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DEVELOPMENT OF RESOURCES AND  
STABILIZATION OF EMPLOYMENT IN THE  
UNITED STATES

PART II. REGIONAL DEVELOPMENT PLANS

JANUARY 1941

NATIONAL RESOURCES PLANNING BOARD

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NATIONAL RESOURCES PLANNING BOARD

UNITED STATES GOVERNMENT PRINTING OFFICE

WASHINGTON, D. C.

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## REGIONAL DEVELOPMENT PLANS

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### FOREWORD

Well considered programs for national development must, of course, reflect local, State, and regional points of view as well as the best judgment of administrative groups and functional policies. This Part IV of the report on *Development of Resources and Stabilization of Employment* reproduces statements on Regional Development Plans prepared in the field in cooperation with Regional and State Planning agencies and with representative citizens.

What is a Region? Americans have always recognized the existence of regions or groups of States within the United States which have distinctive problems or unifying backgrounds. From the earliest Colonial days of the New England Confederation, through the time when the "South" was clearly recognized, down to the more recent realization of great geographic areas like the Dust Bowl, or the Tennessee Valley, we have thought in terms of regions. In 1935, the National Resources Committee issued a report on "Regional Factors in National Planning and Development" which reviewed the many types of regions and regional organization in this country. Since that time, many further efforts have been made to organize regionally or on a sub-national basis for both public and private purposes.

The desire of the National Resources Planning Board and its predecessors to aid decentralized planning has contributed a number of experiments in this field. The Board has organized its field staff in regional centers serving areas with no fixed boundaries and using a variety of different planning methods adapted to the special situations in each area. For strictly administrative and budgetary reasons, the number of "centers" which the Board could staff was limited to 10 located as follows:

1. Boston, Mass., serving New England.
2. Baltimore, Md., serving the Middle

Atlantic Region.

3. Atlanta, Ga., serving the Southeastern Region.

4. Indianapolis, Ind., serving the Ohio-Great Lakes Region.

5. Dallas, Tex., serving the South Central Region.

6. Omaha, Nebr., serving the Missouri Valley.

7. Denver, Colo., serving the Intermountain-Great Plains area.

8. San Francisco, Calif., serving the Southwest.

9. Portland, Oreg., serving the Pacific Northwest.

10. Juneau, Alaska, serving Alaska.

From each of these Field Offices or regional centers, the Board has received preliminary statements of the objectives of regional developments as seen by the Regional Officers of the Board. These programs have been revised, re-worked and expanded during the last year with the cooperation of State planning boards, regional planning commissions, special advisory groups, and with the active assistance of the field representatives of many Federal agencies. The resulting statements are called "Regional Development Plans." They are obviously first approximations of plans rather than full specifications.

The criteria or statements of objective which these Regional Plans suggest for testing public works projects vary as might be expected in accordance with the widely different problems which the regions face. It is hoped that these first statements and the revisions and improvements in these Regional Plans which are already under way may aid in the public understanding of regional points of view towards development projects and aid the Congress in making decisions concerning them.

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THE PROGRAM — REGIONAL DEVELOPMENT PLANS

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PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

NEW ENGLAND

REGION I

BOSTON, MASSACHUSETTS

1940

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Report of the  
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**NATIONAL RESOURCES PLANNING BOARD  
FIELD OFFICE  
BOSTON, MASSACHUSETTS**

September 30, 1940

**Hon. Frederic A. Delano  
Chairman, National Resources Planning Board  
Executive Office of the President  
Washington, D. C.**

**Dear Mr. Delano:**

I transmit herewith copy of a Comprehensive Regional Development Plan for New England, based on objectives adopted by the New England Regional Planning Commission, and compiled from plans and recommendations submitted by the Commission, the State planning boards, Federal agencies, regional organizations interested in the development of water resources, of land resources, of air navigation facilities, of highways, of recreation, and of industry, and other official and unofficial groups. This plan presents the principal objectives toward the achievement of which we believe all public endeavor and private enterprise should be directed.

As a background for these objectives and to make clear the reasons for their selection, we submit in brief form a summary of present conditions and anticipated trends in respect to the people of the Region, where they live and what they do. So far as our research and studies will permit, we have also indicated those lines of attack which offer the greatest opportunity for early attainment of the objectives.

The purpose of a New England Regional Plan is not to spend money, but rather to save it by making sure that such money as is spent will be spent wisely. The function of our plan is not to require that public and private activity be carried on according to the preconceived ideas of a few individuals, but rather to permit the desires and needs of the people as a whole, as expressed through democratic media, to be obtained in an orderly and efficient manner. With these views in mind we have prepared the attached Comprehensive Regional Development Plan for New England.

Sincerely yours,

**VICTOR M. CUTLER**  
*Chairman*

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PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
NEW ENGLAND

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A Ten-Point Program for New England -

Summary Statement

1. Land Use

To bring about better conservation and use of our natural resources, a land utilization program should be adopted to the end that no land capable of producing a profitable crop shall be idle; that those farm lands which, because of poor soil conditions or inaccessibility, are submarginal for farming be withdrawn from cultivation and put to forest or recreation uses; that our 15,000,000 acres of now practically idle woodland be made to produce marketable timber on a paying basis; that erosion be minimized; that full use be made of such mineral deposits as are of sufficient quality and quantity to permit profitable extraction.

2. Recreation

To increase opportunities for recreation for residents and visitors and to develop commercial recreation, efforts should be made wherever practicable to combine with agricultural, forestry, and water resource uses the development of recreational possibilities; adequate public camping and bathing facilities should be provided within easy reach of all urban centers and recreational resorts; historical and scenic sites and all roadsides essentially rural and scenic in character should be protected from harmful exploitation and defacement; the highway system should provide adequate and direct access to all important recreation areas and a system of less direct tourways should provide attractive pleasure routes; picnic areas should be developed at convenient intervals along both; wood and waste lands and water bodies should be so managed as to assure the reproduction of wildlife in numbers sufficient to encourage hunting and fishing and at the same time preserve all native species.

3. Water Use and Control

To assure effective use and control of our water resources, reservoirs should be

constructed, where feasible, near the headwaters of major rivers, and should be supplemented by local protective works and flood plain zoning; pollution should be eliminated where the cost is not out of proportion to the benefits; steps should be taken wherever practicable to conserve low-water flows and to develop water power; water supply reservoirs and their watersheds should be managed on a multiple-use basis to the maximum extent compatible with maintenance of purity of the water supply; steps should be taken to insure maximum steady returns from commercial fisheries.

4. Industry

To stabilize and encourage productive industry appropriate to New England, there should be constant improvement of transportation facilities, service by other utilities, distribution methods, living conditions, taxation, and community interest; such industries should be attracted that large industrial centers will have diversification of types of industry, and small industrial towns will have industry that is peculiarly adapted to local conditions; decentralization of industry and development of local handicrafts and other part-time activities should be encouraged.

5. Housing

To improve living conditions, the present deficiency in decent housing should be overcome by the provision of at least a quarter of a million new housing units; in general, new urban housing should be accompanied by slum clearance; in rural areas, resettlement should be encouraged in areas where such services as water supply, electricity, improved roads, and schooling can be made available within the limits of economic practicability.

6. Transportation

To obtain a satisfactory regional transportation system, the different modes of transportation, highway, rail, water, and air, should be improved and integrated to the end that all traffic is carried by that type of transportation which is best suited



to carry it; a system of airways should be developed according to plans that provide for class 3 fields or better at all existing air transport stops and at other large population centers, for class 2 fields at secondary population centers and all important recreation centers, and for local airports wherever carefully prepared plans show such facilities will be needed for private or commercial flying; a Region-wide highway system should include a coastal limited way running from the New York - Connecticut line into Maine with branches up the Connecticut and Merrimack valleys and to Cape Cod, a network of through secondary routes designed to accommodate tourist traffic as well as to provide local access, and improved farm-to-market roads serving all rural areas well suited to year-round residence.

#### 7. Education

To make New England people happier and more useful citizens, education, available to all youths and adults as well, should include fundamental types of vocational training; community centers for the promotion of literature, music, art, and adult recreational activities should be fostered; instruction in regard to local conditions, resources, planning, and other governmental problems should be included in the curricula of all schools.

#### 8. Welfare

To provide a greater measure of social security, there should be a permanent, co-ordinated program in which all gainfully employed workers would have unemployment and old age insurance; work on carefully planned projects of lasting value to the public would be the basis of relief for those unemployed who are capable of working; and public funds would be set aside regularly to act as a cushion in meeting the fluctuating needs for relief; health should be promoted by making hospitals and other medical services easily assessable to everyone.

#### 9. Defense

To prepare adequately and efficiently to defend ourselves against invasion, our major transportation networks should be so improved that they meet not only peace-time needs but also conform to minimum requirements for defense purposes; expansion of industrial activity and of concomitant business and residential development should proceed along

lines that are in harmony with normal peacetime trends to the extent that this is compatible with defense needs; accurate and up-to-date inventories of natural, industrial, and transportation resources should be kept continually available.

#### 10. Administration

To help bring about more efficient government, and a reduction in the tax load, there should be: community plans and zoning ordinances; public works programming; actively operating municipal planning boards in all cities and all except possibly the smallest towns; and adequately staffed State planning boards functioning as units in the governments of all six States, cooperating with municipal planning boards, and working together, as a regional planning agency, towards the development of a better New England.

#### The Problem

To be sound, any action program must achieve carefully conceived and clearly defined objectives. No matter how exactly engineering plans may be drawn up, no matter how efficiently projects may utilize relief labor, no matter how effectively the spending of public funds may combat depression slumps, these procedures are justified only if they produce public good. Obviously, organized foresight offers the surest method of determining what activities will produce the greatest public good, and public planning agencies have been created with the specific task of exercising this foresight.

One of the primary purposes of a planning agency is to keep clearly before administrative officials, and the public, the major objectives that according to considered public opinion, should be accomplished, at least in part, through government action. In this phase of its work, the planning board's job is one of synthesis. It must take legislative policies, programs of executive agencies, public opinion, and deductions based on impartial research, and fit them into the comprehensive picture of the goal of public endeavor.

After the statement of objectives, the next function of planning is to work out the means for achieving these ends. Lines of action must be indicated and frames of reference must be set up so that the detailed programs of public construction agencies can be harmonized with the general objectives.

From the long range point of view, no public works program can be safely undertaken unless it fits into the comprehensive plan. The special field of public works programming is to determine priorities among the desirable projects, based in part on relative needs and in part on the degree of accomplishment which finances will permit within any given period of time.

Although a large part of any plan is concerned with compensating for past mistakes, another primary phase of planning is the creation of future opportunities. It is not enough to provide, in orderly fashion, for the construction of facilities already badly needed. Government agencies must plan also for the development of facilities that will encourage desirable modifications in the social and economic structure and that will assist established or foster new private enterprises. In addition, planning must aid in making available opportunities for employment that will permit free and intelligent choice by individuals among such occupational fields as agriculture, industry, and other activities largely in private hands.

The need for a comprehensive plan, as contrasted to individual plans for such specific phases of development as highway transportation, flood control, or agriculture, is particularly great in New England, because topography and soil conditions and intensive occupancy have created such an intricate pattern of land use. There are no extensive and unbroken uses of land, either rural or urban, except in some large areas of forest, and even here, recreation has intruded at countless points. Often, exceedingly fertile and profitable farms are entirely surrounded by suburban residences; on the other hand, similar farms may be found in the midst of virtually unutilizable waste land or forest. Although much vacation activity is attracted to key localities particularly well known for seashore, mountain, or historic significance, there is hardly a town in the area that does not include within its borders at least one vacation home or business. Then again, although three-fourths of the industrial establishments are concentrated in the seventy largest cities, the remaining 500 plants are scattered throughout the Region, chiefly in small, river-valley villages.

Since the types of economic activity are so varied and intricately interwoven, it is natural that the transportation and other

facilities that serve the people will be unusually complex. River valleys constitute the basis for much of the transportation pattern, but densely built-up cities, compact mill villages, power dams, and water supply reservoirs, not to mention floods, all compete for occupation of the narrow strips of river bottom land. In preparing a plan for the uses of land and the provision of facilities in such a river valley, all these uses must be considered in relation to each other, and in relation to the value of the land itself for agricultural purposes.

Similarly, the development of recreational facilities along almost any stretches of New England streams cannot be wisely planned until considered in the light of possible uses of the same streams for water supply, flood control reservoirs, or for carrying pollution. Areas of level land large enough for airports are rare throughout most of New England; yet there are places in New England where the use of such areas as airports had to be carefully weighed against possibly more desirable uses as recreational parks, industrial sites, fair grounds, or crop lands. In such considerations, availability of alternate sites, transportation facilities, and future needs for air facilities must inevitably play an important part. Still another example of this same complexity may be found in rural areas where there is admixture of farm and estate or summer home use. The provision of local and long distance access, of local facilities, and of schools depends greatly upon the distribution, existing and anticipated, of these uses; at the same time, the future distribution of these uses will depend upon how the provision of facilities is handled.

Because so many different types of use compete for occupancy of the relatively small proportion of good land in New England, because the streams of the Region, abundant as they are, must perform so many different and often conflicting services, and because the provision of transportation facilities depends so directly upon how these other problems are, and will be, solved, comprehensive planning is indispensable to New England.

The basic purposes of a regional plan are, then, to coordinate all lines of development into an integrated program, to consider this program in the light of both present deficiencies and long-term needs, and to evaluate all elements of the program

in terms of public good. These purposes have been kept in view in the preparation of this New England regional development plan.

### The People

It has already been pointed out that the only real criterion of a project is the extent to which it benefits the people. Hence all planning must be based directly on an analysis of the people and their needs.

New England, predominantly urban, has within its borders three of the four most densely populated States in the country (Rhode Island, Massachusetts, and Connecticut); on the other hand, it has one of the largest forested wilderness areas (northern Maine). Yet, except in this uninhabited area and in the widely varying population aggregates, the pattern of population centers; small industrial towns, farms, and forests is fairly uniform throughout the entire Region.

New England people are heterogeneous. About one-third of the population of 8.5 million was born outside of New England; of these; 6 percent was born in other parts of this country, another 6 percent came from Canada, 5 percent from the British Isles, and 10 percent from various parts of Europe. More than 2 million of the native-born are of foreign parentage. That New England has been unable to absorb completely this high percentage of foreigners is attested by the fact that a smaller proportion is naturalized and able to speak English than in other parts of the United States.

The population of New England is practically stabilized. Natural population increase is now almost negligible (less than 4 percent during the past decade); yet the birth rate, the proportion of children, and the rate of natural increase, low as they are, have changed little during the past thirty or forty years. The net amount of migration to and from New England is relatively small, having dropped from a net immigration (principally from Europe) of about half a million in the 1900-1910 decade to practically no net migration between 1930 and 1940.

In the past, both foreign immigrants and people of rural New England have flocked to the industrial cities in search of work. The problems occasioned by the decline in rural population have only recently been overshadowed by the urban population problems caused by the industrial depression of the

past few years. The urban difficulties are being lessened by the recent migration of population from large to small cities and towns, concomitant with the movement toward decentralization of industry. Increased use of the land for recreation and part-time farming has also counteracted, in part, the downward trend in rural economic activity and population growth.

The significance of the trend toward decentralization of population is borne out by the 1940 population figures which show that for the first time in many decades, the rate of increase of the three northern, or rural, States has exceeded that of the three southern, or industrial, States; that of the total population increase between 1930 and 1940, only 34 percent was accounted for by places of more than 10,000, whereas such places accounted for 81 percent of the gain during the previous decade; that nearly a third of the places of more than 10,000 people lost population during the decade; and that the net gain for all places in that population class was only one and one-half percent, less than half that for the Region as a whole.

There can be no doubt that this recent decentralization has been caused, in the main, by distress conditions. Nevertheless, there is good reason to expect that the trend will continue; it should be fostered rather than discouraged. Living conditions are better in the less congested places, and needed services can be provided just as readily. Industries of certain types have already shown willingness, if not distinct inclination, to locate in the smaller cities and towns. Although there is not likely to be any great change in the population pattern in so stabilized an area as New England, definitely rural areas and the more congested cities will probably show slight decreases and most smaller cities and towns will continue to show increases in population during the next decade or two.

Analysis of employment trends shows little marked change in the total percentage of gainfully employed over the past few decades. The proportion of workers has consistently stood at about 42 percent of the total population. There has been, however, an appreciable increase in the proportion engaged in the service occupations, such as transportation, trade, and "white collar" jobs, and a corresponding decrease within such primary occupations as manufacturing, farming, and forestry. Thirty years ago,

nearly 60 percent of all employed persons were engaged in manufacturing or the cultivation or extraction of natural resources; today, that figure is probably less than 50 percent.

The most significant recent trend in employment is one that does not show up in general classification figures, namely, an increase in the proportion of those with multiple sources of income. Because of the instability of employment during the past decade, thousands have had to resort to combinations of part-time farming, industrial work, and service occupations, in whatever proportions seemed most practical. Mixed occupations, especially farming in combination with either industry or recreational service, will undoubtedly continue and increase as the means of livelihood for large numbers of families, especially in rural areas.

Revival of industrial employment, or at least check of its present decline, is essential if New England is to maintain any degree of prosperity. To accomplish this, industry must be placed on a firmer footing, and this, in turn, must be preceded by improvement of the industrial environment and increase, wherever possible, in the number and types of industry dependent upon local resources. The greatest opportunities for industrial employment will be in those places where industry is most closely tied to local resources and skills; where housing and local municipal services are most favorable to industry; where municipal development has been such as to maintain a sound financial structure; where easy access is provided by modern transportation facilities.

Agricultural employment will undoubtedly continue to decline, although the decline will be in part, perhaps in large measure, offset by part-time farming and forestry. At the same time that the soil and the topography indicate a need for retirement of much land from agriculture, and hence for reduction of full-time farming, the distinct possibilities for obtaining income supplementary to agriculture point to increases in the practice of part-time farming and partial-subsistence farming. The most fruitful sources of supplemental income, besides local industry, will be recreational service, forestry, and local handicrafts.

The hurricane of 1938 made New England much more forest-conscious than it had ever been. Revision of laws relating to forest-

ry, and improvement of marketing methods will do much to increase the possibilities for employment in this field.

Local handicrafts have suffered because of the over-emphasis on mass production during the decade of the twenties, and because of the emphasis, in the field of agriculture, on cash crop specialization. The increased popularity of cooperatives as a marketing medium for small producers, the advent of educational programs emphasizing the opportunities for, and the ways of carrying on, home industries, and the natural increase in self-reliance that is born of financial hardship will do much to revive and strengthen handicraft industries as a supplemental source of income.

The field of employment that is most likely to expand in the near future is the business of providing recreational services. Already, the gross income from recreation in New England is greater than that from any other class of economic endeavor except manufacturing. Throughout the Region, the funds attributable to tourists, vacationists, and summer home owners have played a significant part in offsetting decreases in agricultural, forestry, and manufacturing income. As the cash needs of rural families increase and as the rural non-farm population increases, recreation will become an even more important factor than it now is in the economy of the Region. Because of this, the conservation and development of New England resources will have to give more and more weight to items of recreational significance.

To sum up: The population of New England, fundamentally stable, will undergo no marked changes in composition, distribution, or employment. The most significant changes in population composition will be a decrease in the proportion of young people, a corresponding increase in the proportion of older people, and a decrease in the proportion of foreign-born. Distributional changes will effect population increases in the small towns and cities at the expense of large urban centers and scattered rural settlements. The greatest increases in employment opportunities will be in the fields of recreation, forest production, and manufacture that utilizes local raw materials. People will have to rely less upon the opportunities created by rapidly expanding markets and more upon the resources of the Region and their own resourcefulness.

## The Plan

### Land Use

#### Objective

To bring about better conservation and use of our natural resources, a land utilization program should be adopted to the end that no land capable of producing a profitable crop shall be idle; that those farm lands which, because of poor soil conditions or inaccessibility, are submarginal for farming be withdrawn from cultivation and put to forest or recreation uses; that our 15,000,000 acres of now practically idle woodland be made to produce marketable timber on a paying basis; that erosion be minimized; that full use be made of such mineral deposits as are of sufficient quality and quantity to permit profitable extraction.

#### Existing Conditions

Physical and economic factors have united to alleviate the "one crop" farming problem in New England. Small farms and small scale operations, with flexible methods of procedure, have been prevalent because topography, soil, marketing opportunities, and transportation facilities vary greatly within small areas. Moreover, reasonably favorable climatic and marketing conditions are conducive to the production of a wide variety of crops. In a few sections, there are found dominant crops, but commonly there is evidence of adjustment to diverse conditions as in dairy farming, the leading type of farming in New England. In this case, hillsides and poor soils are continuously in pasture, while the better soils are used to grow feed and sometimes supplementary crops. Diversification has reached into the farm woodlot, which provides a tenth of the farm products income in New England.

Agricultural economy, particularly on small farms, depends upon the balance between cash-crop income and part-time labor income. Nearly half the New England farmers earn a substantial part of their income by work off the farm. The depression years showed a distinct return to farming, particularly for part-time operation. The area of New England farm land has decreased from more than twenty to fifteen and a half million acres (1935), although the number of farms has not shrunk proportionally. The reduction has been economically prudent and

has resulted in better returns per acre; nevertheless, even further reduction will be necessary to meet the demands of existing economic conditions.

The forested lands, whether once cleared or not, have practically all been logged, and, in at least two-thirds of the forest, the growing stock has been depleted. In northern New England and on public forests elsewhere, there has been attained in large measure practical adjustment between the existing economic conditions and the natural forest conditions. The pulpwood-producing spruce and fir regions have readily lent themselves to this adjustment because cropping rotations are short, thirty years or less, and the owners hold large blocks. Outside the pulpwood regions, the average forest holding of each owner is small, probably less than 100 acres. Because these small holdings are so scattered, the manufacturer finds it difficult to establish contact with the various owners, and the owners themselves cannot easily consolidate their holdings to operate on a sustained-yield basis. By these circumstances, forest enterprise is heavily handicapped. At present, New England forest land is producing only one-fourth as much marketable wood as it is capable of growing, yet forestry is the most intensive type of land use feasible on about 75 percent of the area of the Region.

Mineral resources have never attained primary importance in New England. Nevertheless in a number of localities, intensive mineral extraction has supported vital local industries. The granite, marble, slate, and mica deposits are well recognized commercial assets, and in combination with other rock, clay, and gravel products, they contribute substantially to the economic life of the Region. In Vermont, quarrying constitutes the principal industry. Since New England mineral deposits are commonly believed to be of little present value, there has not been any complete listing of them. Extensive data on their character and coverage should be gathered, although the fact that deposits are often hidden by a blanket of glacial till may make research somewhat difficult.

#### Needs

The abandonment of the poorer soils in New England and the selection of crops suitable for disposal in the local markets have been in part adjustments to meet emergencies and in part the result of guidance by agri-

cultural leaders. The continuance of this guidance must be relied upon to enable the farmers to keep pace with future marketing developments. Experience has demonstrated that habit and custom are fallacious guides in choosing successful crops; and there are definite indications, such as the popular reception given to the county land use planning committees, that farmers welcome qualified advice and cooperative analysis of farm problems with a view to adjustment to soil and market conditions. Outstanding among the adjustments that should be anticipated is a further reduction of the present area of tillage and pasture land by perhaps as much as one-fourth. This will simply continue the reversion of inferior or depleted soils to forest.

Part-time farming is a logical adjustment and deserves encouragement wherever leaders agree that the practice fits into the local economy. Complete subsistence farming, an ideal intriguing to some, rarely exists, since individuals desire so many of the auxiliary comforts not obtainable except through cash outlay. Part-time farming, however, is eminently practicable wherever tillable soils can be found near dependable sources of supplementary income.

Soil erosion and soil conservation problems, although acute only in certain sections of New England, demand recognition and action to prevent both inconspicuous, insidious sheet erosion and the more spectacular riverbank erosion from destroying valuable and irreplaceable assets.

Mineral industries will find revival in the development of new uses rather than in rehabilitation within the present fields of use. Mineral resources must be surveyed and listed, their properties analyzed, their uses indicated, and finally their commercial value determined.

The less intensive land uses, forestry, recreation, and wildlife, do not, in spite of recent improvements, measure up to their economic and social possibilities. As both forestry and wildlife management depend on sustained yield at a low cost per acre, costs must be kept low by relying upon inexpensive methods of controlling natural forces and conditions. Such techniques are tested and proven slowly and seldom lend themselves to spectacular demonstration. This inevitably results in a slow increase in public understanding and application of these methods. Other deterrents to the application of improved methods of forestry

and of wildlife management are: the handicap, in most of New England, of forest ownership in small blocks; the lack of any assurance that a long-term investment will be protected by reasonably stable market prices at the time the crop becomes salable; and the fact that, although the forest fire menace has been greatly reduced, that of insects and diseases has not been so successfully checked.

There is acute need of some means of materially improving the forests in private ownership. Each of the three types of forest land in New England requires a different method of attack: farm woodlots (7,500,000 acres), small commercial woodlands (10,000,000 acres or more), and large commercial forests (about 10,000,000 acres).

Owners of large commercial timberland are primarily interested in informational programs, fire, pest, and disease protection, and the execution of the national forest survey in New England. Farm woodlot owners can be helped through the Extension Service. The ground work for intensive activity has already been well prepared in most New England States, but many more extension foresters are needed throughout the Region. Finally, the most baffling problem is that of reaching the small block owners, who hold more than one-third of New England forests but who usually live at some distance from their woodland and are not easily stirred to action.

The management of forest land according to principles of sustained yield cannot be successfully accomplished in New England until there has been developed a method of consolidating the administrations of many small forest properties to gain the needed continuity and uniformity of operation. These working circles, as the forester names them, should be established as geographical areas within which the timber produced is earmarked for certain wood-working mills. Application of the working-circle control of sustained-yield practices wins for the forest owner a steady and dependable market for his timber, and for the people in the vicinity continuous and stable employment.

#### *Recommended Action*

Diversification of agricultural crops is desirable in this Region, and therefore should be facilitated by such subsidies as conservation payments, so long as they do not exceed the benefits from permanent improvements to the farm. Agricultural production can also be guided by continuing

such activities as extension work, land classification, and county land use planning.

Rural wellbeing and economy of town government can be improved by applying such rural zoning principles as can be adapted to New England conditions. This may require the development of a system wherein the State prepares the rural zoning map and ordinance and submits them to the town for approval before they shall become effective. In the instances where municipal economies can be quickly realized by resettlement of remote families, State or Federal funds for this purpose should be available to the town, which can repay the loan from a portion of the savings realized.

Forest taxation should be revised, but a revision based only upon the problems of the forest owner will be unfair to other taxpayers and may unduly curtail the income of rural towns where there are large areas of forest. Therefore, the vitally important forest taxation question must be approached through an exhaustive study of the entire tax system and of the effects that reduction of annual forest taxes would have upon the revenues and administration of rural towns. It is possible that a State or Federal bond issue could provide funds for the operation of a municipal government until the forest-yield or severance taxes were being paid steadily enough to make the municipality self-sustaining again, and eventually to permit repayment of the sums advanced.

Private ownership of forestland should be given encouragement commensurate with efficient production of wood crops. Inevitably, future forest crops will be protected by reasonable public control of private cutting operations, either by State or Federal programs. At the same time, more intensive efforts must be made to bring into efficient production the many small woodland holdings and to make better marketing outlets available. A system of governmental leasing of private forest land has been suggested as a means of achieving this; conservation payments have also been mentioned as a possible means of attaining the same objective. Both methods, however, are unwieldy.

Meanwhile, some woodland owners have turned to a cooperative method of administering forest properties, a method that has been encouraged by governmental agencies. Such cooperatives usually perform the important service of finding and holding markets for wood products and also advising the

owners how to practice forestry. While active groups in New Hampshire, Massachusetts, and Connecticut are vigorously attacking State-wide forestry problems, adaptation to local conditions is essential, and cooperative or other local procedures, based on owner responsibility, need to be adopted throughout New England. These may be carried out by groups working under the guidance of State-wide agencies or by such groups as the county land use planning committees. In some places, these committees have already installed improved forestry practices, and they may become the most fitting intermediaries to work with the owners of farm woodlots and of small commercial forests.

Any organization which promotes private forestry will need to supplement its activities by issuing publications that give in simple form the rudiments of forest management. This practical instruction must be explicit, for it is the owner who, if he reads and applies the precepts outlined, stands to gain or lose. Vague theories confuse the forest land owner. He prefers plain facts based on actual forest management experience in New England. Then he can see how closely the advice can be followed in dealing with the conditions prevalent in his own locality.

The importance of topographic mapping and geologic surveys has been too little appreciated by State governments. Hence the burden of such projects, if they are to be executed, rests largely upon the Federal Government. Consequently, the Federal Government must increase its percentage of Federal subsidy, particularly in cooperative geologic surveys, unless interested groups within the States can find more effective ways of convincing their legislatures of the common sense of underwriting the cost.

#### Recreation

##### *Objective*

To increase opportunities for recreation for residents and visitors and to develop commercial recreation, efforts should be made wherever practicable to combine with agricultural, forestry, and water resource uses the development of recreational possibilities; adequate public camping and bathing facilities should be provided within easy reach of all urban centers and recreational resorts; historical and scenic sites and all roadsides essentially rural and scenic in character should be protected from harmful exploitation and defacement; the

highway system should provide adequate and direct access to all important recreation areas and a system of less direct tourways should provide attractive pleasure routes; picnic areas should be developed at convenient intervals along both; wood and waste lands; and water bodies should be so managed as to assure the reproduction of wildlife in numbers sufficient to encourage hunting and fishing and at the same time preserve all native species.

#### Existing Conditions

It is well known that New England contains within a day's drive a myriad of points of scenic attraction. But the fact that seacoast, lakes, and mountains are interspersed with an attractive countryside is of greater importance, since this makes travel between spectacular points of interest a pleasant ride through varied surroundings dotted by farms, forests, or villages, making a pattern of endless mosaic.

These assets draw three million people a year from other parts of the country, who spend here about half a billion dollars annually. This is one-fifteenth of the money spent in the United States for recreation. The present volume of this business, rated as second in importance in New England, has been attained by the slow but steady growth of commercial ventures catering to the recreation seeker.

Commercial recreational business is largely a part-time activity, because the summer season lasts three months or less. Increase in the numbers of auto camps and wayside stands, spread of tourist homes and boarding houses, and sporadic improvement of existing facilities are the only signs of modernization in travelers' accommodations provided by commercial enterprise during the past twenty years. Meanwhile, most of the recreation travelers have turned from the railroads to the highways, a trend belatedly checked by provision of faster, air-conditioned trains. The highway traveler now goes touring, makes short stops, and more often than not chooses inexpensive accommodations. As a result, the summer hotel owners have found their veranda rocking chairs empty, week-long and month-long guests rare, and perforce have welcomed a more mobile clientele, ever restless to move on. Farmers and townspeople in favorable locations compete with hotels and resorts for this overnight trade.

When on the highway, many recreation

seekers have found that rural areas and remote lakes and ponds are as interesting as well-known resorts and perhaps more restful. Therefore, the still rapidly growing recreation business has become widely dispersed, comprises many small establishments, and is a significant source of employment in rural sections.

At all seasons, man-made as well as natural spectacles prove dependable crowd-gathering attractions. Such spectator interest draws crowds to races, fairs, carnivals, and theatres, to mountains, seashores, and lakes. With the automobile for a vehicle, the spectator goes touring to view many scenes, and makes short stops that end as soon as local attractions pall.

Tourists have found that the appearance, and at times the capacity, of main access roads make them unattractive as pleasure routes. Seeking by-ways for more interesting scenery and for more leisurely travel, the tourist has discovered that many especially attractive pleasure routes, or "tourways," are inadequately marked. Likewise, the increased number of travelers threatens to overcrowd points of noteworthy scenic or historic interest and makes imperative the furnishing of additional picnic areas, camp grounds, bathing areas, and other facilities.

The seasonal influx of highway travelers has prompted, in many cases, unwisely conceived or low-grade commercial enterprises that destroy the scenic values inherent in an unspoiled countryside.

#### Needs

While a great deal of effort is and should be expended in serving the money-spending tourists from outside the Region, probably too little is expended in better serving the recreational needs of the large urban populations within New England. In the studies of parks, parkways, and recreational areas conducted by the National Park Service in cooperation with the various States, the recreational resources and needs of New England have recently been thoroughly explored for the first time. The cities have made progress in the provision of in-town playgrounds for children, but it is safe to say that adequate recreational opportunity for both youth and adult has not been attained in any city.

The public interest plainly justifies the provision of recreational facilities near urban centers to make out-door recreation possible for large population groups. Else-



where throughout New England, well selected and properly located open spaces will benefit the general public and the commercial recreation interests as well. Naturally, facilities will vary to fit circumstances, but especial concern should be accorded picnic, bathing, boating, and scenic sites, winter sports, hiking, hunting, and fishing.

Adequate direct access to sections of recreational importance should be provided by continuous development of the through highway system, and notably by construction of the coastal freeway from New York to Bar Harbor. Along the roads approaching recreational areas, the scenery and the attractiveness of the countryside require control so that needless eye-sores cannot endure. Routes through the best of New England scenery will be most easily followed if clearly marked as tourways. Rural parkways planned to fit the topography are the most effective publicity for local scenic assets. A continuous rural highland parkway, touching the Berkshire, Green and White Mountain ranges and continuing through the Maine wildlands past Katahdin to eastern Maine, could well be laid out as a national parkway. If such a parkway were built and supplemented by attractively developed State parkways and other access highways, and if the many scenic roads already available were well marked, an ideal road system for satisfying the human desire for travel would then exist in New England.

The establishment of public parks and the equipment of other open spaces with recreational facilities can be an asset to commercial interests if properly guided. On the other hand, so long as commercial interests do not know what policies will guide the establishment or future expansion of parks, there is real uncertainty concerning the competition which the public park may offer. This complicated problem must be adjusted to fit local conditions, but there is need of a clearer park development policy, which is as vital a factor as the determination of suitable fees or insistence on landscaping.

#### *Recommended Action*

Selection of land for public recreational use can readily conform to land-use plans. The result is a happy combination of improved land use coincident with provision of improved public facilities for picnicking, camping, and water sports. Particularly in New England, it is usually possible to choose

park or picnic areas where other intensive use is impracticable and occasionally, where land is tax delinquent. Moreover, in the large park areas, there is an excellent opportunity to apply multiple-use principles by developing simultaneously recreational, wildlife, and forestry resources. Along the coast, prompt control measures can preserve for public use and enjoyment enough beaches and other seashore features before intensive private occupation usurps them.

Many features of the recreational program can be administered best by State authorities, particularly where policy adjustments are desirable in view of local commercial recreational enterprises. Each New England State, when working out its own recreational programs, can profit by adopting certain of the methods followed by one or another of the other States in establishing and operating State parks.

Since New England has a real asset in its potential forest crop, park administration or recreational use should prohibit selective cutting of merchantable trees only in small areas especially valuable for recreation.

Marked tourways, rural parkways, and improved access roads must receive constant attention if recreational assets are to be developed continuously so that they may draw desirable summer visitors.

The provision of picnic facilities at many widely scattered points, which is emphasized in Connecticut and Maine, is worthy of review and adaptation to local conditions in other States.

Scenic control of the roadside is possible by means of freeway legislation in Connecticut, Maine, and Rhode Island. Another way of gaining this control is by the purchase of easements, as along Route 100 in Vermont. But additional means must be found to protect scenic assets along the highways. Perhaps rural zoning can be introduced promptly enough to keep the country charms from deteriorating; otherwise immediate control lies in the passage of State legislation to guard scenic roadsides through application of strip zoning.

In the future, wildlife resources will be controlled more effectively because of progress in scientific management. Proper application of these management methods should be encouraged and conducted in accord with principles of multiple use. More particularly, fish and game laws in contiguous States will be revised so that they harmon-

ize; and where it is desirable to have special hunting and fishing areas, as in Connecticut, such areas will be selected with increasing regard for other land uses. Public hunting and fishing areas, either State owned or leased, will usually either be selected in locations where multiple use is feasible or located on little used or waste land. Meanwhile, private owners should be urged to improve the wildlife on their lands and to reimburse themselves by charging fees to hunters and fishermen.

#### Water Use and Control

##### Objective

To assure effective use and control of our water resources, reservoirs should be constructed near the headwaters of the Connecticut, the Merrimack, and, where feasible, of other major rivers, and should be supplemented by local protective works and flood plain zoning; pollution should be eliminated where the cost is not out of proportion to the benefits; steps should be taken wherever practicable to conserve low water flows and to develop water power; water supply reservoirs and their watersheds should be managed on a multiple-use basis to the maximum extent compatible with maintenance of purity of the water supply; steps should be taken to insure maximum steady returns from commercial fisheries.

##### Existing Conditions

New England is a well-watered region with an annual rainfall in excess of 40 inches, almost evenly distributed throughout the year. Severe droughts rarely reduce the annual precipitation to less than two-thirds of its normal amount. Destructive floods are frequent, though irregular, visitants; they are associated either with tropical hurricanes that impinge upon the shores of New England in the fall of the year or with spring thaws that discharge the winter snow from the uplands of the Region.

In the development of its water resources, New England pays the penalty for early settlement and industrial exploitation, which employed mechanical rather than electrical transmission of power, and for the establishment of textile and paper-making industries that utilize large volumes of water for washing or scouring purposes and so pollute the streams. Both these types of development have crowded factories and municipalities into stream valleys and augmented

the hazards of floods.

About 90 percent of the population is served by public water supplies. The numbers of ground-water and surface-water sources are about equal, but about three-quarters of the population uses surface water. Only about 10 percent of the water works include treatment by filtration, because surface supplies are obtained, with rare exceptions, from sparsely inhabited upland areas.

Most of the large communities in New England possess sewerage systems, but many have inadequate or no treatment. These and the industrial developments are responsible for the high degree of pollution of the larger streams and tidal estuaries. Damage to both commercial and recreational fisheries, which is assuming large proportions, is traceable to lag in adoption of such remedial measures as treatment of the polluting waters.

While there has been a strong shift in the development of power from individualized works that serve isolated or communal industries to central hydro-electric and steam stations, it has been difficult to liquidate early investments in water power without displacement of industries. Rural electrification lags.

The control of destructive floods as a planned engineering undertaking is of relatively recent origin, following in the wake of a series of disasters of unusual magnitude. The conservation of water for regulation of low water flows has, so far, been almost entirely for the purpose of power development and not for the improvement of navigation, recreation, or abatement of dry-weather pollution.

On the whole, existing conditions are attributable to individualistic exploitation of water resources. Aside from its historical basis, this state of affairs is due also to the lack of coincidence of political and hydrological boundaries. Few catchment areas of any importance lie wholly within one State. The mechanism for cooperative efforts between States has always been clumsy, and laudable undertakings have often foundered.

##### Needs.

The most obvious need in the development of the water resources of New England is the construction of new projects for and adaptation of existing works to multiple use. Beginning with the projects of greatest magnitude, namely the flood control works that are now under construction or in contempla-

tion, provision should be made for coverage of all economically sound services: flood control, power, water supply, low water regulation, and recreation. The responsibilities associated with water use and control should be assigned neither upstream nor downstream in their entirety. Development should be well balanced. Flood control, for example, is attainable (1) by upstream storage of flood waters in reservoirs, (2) by improvements of river channels and flood-protection works, and (3) by zoning of the flood plain. Adherence to the first method alone would place the major burden of change upon upstream areas; adherence to the last two would impose it downstream. In a similar manner, pollution control by interception of waste waters and discharge into the lower river reaches or into tidal estuaries should be balanced against construction of treatment works at or near the point of waste production.

Reasonable and full development of the water resources of New England must be integrated into the general plan for the Region. Water supplies are affected in quality and quantity by land use and affect land use in their turn. Similar inter-relationships exist in connection with recreation, industry, services and utilities, transportation, preservation of wildlife, and control of mosquitoes and other nuisances.

#### *Recommended Action*

Comprehensive river development is predicated upon the establishment of a properly constituted valley-wide agency that will initiate, or allocate, or reconcile the various proposed uses of the water resources that lie within a given drainage basin. An important function of such an agency is the development of a far-sighted, comprehensive, and flexible river plan and the fitting of projects into the plan with due regard to changing needs and requirements.

Because of the great variety of ways in which the water resources of a region touch upon the life of the region, the spheres of activity and authority of different governmental agencies must necessarily overlap. While it might be possible to centralize activities in one valley authority, it is doubtful whether such centralization would be desirable. What appears to be needed is a mechanism that will facilitate consultation between the different agencies, Federal, State, municipal, and private, and will also establish procedures for assigning to

the appropriate agency or agencies responsibility for the construction, operation, and financing of a given project.

The National Resources Planning Board's drainage basin committees, and such interstate organizations as the Interstate Commission on the Delaware River Basin and the Interstate Sanitation Commission (New York, New Jersey, and Connecticut) are examples of the type of agency needed, although they do not yet have the responsibility for coordinating multiple uses and apportioning benefits which will eventually prove necessary.

#### *Industry*

##### *Objective*

To stabilize and encourage productive industry appropriate to New England, there should be constant improvement of transportation facilities, service by other utilities, distribution methods, living conditions, taxation, and community interest; such industries should be attracted that large industrial centers will have diversification of types of industry, and small industrial towns will have industry that is peculiarly adapted to local conditions; decentralization of industry and development of local handicrafts and other part-time activities should be encouraged.

##### *Existing Conditions*

New England is predominantly an industrial area. In recent years, its developmental efforts have been directed primarily at regaining the industrial supremacy which it enjoyed for about a century. That industrial employment be maintained at its present level, or even a higher one, is essential to the future well-being of the Region. Trends indicate that this will be possible only if the present transition results in the establishment of types of industrial activity better suited to New England conditions than those which have recently experienced such sharp declines. Then again, the industrial security of the Region will require more diversification and more decentralization than now.

New England industry was founded on such local resources as water power, pure water for processing, and wood; it prospered because of proximity to large markets and because the industrialists of the Region exhibited enterprise and skill. Today, most of these factors have changed: small water-power installations are often not economi-

cal; many of the streams are polluted; the timber supply has been greatly depleted; marketing conditions have been completely changed through the advent of improved transportation methods; in many respects, owners and operators have failed to make the adjustments necessary to keep abreast of the times.

Where timely adjustments have not been made, small, one-industry villages have suffered severely when economic conditions have attracted their sole means of support elsewhere, or when changed customs have reduced to almost nothing the demand for the particular commodity manufactured. In the same way, large industrial cities and even regions have suffered tremendously from the effects of such significant changes in the industrial structure as the migration of the cotton industry to the South. Yet, where management has been alert, these blows to New England industry have been averted, or healed, by substitution of new types of manufacturing.

#### Needs

It is likely that there will be further industrial migrations from New England. To avert calamitous results in such instances, efforts should be bent toward wider diversification of industry in all industrial centers throughout the Region. The need today is not to attract more industries of the types that are already established so much as it is to attract or develop new and varied types of industry.

One of the most critical industrial situations today is created by the scores of abandoned factory buildings now on the market. In many cases, those buildings offer excellent quarters for new industry, and all efforts, short of outright subsidy, to get tenants for them should be encouraged. But in many, perhaps more, cases, buildings are so old, so out of repair, or so ill adapted to modern industrial requirements that they cannot rightfully be expected to serve further industrial use. To establish new industries in these buildings would be to invite trouble. One of New England's greatest needs in the field of industry is to "write off of the books" and destroy the obsolete vacant industrial plants.

Efforts to establish industry on what turned out to be weak foundations have produced difficulties. Attraction of an industry by some sort of financial inducement when there are no fundamental assets to hold

it has often been temporarily successful but has rarely resulted in permanent benefit to the community. Industrial development or rehabilitation will depend increasingly upon specifically favorable local conditions, such as availability of raw materials, ready access to markets, availability of supplies of skilled labor, and provision by the community of needed services and facilities.

A phase of industrial activity which has received too little attention is the development of handicrafts and small home industries as both part-time and full-time occupations. Widespread encouragement of this type of work through educational training and through organization of market outlets is needed to turn spare time, latent skills, and unused resources into supplemental sources of income.

Although New England industry has long depended on the abundance of skilled labor as one of its chief assets, the Region is no longer so outstanding in this respect. Vocational training, including some apprentice work, is greatly needed if the skills which are so important to New England are to be maintained. At the same time, research, the development of new industrial methods, and the manufacture of new products, which were so characteristic of New England in the past, must not lag if the Region, deficient in most natural resources needed by industry, is to retain its high place in the industrial field.

#### Recommended Action

Inventories of industrial assets and opportunities, similar to those already made in some localities, should be made for all New England. Such inventories should place more emphasis on local resources, physical, social, and financial conditions of the community, and opportunities for future development than on vacant plants and past industrial performance.

Vocational education and opportunities for apprentice training, such as are now available in many industrial centers, should be made more generally available throughout the Region. In the less populated areas, State subsidy of such training courses as part of local school curricula may be necessary. Training of this sort should be easily accessible to adults as well as to youth.

Industrial research, based on, and integrated with, the inventories of natural resources recommended in the land-use section, should be continued with increasing emphasis by development agencies, educational insti-

tutions, and the industries themselves. This research should aim to develop more efficient ways of carrying on existing lines of manufacture as well as to discover new products that will make use of natural resources or industrial by-products.

If industrial promotion work is to bring lasting results, a larger proportion of available funds should be spent on improving the basic qualities and environment of potential sites, and less on calling attention to the mere existence of the sites. To attract new or to hold existing industries, New England towns and cities must offer good living conditions, modern public services, adequate transportation facilities, and sound governmental and financial structure.

#### Housing

##### Objective

To improve living conditions, the present deficiency in decent housing should be overcome by the provision of at least a quarter of a million new housing units; in general, new urban housing should be accompanied by slum clearance; in rural areas, where such services as water supply, electricity, improved roads, and schooling can be made available within the limits of economic practicability.

##### Existing Conditions

Housing difficulties in New England relate rather to the quality than to the quantity of the homes. Where there is demand for new housing units, aside from replacements, it is usually in connection with industrial expansion due to national defense contracts. Urban housing, except in some of the mill cities and towns, is probably equal to or above the United States average. Many cities, especially these mill centers, do, however, contain slums of the worst type from the standpoints of construction and sanitation.

Rural houses in New England, on the other hand, are among the best in the country, in both construction and maintenance as well as in equipment with such services as water, telephone, and electricity. Exception must be made in the case of the colonies of tar paper shacks that have sprung up in many places, largely in the last decade.

In suburban areas, housing is generally good. Nevertheless, small lots offer some difficulties, chiefly where rows of multiple dwellings erected on narrow lots have added

tremendously to the problems of sanitation and fire and police protection. Again, the community tax base has been seriously disrupted in some suburban areas where the location of colonies of small bungalows on isolated back roads has made the cost of providing services unreasonably high in proportion to the amount of taxes they produce. The large, ornate houses of the last half of the nineteenth century are sources of embarrassment in many suburbs. People who can afford to maintain them will not live in them; and situated as they usually are, they cannot be remodeled for other than single-family use because of zoning restrictions.

##### Needs

Adequate housing for the lower income groups is one of the most pressing needs in New England today. Construction costs are so high that it is virtually impossible to provide new dwelling units for really low rentals, and many of the existing units are definitely sub-standard.

In urban areas, there should be gradual but steady abolition of slums. Where replacement of eliminated units is necessary, new housing should be so located, built, and protected that the passage of a few years will not result in the formation of another slum.

Measures are needed to prevent further spread of ribbon development of rural slums along main highways. In isolated rural areas where a decent livelihood under today's economic conditions can no longer be obtained from the land, there is likely to be need of resettlement, preferably along improved roads; following the resettlement, the original property should probably be allocated to recreational uses.

Suburban housing should be protected unwarranted encroachment by business and industry. Better control of subdivisions is desirable, not only by review of individual plats, but also, if possible, by prevention of over-subdivision during boom periods. In addition, there is need to curb developments in architectural style and construction which might render livable homes obsolete in the eyes of the public, for houses which the public shuns add to the burden of unnecessary depreciation in taxable real estate.

##### Recommended Action

To remedy deficiencies in housing for those in the lower income brackets there should be:

1. A thoroughgoing attempt to provide really low-cost housing on a self-liquidating basis.

True low-cost housing cannot be provided by building housing units singly or in small groups under present construction conditions. The success of such a self-liquidating program will depend on the extent to which modern methods of mass production are utilized. To permit this, building codes in many places must be liberalized.

2. A further trial of public subsidy of low-cost housing.

The extent of public subsidy necessary is largely determined by the degree of success of the self-liquidating program. It is obvious, however, that housing for people in the lowest income groups will have to be subsidized on some basis if they are to have decent homes. And it is probable that unless present building practices, labor conditions, and prices are radically altered, some form of subsidy must be made available if home ownership or adequate housing is to be provided for those who earn no more than the standard minimum wage.

3. Mortgage funds for long-term loans.

An indispensable factor of a low-cost housing program is encouragement of home ownership by those in a position to benefit by it. Loan funds should therefore be made available on terms adapted to the financial resources of those with small incomes.

4. Slum clearance.

No program to improve conditions in low-cost housing can be considered adequate that does not provide for the removal of definitely sub-standard housing. This should be undertaken as fast as new units can be constructed.

5. Decentralization of low-cost housing.

Since industrial areas in New England usually consist of a central city and several satellite towns, low-cost housing developments should be distributed as widely as possible to avoid over-building any one municipality with small houses and hence creating an unreasonable tax burden on other real estate in that municipality.

General acceptance by cities and towns of the principles of zoning, subdivision control, and modernization of building codes until they include some control over architectural design constitutes an important means of improving housing conditions. Establishment of local planning boards and adoption of official master plans will furnish the mechanism for making these princi-

ples effective. Enabling legislation for the preparation of official plans is needed in some of the States. Where protection against unwarranted subdivision is not afforded by an official map, subdividers should be required to install certain necessary services on their properties. The solution of housing problems in rural areas where the land is submarginal for agriculture will require some form of rural zoning.

Proper location of housing units is just as important as design and construction if property values are to be maintained under changing economic conditions. New housing needed by reason of sudden expansion of industry, as in connection with some of the present national defense contracts, should be related to the permanent economy of the locality.

#### Transportation

##### Objective

To obtain a satisfactory regional transportation system, the different modes of transportation, highway, rail, water, and air, should be improved and integrated to the end that all traffic is carried by that type of transportation which is best suited to carry it; a system of airways should be developed according to plans that provide for class 3 fields or better at all existing air transport stops and at other large population centers, for class 2 fields at secondary population centers and all important recreation centers, and for local airports wherever carefully prepared plans show such facilities will be needed for private or commercial flying; a Region-wide highway system should include a coastal limited way running from the New York - Connecticut line into Maine with branches up the Connecticut and Merrimack valleys and to Cape Cod, a network of through secondary routes designed to accommodate tourist traffic as well as to provide local access, and improved farm-to-market roads serving all rural areas well suited to year-round residence.

##### Existing Conditions

The lines of New England railroads lie almost wholly within the Region. For the most part, they do not compete with each other, but some of them do have as rivals the alternate routes, with lower freight rates to western points, that are provided by lines of the Canadian railways that extend into New England. Passenger travel on the New England roads, although declining

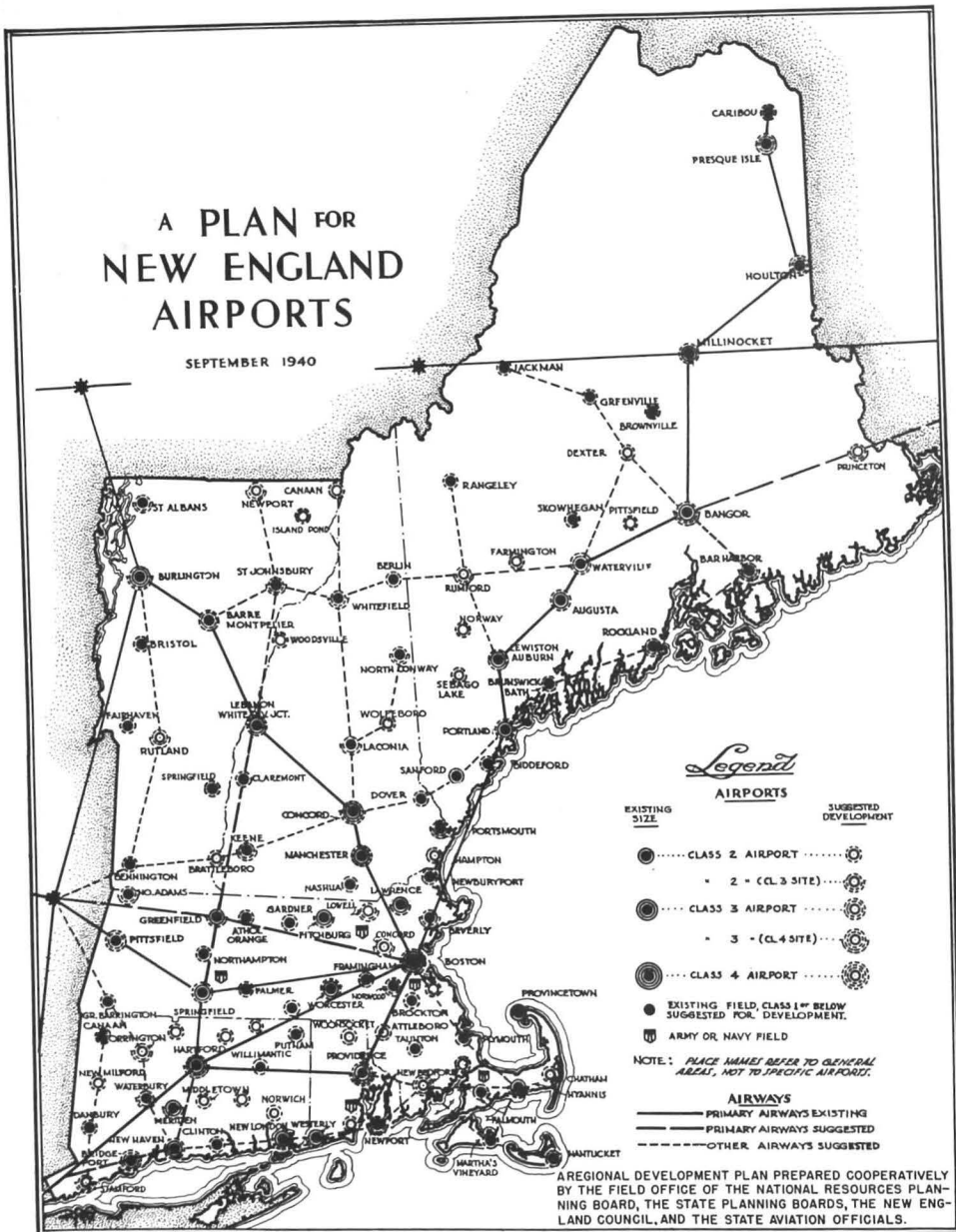


Figure 1.—A Plan for New England Airports

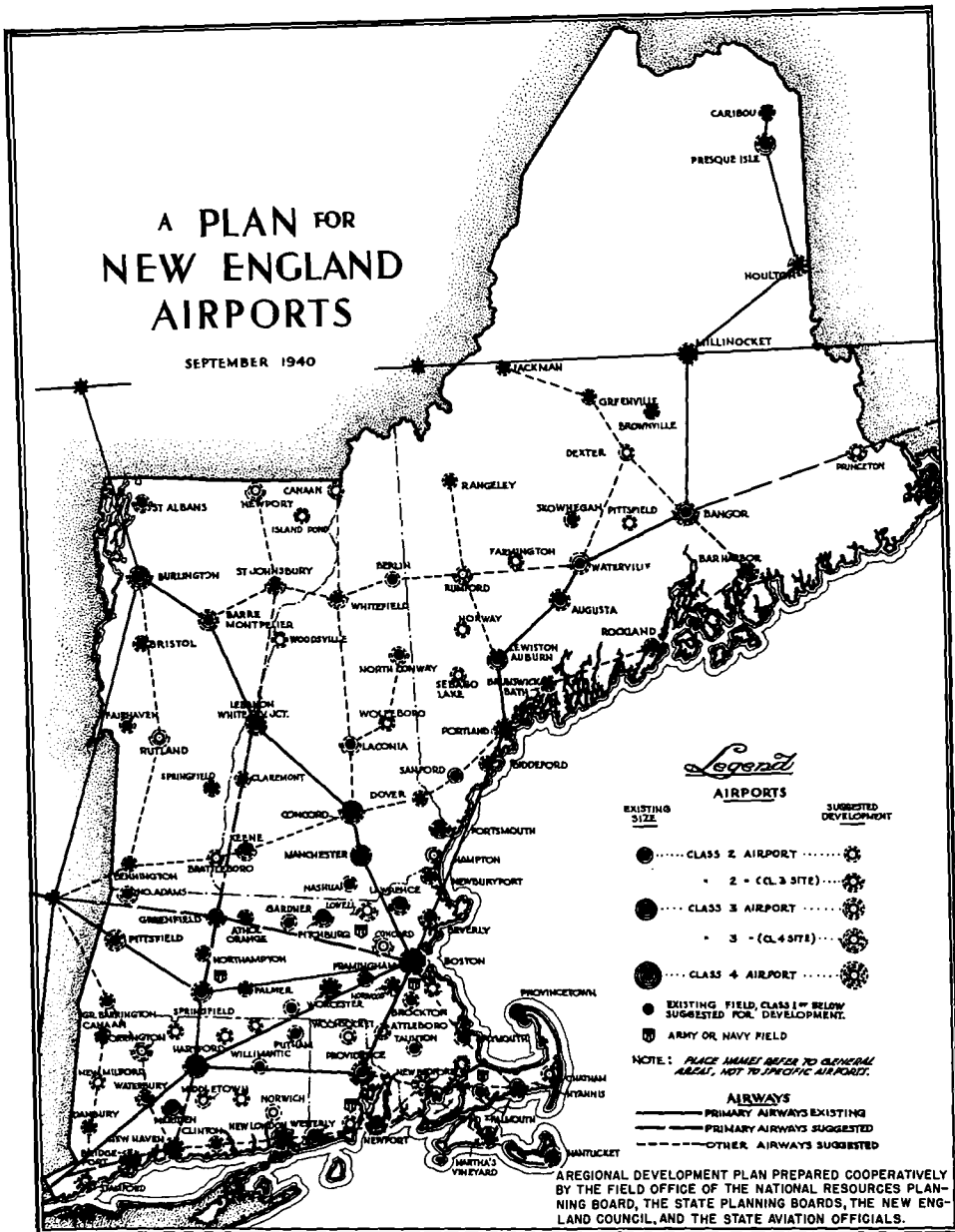


Figure 1.—A Plan for New England Airports



rapidly, is still well above the United States average. Freight traffic is predominantly terminal in character; the length of haul is much below the United States average. A major problem is the lack of balance between freight moving into and out of the Region, for the tonnage of imports is about five times that of the exports.

This same lack of balance is evident in water-borne commerce. While 10 percent of the Nation's shipping goes through New England seaports, only 10 - 15 percent of the tonnage handled is for export. Domestic commerce, mostly in imports of fuel, accounts for the bulk of the traffic by water.

Air transportation development in New England is governed primarily by the small size of the Region, with three-fourths of the people living in the three southern States; by its location in the extreme northeast corner of the United States; and by its rough terrain and rigorous climate. There are at present about 100 airports and landing fields in the Region, but only one-quarter of these are capable of handling air transports. Federal airways with all-year transport service extend from Boston to New York, to Albany and the West, to Montreal, and to Bangor and Aroostook County points, while there are prospects for an early extension to points in the Maritime Provinces. In addition to this all-year service, several routes are flown during the vacation season. The many harbors and inland lakes make New England ideal for seaplane operations.

While New England has long been noted for its good roads, very few modern motorways have been constructed. Most of the main highways, dating from colonial or early republic times, are still in the process of modernization. As a result, while pavements are usually adequate, grades and curves are often excessive. There are many traffic bottle-necks because, although southern New England is one of the densest traffic areas in the country, trunk highways pass through the business centers of most of the cities and towns along their routes, and intersections at grade with other heavily traveled roads are numerous. Traffic congestion is augmented by auto parking in business centers, by ribbons of commercial development on the roadsides, and, during the summer months, by a huge volume of recreational travel.

#### Needs

Transportation is one of the vital needs.

not only for domestic prosperity, but also for national safety and defense. Further development of all forms of transportation must be in accord with military needs and should conform to military standards where necessary. Units of transportation systems that are considered important links in national defense, and which are now sub-standard from a military viewpoint, should be the first to be improved.

In addition to being adapted to the needs of national defense, transportation in New England should be so developed that each type of carrier will bear the traffic for which it is best adapted. To this end, the railroads, if they are to be put on a permanent basis under private ownership, need contraction through abandonment of unprofitable branch lines and services into systems that can operate profitably in semi-competition with the partially subsidized air and highway traffic. To provide properly for air travel, it will be necessary to expand aviation facilities. Likewise, the highways need general improvement and modernization, and special highways and parkways must be designed expressly for through motor travel.

Better and more convenient terminals and transfer points and administrative integration will be needed to facilitate coordination of service by rail, water, air, and highway. The ideal to be striven for is to provide the shipper with a complete service, door to door, in which the goods will be moved by whatever means are most expeditious and economical. It does not matter to the shipper what means of transportation his goods are shipped over so long as he gets good, fast service with no risk of loss. Integration of service and facilitation of transfer from one means of transportation to another can eliminate short-haul railway freight and uneconomic long-haul trucking with its consequent high demands upon the highway system.

To permit extension of scheduled air transport service, New England needs approximately 35 to 40 airports of class 3 rating (3500-foot runways). To provide for feeder service and recreational flying, 75 more airports and landing fields of class 2 rating (2500-foot runways) will be needed. The Boston airport, a natural base for trans-Atlantic operations, needs improvement for both land and sea transports.

More than six thousand miles of highways in New England should be rebuilt, widened, or relocated to provide adequately for the

passage of mechanized army units. More than five hundred bridges need to be widened or rebuilt. Grade separation and the by-passing of many cities and towns are needed to eliminate traffic bottle-necks. To provide for efficient motor travel as well as for the free movement of troops, New England needs a system of strategically located modern motor ways, the first unit of which should be the coastal limited way which has been proposed from New York and the South to Maine.

#### Recommended Action

In order that transportation in New England may develop along sound economic lines, there should be:

1. A comprehensive plan which will indicate the approximate part each type of transportation will play in the future.
2. A guide for allocating Federal, State, local, and other responsibilities for future transportation development.

This is particularly needed in the case of air travel. The establishment of a policy by which airports that could logically be considered parts of the public transportation system of the Region would be eligible for development with Federal and State funds in much the same way that highways are now improved with Federal aid is necessary to provide adequate air terminals. Standards for the development necessary on secondary airways and the determination of the extent of Federal and State responsibility in their establishment will extend air travel to sections of New England now inadequately served.

The regular Federal-aid highway development program should at first be directed toward bringing up to military standards the sections of existing roads that are now inadequate. Federal aid in the form of direct grants or loans should be sought for the construction of the new regional highways of freeway design that are so badly needed to provide for normal business and recreational travel as well as for national defense. Determination of the extent of public responsibility for providing facilities for the motor car when stopped as well as when in motion must be made applicable to specific situations before a solution of the parking problem can be achieved.

3. The enactment of legislation necessary to develop and protect modern transportation.

Proper development of transportation will be difficult until additional legislation is

provided. Especially needed are:

Legislation to provide for Federal and State participation in the development of airports and landing fields on a permanent basis rather than on a work relief basis.

Freeway enabling legislation in the States that have not already passed such acts.

Zoning laws or other legislation to control roadside development and to protect airports and their approaches.

#### Education

##### Objective

To make New England people happier and more useful citizens, education, available to all youths and adults as well, should include fundamental types of vocational training; community centers for the promotion of literature, music, art, and adult recreational activities should be fostered; instruction in regard to local conditions, resources, planning, and other governmental problems should be included in the curricula of all schools.

##### Existing Conditions

The first college, the first public high school, and the first normal school in America were founded in New England. Ever since then, the Region has ranked at or near the top in the field of education. Although today it exceeds the national average in the percentage of children who go to grade and high schools, in the amount of money spent upon education per child, and in facilities for caring for the blind and for mental delinquents, it has fallen behind in the proportion of pupils who attend college and vocational schools.

The New England system of town government has militated against educational progress in rural districts because it has so favored continuance of school units too small to be efficient. Yet this same system of government has, through the intimate community life and responsibility that it fosters, developed a widespread interest in civic affairs and in the cultural opportunities that community effort can provide. Nearly every community has its library, and both the number of volumes and the circulation per capita are far higher than the national averages. The proportion of illiterates is relatively low in New England, in spite of the fact that foreign-born elements are responsible for abnormally high percentages of illiteracy in many of the industrial cities.

Because the number of children of school age is stationary or even declining in most sections of New England, it will become increasingly easy to overcome deficiencies in school equipment.

#### *Needs*

Probably the greatest educational need in New England is the expansion of vocational education. Principally true in the rural public schools, this observation applies throughout the Region, and for adults as well as for people of school age. To permit this expansion, there will be need for much reorganization of educational practices and, especially in rural areas, for substantial additions to present curricula.

If rural areas are to obtain educational benefits, vocational and otherwise, comparable to those in the city, there must be much consolidation of school units. Advantages of modern equipment, experienced teachers, and varied curricula can be obtained for rural areas only if several towns combine their resources and establish schools large enough to be efficient. The economies and advantages made possible by this practice usually more than offset the additional transportation expenses.

In some rural areas, consolidation of residence is needed even more than consolidation of schools. Costs of transporting children to schools from isolated dwellings, usually farms, are often such as to put the local school budget completely out of balance. In the many places where the costs of this transportation, plus the extra burdens of road maintenance, especially in winter, and of police and fire protection, are appreciably higher than the returns from these places in the form of taxes, it will probably be worth-while to retire the dwellings from use as year-round residences. In any case, application of some such measure as rural zoning would prevent school and other costs from amounting unreasonably.

A deficiency in many school programs very nearly as great as that of vocational education is lack of instruction in the fields of local resources, local government, and citizenship. Important as may be the usual types of geography, history, and civics courses as means of familiarizing the student with Nation-wide and world-wide conditions, there can be no doubt that his future usefulness as a citizen will be enhanced if he learns more about these subjects as they relate to definite, tangible local problems.

Although New England is singularly fortunate in the number of its public libraries, it is not nearly so fortunate in the number of its local opportunities for enjoyment of art, music, and drama. Social service enterprises, fraternal organizations, agricultural extension, and other agencies have done much to foster these types of educational and recreational activity, but there is a distinct need for more work of this sort. It may prove desirable to employ, on a State or county basis, extension workers to perform just this type of service.

#### *Recommended Action*

Before there can be more widespread vocational training and instruction in local civics, resources, and related subjects, teachers must be better trained in these fields, more and better text-books written and made available, and greater cooperation obtained between the schools and various local interests. Particularly needed are new textbooks which shall deal with the background and machinery of local New England government and with New England resources and their uses. It may well be within the province of State and regional agencies to make material of this type available. Certainly, planning agencies at all levels of government should facilitate cooperation and exchange of information between schools and government administrative, research, and construction agencies.

To aid in school consolidation and in the financing of new schools thus made necessary, State agencies should be granted additional powers and responsibilities, and possibly funds should be lent for school construction. Although it will probably not be desirable to enforce consolidation upon rural communities, such action may well be encouraged in connection with State educational subsidies. Certainly in connection with the allocation of State or Federal funds for aid in constructing rural schools, the possible advantages and long-range economies of consolidation should be given careful consideration. Even in urban areas, the needs and opportunities for consolidation or replacement are likely to be much more important than the need for additional facilities.

#### *Welfare*

##### *Objective*

To provide a greater measure of social security, there should be a permanent, coordinated program in which all gainfully

employed workers would have unemployment and old age insurance; work on carefully planned projects of lasting value to the public would be the basis of relief for those unemployed who are capable of working; and public funds would be set aside regularly to act as a cushion in meeting the fluctuating needs for relief; health should be promoted by making hospitals and other medical services easily accessible to everyone.

#### *Existing Conditions*

In all six New England States, there are fairly uniform programs for old age assistance, aid to dependent children, aid to the blind, unemployment compensation, and old age insurance. However, in Connecticut there is, instead of aid for dependent children, a type of assistance administered as aid for widows with children, and in Rhode Island the program of aid for the blind was not installed until late in 1939. But even a partial picture of welfare conditions as indicated by disbursements during the fiscal year ended June 30, 1939 for these types of aid shows, for a Region as small as New England, wide variations in expenditures among the States. For instance, in that year Vermont paid out only \$1,798,265, or \$5 per capita, for these categories of assistance, while Massachusetts spent for the same purposes \$57,962,433, or \$13.50 per capita. The Federal Government contributes heavily to the payments to recipients of old age assistance, aid to dependent children, and aid to the blind. In the fiscal year ended June 30, 1939, the Federal Government paid approximately one-half of the totals of these payments in New England.

Entirely apart from the Work Projects Administration and its predecessors, which, since 1934, have assumed a large share of the work relief burdens of the State, the amounts expended by States for "general relief, sometimes called outdoor relief, home relief, or direct relief" ranged in 1938 from \$803,367, or \$2.40 per capita, in Vermont to \$21,967,009, or \$5.10 per capita in Massachusetts. The grand total expenditure for New England for the above types of assistance was \$129,790,340, or \$15.40 per capita.

The concentration of more than three-fourths of the population of New England in urban communities accounts for most of the so-called "welfare" problems, including housing, unemployment, and health.

In the urban areas, natural population increase is almost negligible; hence the pro-

portion of people in middle and old age is large. As a result, in an age when industry discards employees who are nearing the half-century mark, unemployment is high. According to the 1937 Census of Employment in the United States, 6.6 percent of the people of New England were unemployed. This is .5 percent higher than the percentage of unemployed in the United States as a whole, and in only one other group of States, the Middle Atlantic, was there a higher percentage of unemployed in a region.

New England is, by contrast with other parts of the country, well equipped to care for the health of its people. In proportion to its population, it has more than its share of doctors and hospital beds, and while this is largely due to the concentration of medical facilities in Metropolitan Boston, the small area of the Region makes it possible for a large proportion of the people to reap the benefits of these facilities.

#### *Needs*

New England, in common with the rest of the world, is realizing more and more that, due chiefly to technological developments, unemployment is as likely to increase as to decrease in the future unless steps are taken to prevent increase. For the older unemployed people, old age assistance must, as time goes on, be replaced by old age insurance, lest the tax burden for outright assistance become so heavy as to upset the balance of the entire tax structure. For the younger unemployed, the present system of unemployment compensation must increasingly help to reduce the expenditures for general relief. Similarly, the present systems of sickness and accident compensation must be expanded until they can keep temporarily disabled workers off the general relief rolls.

Although it is geographically true that medical facilities are within reach of most of the people in New England, financially it is untrue for a large proportion of the population. What New England needs is an adaptation of the cost of medical treatment to the ability to pay.

The experience of the last decade should have taught that haphazard work relief trumped up in severe emergencies is unsatisfactory. The brighter side of the picture is that if work relief programs are planned in advance, emergencies need not be severe. In the early days of the depressed '30s, the State of Vermont had opportunity to discover this, as the following illustration shows.

After the flood of 1927, State and Federal government agencies made a flood control survey and developed preliminary plans for reservoir construction. The spring of 1933 brought an acute unemployment situation, and to deal with it, the flood control plans were translated into action. As a result, it became possible, on a few days' notice, to set five thousand men at work on two great flood control projects in Vermont.

Public and private construction should be so regulated as to mitigate the periodical booms and slumps that upset the balance between wages and markets. Otherwise, New England can never achieve the goal of having good enough homes, factories, and public buildings for all the people all the time.

Successful private business concerns have learned that they owe much of their success to the practice of accumulating sinking funds to pay their upkeep when profits are diminishing or non-existent. Likewise, local governments, if they would avoid bankruptcy, need to accumulate sinking funds, not only to insure themselves against times of depression, but conceivably to permit some lowering rather than raising of the tax burden during bad times.

#### *Recommended Action*

Granted that medical facilities should be not only geographically but financially accessible to all the people, one way to make this come true seems to lie in State or Federal subsidy of hospitals and medical services, particularly those in the rural sections of New England. Another means of bringing medical treatment within range of the purses of the middle-income groups is some plan of health insurance.

Public works construction programs, supplemented by a wisely administered system of Federal subsidy of the kind that the Public Works Administration could provide, should help to restore the equilibrium of labor and capital and then to hold it steady. The few towns and cities in the Region that, to date, have projected plans for construction of public works are convinced that the procedure is sensible. It remains, then, for every town and city to develop a long-term program of construction of public works to be built if, as, and when local demands and municipal finances are sufficiently in balance to permit construction.

But when all is said and done, one remedy remains to be applied. The New England people need to shake off the "depression mood"

and, instead of claiming government subsidies, prove that they can stand on their own feet. Having proven that, they will deserve subsidies, but not until then. New England people glory in the history of the exploits of endurance and ingenuity of the Pilgrims. There were no government subsidies in 1620. Let the New England people prove that moral and physical courage in 1940 are no less characteristic of the citizenry than they were three hundred years ago. Then shall we have Public Welfare, not Public Charity.

#### *Defense*

##### *Objective*

To prepare adequately and efficiently to defend ourselves against invasion, our major transportation networks should be so improved that they meet not only peace-time needs but also conform to minimum requirements for defense purposes; expansion of industrial activity and of concomitant business and residential development should proceed along lines that are in harmony with normal peace-time trends to the extent that this is compatible with defense needs; accurate and up-to-date inventories of natural, industrial, and transportation resources should be kept continually available.

##### *Existing Conditions*

As the part of the United States nearest Europe, New England is in a vital location from the standpoint of defense. The presence of many large industrial centers and of several key armament manufacturing centers makes it a doubly vulnerable target, as does the fact that 80 percent of the people live within 50 miles of the coast. However, it is equally significant that, outside of the areas of concentrated population, New England has a pattern of widely dispersed farms and small mill-towns, places capable of accommodating temporarily large increases in industrial activity and in out-of-city residence. Moreover, since defense activities will be concentrated along the coast, it is not an unmixed evil that so many defense industries are located near the seaboard. Their products will therefore be near at hand for emergency use, and the burden on transportation facilities will be at the minimum just when it is most necessary to draft men and machines for defense.

Serving virtually all settled parts of the area, there is a network of improved roads reasonably adequate for peace-time needs, but curves, grades, bridges, and

light-weight surfaces will render much of this network of little use for primary defense. The topography and land cover of the Region is such that flying operations must be confined to improved landing fields, and the number of such fields, especially those capable of accommodating large planes, is very small. Railroad and navigation facilities are more nearly adequate to meet defense needs than the other media of transportation.

Because New England industries import practically all of their raw materials and fuel, they are completely dependent upon transportation links with other portions of the country, except in the case of those few types of manufacturing that use wood or other local resources. If New England is to play its part in the defense industry picture, access to raw materials and fuel must be bettered through improvement of transportation facilities.

Of possible significance is the existence of thousands of summer homes throughout rural New England. With only slight improvements, these homes could accommodate a large proportion of those made homeless by evacuation of cities in time of threatened invasion. Many summer cottages are so located as to be readily usable to house employees in the event of emergency expansion of now small, out-of-the-way industries.

#### *Needs*

The greatest defense need of New England today is the improvement of transportation facilities. The main highway system should be so improved that it conforms throughout to military standards; important new connecting links, such as by-passes around Boston and other big cities, should be rushed to completion; and, when these more immediate needs are met, work should be commenced on the construction of some modern, high-speed highways that will tie in, both for defense and for peace-time purposes, with a national system. First of these highways for New England should be one from New York to Boston and thence to eastern Maine, passing near, but not through, most of the Region's largest industrial centers.

Second only to highways in importance are airplane landing fields. In addition to the military fields now being built, most fields now used for commercial aviation should be so equipped as to be easily adaptable to general military use; and large numbers of small fields should be improved so as to be

capable of handling the smaller military planes.

From the point of view of defense industry, two procedures are imperative: (1) the making of exhaustive inventories of resources, human, natural, industrial, and transportation; and (2) decentralization of industry. Because the present distribution of industrial activity already includes wide dispersion of small industries, it will be relatively easy to accomplish partial decentralization without disrupting the present general economy. Additional housing for civilians will undoubtedly be needed at certain points, particularly where such fixed industrial establishments as navy yards or ship-building plants must be expanded.

In accomplishing those improvements and adjustments that are demanded by defense, every possible consideration compatible with execution of the defense program should be given to anticipated peace-time needs. Particularly in the fields of transportation, where deficiencies are especially great, and of industry and housing, where much rehabilitation work is already necessary, there are distinct opportunities for defense measures to aid rather than to conflict with normal improvement programs.

#### *Recommended Action*

First efforts towards improving the highway system should be directed toward bringing up to military standards all the weak points on principal highways. Thereafter, efforts should be divided between construction of major new highways and improvement of secondary roads.

All airports near large cities, and especially those along existing airways, should be improved so that they can handle the larger army planes. Elsewhere throughout the Region, airports of class 1 or 2, or even smaller, should be improved as soon as possible to the extent compatible with anticipated peace-time needs. Probably the bulk of Federal funds should be spent on the larger fields, while State and local funds will certainly be needed to render the smaller fields anywhere nearly adequate. It would appear that the spending of local funds should be confined to those fields that are approved as to size and location by State officials.

Wherever possible, in view of the emergency needs for defense production, industrial expansion should be fostered in the smaller centers and in many scattered plants. Such a procedure will certainly be compat-

ible with defense strategy, and at the same time, it will initiate a desirable trend in future regional development. Through this procedure, the need for new housing accommodations will be kept from becoming acute, since in many rural areas there is an abundance of housing suitable for emergency use.

Inventories of all types of resources likely to be of value in case of invasion or war status should be made immediately. In most States, the State planning boards are in the logical position to cooperate with State defense councils in performing this task.

#### Administration

##### Objective

To help bring about more efficient government and a reduction in the tax load, there should be: community plans and zoning ordinances; public works programming; actively operating municipal planning boards in all cities and all except possibly the smallest towns; and adequately staffed State planning boards functioning as units in the governments of all six States, cooperating with municipal planning boards, and working together, as a regional planning agency, towards the development of a better New England.

##### Existing Conditions

The town meeting form of government in New England is of long and honorable standing, and is probably the most democratic form of local government in the world today. Nevertheless, the slight inefficiencies and lack of direction that are likely to be found in as flexible a type of government as that in New England towns have been common. Sometimes errors have been made, although the cost of paying for them has not been too great. However, government has been haphazard on the whole; it has followed development and growth rather than stimulating them; it has overcome obstacles, but has not done much to develop opportunities.

As a result, New England towns and cities have tended to be inefficient units. When growth was at a rapid pace, it was fairly easy to cover up the mistakes; but now, when growth is very slow or has stopped altogether, the situation becomes acute.

Deficiencies in many parts of a city's equipment stand out in sharp contrast to over-developed facilities in other parts. Over-development of residence and business

looms up as a conspicuous error when a temporary industrial boom subsides, or when the crop of forest timber has been stripped off and no inexpensive supply of wood is available. Again, increasing bonded indebtedness presents a distressing problem when accompanied by precipitous declines in the value of assessed property. These conditions, in varying degrees, have been more the rule than the exception. The business of government has not been run with the same amount of thrift and acumen as have most other New England businesses.

##### Needs

To overcome these errors and deficiencies in government, the chief need is for the incorporation of direction or purpose into the government framework. Research and long-term guiding policy, two essentials to good business, must be given more conspicuous roles in all government units. As time goes on, it will not be sufficient to satisfy the more crying needs of the people when and as they are forced upon the attention of administrative officials. Each State or municipality must decide what are its goals, and then work out the best means of achieving these goals.

This immediately points to the need for coordinated plans as guides to be followed in public development and for broad plans, supplemented by legal controls, to guide private development and keep it from opposing the public interest.

##### Recommended Action

All States and municipalities should have, as integral parts of their governmental set-up, planning boards charged with the responsibility for preparing long-range plans for public development, for coordinating the individual plans of executive departments, and for assisting the chief administrative officials to work out efficient ways of executing their construction programs. Such planning agencies should be purely advisory in character, but should be clothed with sufficient authority and supplied with funds enough so that they may perform the necessary research and coordinative functions.

Working in close association with these planning agencies, or as parts of them, there should be agencies vested with the responsibility for exploring opportunities for economic development and employment. There is no doubt today that one of the functions of government is to encourage those enterprises upon which depends the

livelihood of the people.

Not only must government encourage private enterprise, but it must also impose upon it some restrictions. Among the types of restriction most needed is that known as zoning, the assignment of the various uses of land to areas where such uses may be carried on without being prejudicial to the public interest. In both urban and rural areas, zoning should be enforced, and should be kept sufficiently flexible so that it may conform to changing conditions. In rural areas, study should be made of the possibility of having zoning ordinances prepared by State planning boards or other State agencies and adopted and administered by the town governments. It may even prove practical to relate the application of rural zoning to certain types of State aid.

Another control over private development that should be given wider application is

the control of subdivisions. Particularly now, when so many municipalities have stationary or declining populations, it is important that some control be exercised not only over the location and general design, but also over the number and extent of subdivisions. Enabling legislation in Massachusetts gives to municipalities the powers that are needed. Exercise of these or similar powers should be common throughout the Region.

In conjunction with the establishment of comprehensive planning as an integral part of State and municipal government, there should also be established the practice of public works programming. An orderly programming of public works construction, subject to the considered judgment of the administrative officials, should be tied in directly with the municipal finance program and based on long-term plans for comprehensive development.



PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

MIDDLE ATLANTIC

REGION 2

RICHMOND, VIRGINIA

1940

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Report of the  
MIDDLE ATLANTIC REGIONAL PLANNING COMMISSION

Morton L. Wallerstein  
*Regional Chairman, Region No. 2*  
*National Resources Planning Board*

Harold Merrill  
*Acting Counselor, Region No. 2*  
*National Resources Planning Board*

John W. Hyde  
*Planning Technician, Region No. 2*  
*National Resources Planning Board*

NATIONAL RESOURCES PLANNING BOARD  
FIELD OFFICE  
RICHMOND, VIRGINIA

October 5, 1940

Mr. Charles W. Eliot, Director,  
National Resources Planning Board,  
North Interior Building,  
Washington, D. C.

Dear Mr. Eliot:

I am enclosing mimeographed report entitled "Plan for Regional Development in the Middle Atlantic States". The objectives and recommendations presented are the result of planning far from adequate and in a very preliminary stage. In addition, many phases of planning, primarily national in scope, have not been considered except in passing.

This report is the result of the cooperative efforts of all the state planning boards in the region, the regional offices of federal agencies in the area and our own regional office. Several conferences of representatives of the state planning boards were held prior to the compiling of the report, which now has been developed as a result of the effective collaboration of state directors, their staffs, and the regional representatives of federal agencies. We have also received invaluable suggestions from many individuals and from our own consultants.

Very truly yours,

MORTON L. WALLERSTEIN,  
Chairman, Region No. 2.

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PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
M I D D L E   A T L A N T I C   S T A T E S

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### Introductory

Bordering the Atlantic Ocean from Long Island to Cape Hatteras, the Middle Atlantic Region contains the following States: New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. The District of Columbia is also included. Although, contrasted with New England or the Pacific Northwest, the Region lacks what might be termed regional consciousness, the similarity of its urban, industrial, recreational, and seaboard problems justifies its consideration as a region, at least for planning and development purposes.

The conclusions and recommendations set forth below are derived from many sources at an embryonic stage of comprehensive planning. They are the best that can be offered, at the present time, considering the fact that no overall State, regional, or national plans are far enough advanced to serve as frames-of-reference for testing the relative merits of various programs. The projects listed are designed to exemplify the type of programs needed throughout the Region. Many projects listed do have an individual and obvious merit not likely to be greatly altered by subsequent and more comprehensive study. The statement, therefore, is in the nature of a progress report.

### Characteristics of the Region

The Region's varied topography ranges from ocean barrier beaches and tidal sounds to the Appalachian Highlands and the Great Lakes. It is the most densely populated area of comparable size in the United States. Its 200,000 square miles include a total population of 38,000,000. The Region is also the most highly industrialized. With only 7 percent of the land area of the Nation, it produces one third of the industrial output, contains 28 percent of the population, and has ports which clear 40 percent of the tonnage, 75 percent of the value of the country's water-

borne exports and imports. Its domestic shipping—coastwise, river, lake, and canal—amounts to 25 percent of the tonnage of the whole United States. It produces all the anthracite coal mined in the United States, 25 percent of the bituminous coal and developed water power, 5 percent of the natural gas, and 2 percent of the petroleum. Last year, the expenditures of tourists were one and a half billion dollars, 27 percent of those of the Nation. The Region's strategic position on the seaboard makes it the focal point of much of the Nation's trade, finance, and transportation, and of activities relating to the national defense.

Following industry and commerce as the primary activities of the Region come agriculture and coal mining. Forty-eight million acres, 37 percent of the land area of the Region, are in agricultural production, chiefly dairy, poultry and general farming, vegetable and fruit growing, and the growing of such special crops as tobacco, cotton, and peanuts. A small portion of the Region's land is used for urban development or is in swamps and tidal marshes. The remainder, over half, is in forest land and in farm land reverting to woods, unsuitable for agricultural uses by reason of poor soils, steep slope, or bad drainage. Once rich in forest products, the Region is now in process of restoring its timber resources after generations of ruthless harvesting and inadequate forest management.

Mineral products are also important in the Region. Coal reserves are ample for a century or more, although some of the best veins are depleted; but petroleum and natural gas reserves are very limited. Other natural products of the Region include building materials and seafood.

Industry and commerce are largely responsible for the concentration of two-thirds of the Region's population in 25 metropolitan districts, each with over 100,000 population, the largest of which are New York, Philadelphia, Pittsburgh, Baltimore, Washington, and

Buffalo. In fact, the "population belt" from New York to Washington and extending westward as far as Scranton and Harrisburg contains less than 12 percent of the Region's area, but accounts for 55 percent of its population and 59 percent of its manufacturing.

Population growth of the Region as a whole has paralleled that of the United States very closely, but marked differentials exist between the northern and southern parts. In the past decade, States in the Region south of the Mason and Dixon Line grew in population at rates of from 10.0 percent to 12.4 percent whereas Pennsylvania, New Jersey and upstate New York increased by only 2.7 percent or less. Although New York City together with Long Island and Westchester County increased 8.7 percent, many large cities including Philadelphia, Pittsburgh, Newark, Jersey City, Rochester, and Syracuse actually declined in population. The most rapid metropolitan population growth in the Region, 43.2 percent, occurred in Washington and five adjoining Virginia and Maryland counties. The fact that one million of the Region's two million population increase in the last decade occurred in the Washington-Baltimore and New York areas indicates their outstanding importance in regional development.

#### Need for Planning

No part of the country has suffered more from lack of planned development, nor is any in greater need of planning for the future. Perhaps in no place is planning so difficult, since in this Region improvement involves to a greater degree costly processes of reshaping severely exploited land and facilities.

Proportionate to the Region's large and concentrated population and the intensity of its industrial and commercial activities is the problem of bringing about a sound and efficient industrial pattern through voluntary planning by community and public groups at all levels of government. Preliminary studies designed to present a sound picture of industrial resources for analysis and planning are being undertaken by several State planning boards in the Region.

There are also the important planning problems of supplying, at reasonable cost and

with a minimum of disturbance, all the facilities of an industrialized economy, including complete transportation facilities, adequate housing, recreational, educational, and medical facilities.

#### Land

Although the Middle Atlantic Region is usually regarded as an urban region, nevertheless the land resources of the coastal States from New York to North Carolina are extremely diverse and offer a wide variety of problems.

Existing land uses for the Region's 128½ million acres are divided approximately as follows:

Urban (residence, business, industry, vacant subdivisions, railroads, roads)	3 percent
Cropland and pasture	37 percent
Forest, woodland, and other non-agricultural rural land	60 percent

Generally speaking, the land problems in the Region arise from (1) maladjustments in the use of large areas of rural land throughout the Region, particularly in the case of farmed areas unfitted for agriculture; (2) blighted areas in urban centers; (3) subdivision of suburban land far beyond present or probable future needs. These will be treated in their order.

#### Submarginal Land

Surveys by the various State planning boards in this Region show approximately 29 million acres out of 128½ million acres as being "problem areas." Much of this land is now being farmed, is unfit for agriculture, and is unneeded for urban and industrial expansion. Much of it is tax delinquent. Most of it is better adapted to such extensive uses as forestry, recreation, wildlife preserves, and watershed protection.

In addition to 8 million acres already in public ownership, State and Federal purchase programs have already recommended the acquisition and retirement from private use of over 15 million acres. Readjustment of use of an additional 14 million acres either through public purchase or limitation in private use is recommended. Specifically, the following areas of submarginal or forest land

by States are recommended for public ownership or restricted private use:

New York	7 million acres
New Jersey	2 million acres
Pennsylvania	5 million acres
Maryland	1 million acres
Virginia	6 million acres
North Carolina	<u>8 million acres</u>
The Region	29 million acres

Much of this land has been specifically noted in previous reports of State and Federal agencies. The New Jersey State Planning Board, for example, has pointed out the chronic tax delinquency existing in South Jersey. In this sparsely settled wooded area of over 1,000,000 acres, or 22 percent of the State, over one-third of all land was tax delinquent<sup>1</sup> for more than one year. This delinquent area amounted to 40 percent of the total rural tax delinquent acreage in the State as a whole. In adjacent farm areas, the incidence of delinquency was half to a third that in the "pinelands." Most of these lands are included in the 1,000,000 acres in New Jersey definitely recommended for public purchase and multiple use as suggested above.

The New York State Planning Council also has recommended that at least 8,000,000 acres be added to the State public domain. These, again, are lands not adapted to farming or intensive human use. Forestry, recreation, watershed and wildlife protection are the probable future uses.

While programs for handling the problem of submarginal land differ in each State, all States in the Region recognize the necessity of determining the optimum use of land. The specific figures above are gleaned from reports based on widely different approaches. In each case, the areas mentioned are more likely to be the minimum than the maximum recommended for some form of public or readjusted private use.

In addition to acquisition of lands by public agencies for retirement from unsuitable use, there is increasing need that such lands as are not acquired be zoned against improper use. Unfortunately, however, the use of the zoning technique for control of

rural land use, so effective in Wisconsin, has not been widespread in this Region.

In order to bring about more sensible use of rural lands, other remedies need also to be developed, including:

1. More liberal policies of land acquisition, particularly in the case of tax delinquent lands.

2. Control of public services and capital expenditures, notably for roads and education, according to the economic life and potentialities of rural areas as revealed by land classification.

3. Increased use of local and county planning legislation.

4. Continuance and expansion of county land-use planning programs in order to broaden locally the understanding of land-use problems and means of remedying them, including the more efficient grouping of land in individual farming units.

5. Protection of farmland and watersheds from soil erosion by improved farm and woods management practices. Soil erosion is severe in both North Carolina and Virginia and in parts of other States, particularly in certain sections of New York.

#### Urban Blight

The problem of urban blight is by no means peculiar to this Region, but its predominately urban and industrial character renders the problem particularly serious. Although urban blight—its causes and remedies—may not be completely understood, blighted areas have certain common characteristics. Some are slum areas, hereafter more fully treated under "Housing"; some are the result of the flight to the suburbs; and others are merely due to shifts of use of property in the urban area itself.

But, whatever the causes, urban blight constitutes a serious menace to our cities. It must be prevented and remedied, particularly in those areas where the municipal balance sheet shows a high incidence of crime and disease, of tax delinquency, of poor housing conditions, and very low tax income in relation to municipal services rendered.

It is doubtful if there is a city in the Region, regardless of size, not infected

<sup>1</sup> Rural Tax Delinquency in New Jersey 1929-1934.



Courtesy New Jersey State Planning Board

**Figure 1. — Suburban Land With A Blighted Future**

Branded with a planless network of unneeded streets and blocks, the surroundings of this New Jersey town in the "pine area" have become an economic No Man's Land

with it. The accompanying table presents data on seven representative metropolitan areas that were selected to give a reasonably fair cross-section of urban conditions throughout the Middle Atlantic States. As the table shows, 20 percent of the residential area of these cities and their suburbs has already deteriorated to the point where it is judged to be blighted. Large sections of the blighted areas are slums.

*Areas Already Blighted, Declining, or Definitely Restricted as to Residential Desirability in Seven Representative Metropolitan Areas in the Middle Atlantic Region.*

[Areas in square miles]

Representative cities	Approximate population, including suburbs covered	Approximate residential area	Area already blighted	Additional area declining or restricted as to desirability
Philadelphia—				
Camden	2,500,000	158	32	40
Pittsburgh	1,000,000	68	19	23
Baltimore	900,000	51	7	18
Buffalo	600,000	40	3	18
Rochester	400,000	40	8	24
Norfolk-Portsmouth—				
-Newport News	300,000	33	13	15
Charlotte, N. C.	100,000	11	3	4
Total	5,800,000	401	81	142
Percent of residential area—		100%	20%	35%

In addition to areas already blighted, the last column of the table indicates those areas that are declining or definitely restricted as to residential desirability because of such detrimental influences as:

- a. Age, obsolescence, poor construction or maintenance of building.
- b. Inadequate services such as transit, utilities, or schools.
- c. Excessive taxes or special assessments.
- d. Encroachment or infiltration of harmful commercial or industrial activities, or shifting population groups.
- e. Inadequate zoning ordinances, expiring deed restrictions, or an absence of influences that protect the desirability of the area as a home neighborhood.

Most of these additional areas contain the seeds of blight, although only a portion of

them are subjected to those pressures in city growth that make blight imminent. The very large areas of most cities judged to be in this condition highlight the importance of speedily undertaking measures to halt the spread of blight, and to preserve and reclaim those areas for healthful, enjoyable living, and as self-supporting parts of the municipal economy.

There is admittedly no panacea for the problem. Steps to reclaim blighted areas and prevent spread of blight include:

1. Rehabilitation of actual or potential blighted areas in accordance with a "master" city plan and improved zoning practices, applying where possible "neighborhood unit" principles.

2. More liberal policies of municipal land acquisition and management, encouraged by proper State laws for efficient foreclosure of tax-delinquent properties and for permitting urban authorities to acquire, hold, and dispose of land with greater freedom.

3. Taxation policies designed to encourage the best use of urban land including downward revision of assessed valuations in many decadent districts and further trial of landvalue taxation (gradually decreasing tax rates on buildings, coupled with increasing tax rates on land).

4. Cooperative working out of neighborhood development problems by land owners and municipal authorities, following lines suggested for the Waverly district in Baltimore by the Waverly Conservation League, Inc., in cooperation with the Home Owners Loan Corporation.

Premature Land Subdivision

A particularly malignant type of land exploitation is evident in the subdivision of land in the suburban fringes surrounding metropolitan areas, far beyond any present or even future need. Such excess platting not only leaves in its wake much tax delinquency, defaulted benefit assessments, and private financial liabilities, but, even when such areas become built up, the heterogeneous design of scores of adjacent subdivisions results in no uniform road plan or provision for an economic system of utilities. In short,

this patchwork plan has little suitability for public use or for the public interest. Future growth and expansion are sorely hampered, and any future uniform development is well nigh impossible.

The extent of premature subdivision and the financial ills that follow in its wake have been clearly shown by recent surveys in New York and New Jersey.

In 81 towns studied in four metropolitan counties of New York State, 56 percent of all vacant parcels were in arrears in tax payments, and "special district" debt, outstanding to the amount of \$38,000,000, had been incurred largely for the improvement and servicing of new land subdivision. Thus, in New York, the costs of government in areas of excessive land platting have been increased by millions of dollars, much of it yet to be paid. The New York State Planning Council report on premature land subdivision has already led to the passage of useful legislation improving tax collection procedures and providing for "in rem" action under certain circumstances.

In metropolitan and resort areas of New Jersey, prematurely subdivided lands, largely of poor quality, are sufficient to supply a million 50 X 120 foot vacant lots, one for every family resident in the State. Unoccupied land in subdivisions intended primarily for all-year-round occupancy can adequately provide for an additional population of perhaps 3,000,000 people, whereas, in the last decade, the total population of the State increased by only 107,000. Excessive costs of providing street improvements alone for New Jersey's poorly laid out vacant subdivisions would cost from \$125,000,000 to \$150,000,000. Sample studies in nine suburban municipalities in New Jersey show that 45 percent of all vacant lots have been tax-delinquent for more than one year, most of them for more than five years. In most cases, unpaid special assessments on vacant lots amount to considerably more than delinquent taxes, and very frequently, total unpaid charges are greater than assessed valuations. Costs of government and debts for local improvements that should have been met by unpaid taxes and special assessments, are shifted to the remaining tax paying

property. Many municipalities facing bankruptcy thus trace their financial difficulties to land booms and excess subdivision of the post-war decade.

These problems are by no means confined to New Jersey and New York, and the recommendations for these States apply likewise to other over-developed suburban areas, such as exist around Baltimore, Washington, Philadelphia and, to a less degree, around nearly every large city in the Region. Recommended remedies include:

1. Reclamation of existing substandard subdivisions either by replatting in accordance with an overall plan or by restoration to rural or other suitable uses.
2. Prevention of surplus and uneconomical land-subdivision through municipalities taking full advantage of platting control powers provided by law, by refusing to finance subdivision development and requiring reasonable improvement of subdivisions by the owners before supplying public services to subdivided areas, and by augmenting legislation where necessary to accomplish the above.
3. Revision of tax laws, where necessary, to insure prompt tax sale, and provide for "in rem" or other simplified and inexpensive foreclosure procedure.
4. Improved methods of municipal real estate management and sale, including the permanent public ownership of lands suitable for parks, playgrounds, schools, street extension and widenings, municipal housing project, and other public purposes.

#### Water

The far West has been sensitive to its water problems for many years, since they were early seen to be basic to the very existence of its people. In the East, however, the people are not water-minded, although the problems of the rivers on the eastern seaboard are no less urgent and affect a much greater number of people. Outstanding problems include those of industrial and potable water supply, pollution abatement, flood control, water power, depletion of ground water supplies, soil erosion, and recreation. These



are outlined below as they affect particular rivers and drainage basins.

The Hudson River Basin Including the Mohawk Basin

The Hudson-Mohawk rivers constitute probably the most important river system in the Region, by reason of their location in relation to New York City, and because they furnish an important water route to the Great Lakes area. Much has already been done by New York authorities toward improvement of the invaluable water resources of this river system on which the life of millions of people are largely dependent.<sup>2</sup>

*Flood Protection and Low Water Control.*—This is a serious problem throughout the Hudson and Mohawk basins, including secondary streams. For this purpose, the Hudson River Regulating District has planned an extensive system of regulating reservoirs in the upper Hudson watershed. This system, as last reported, provided for an aggregate storage capacity of 1,839,000 acre-feet. A high degree of relief is considered possible through the construction of this system which, by regulation and control of flow, will make possible the better use of all water resources.

*Pollution Abatement.*—This outstanding need is particularly evident in the Mohawk Valley, in the Upper Hudson Valley below Glens Falls, and in the Lower Hudson. Pollution in New York Harbor has long been a serious handicap to the fullest use of harbor facilities. New York City has outlined a proposed program to the Interstate Sanitation Commission for sewage treatment plants to be constructed by 1944, in addition to the \$40 million already expended. In addition, there are needed sewage treatment plants for the 26 municipalities not now supplied on the Hudson tributaries, where population aggregates almost 300,000. Industrial wastes from river

cities also constitute a menace to full use of the river. On the Mohawk, only 45 percent of municipalities in an area containing 400,000 population have even primary sewage treatment. These instances illustrate the necessity for pressing existing programs of sewage treatment in the Hudson-Mohawk system; as well as for laying plans for the further abatement of pollution.

*Potable Water Supplies.*—In spite of New York City's gigantic water supply system, the largest in the world, additional requirements have necessitated the development of available sources in the Upper Delaware basin. Other possibilities suggested by the Hudson River Valley Survey Commission are the more complete utilization of the chain of lakes on the east bank of Hudson, extending from the lower part of Rensselaer County through Dutchess County.

*Recreational Resources of the Hudson and Tributaries.*—If further developed, these should add immensely to the usefulness of these rivers. Recommended by various State authorities are:

1. A Hudson scenic parkway on the east bank, extending from Harlem River north to the vicinity of Albany. The west bank also lacks a scenic drive for more than a small part of its length.
2. The further development of pleasure boating facilities and marine recreation, coordinated with existing park systems. It is estimated that nearly 20 percent of the population of the United States is within "using distance" of this body of water from New York Bay to its upper reaches.
3. Further use of canal facilities in the Mohawk Valley, and possible development of waste State canal lands from Cohoes Falls to Schenectady for a parkway.
4. Progressive stocking of the river with fish as pollution hazards decrease.

*Hydroelectric Power Sites.*—Possible development of water power sites above Troy are largely dependent upon regulation of flow by storage reservoirs which would also benefit existing industries and serve to control floods. The completion of the regulating reservoir program of the Hudson River Regulating District should be expedited as rapidly

<sup>2</sup> Specific problems and recommendations outlined are based on reports of several State and Federal agencies, including:

- (1) Report of the Hudson Valley Survey Commission - March, 1939.
- (2) A Preliminary Survey of the Water Resources of New York State, New York Division of State Planning Bulletin 31, May 1936, and Bulletin 42, June, 1936.
- (3) Drainage Basin Committee Reports, December 1937 - National Resources Committee.

as economically possible. Ultimate plan is for 16 reservoirs with capacity of 1,639,000 acre-feet.

#### Lake Ontario Basins

This basin includes the Oswego, Genessee and Black rivers, all of considerable industrial importance. The outstanding needs of the area include:

**Flood Control.**—This problem, still of immediate and general importance, is illustrated by the program of the Black River Regulating District, whose official plan calls for a series of flood control reservoirs aggregating 574,000 acre-feet and costing \$9,400,000; part of which are constructed and in operation.

**Water Supplies.**—Conflicting reports on water supplies suggest the need of a further thorough study. Although supplies are generally ample, there is apparently need of unifying supply systems over much of the area, including the supply for Rochester.

**Hydroelectric Power.**—Water power resources in this basin and in other northern New York basins could be utilized particularly to meet peak power loads of the system proposed for the St. Lawrence River if and when developed, since this project does not provide for daily or weekly pondage.

#### St. Lawrence River and Its Adirondack Tributaries

Three assets dominate the use of these waters: navigation, hydroelectric power, and recreation.

**Navigation.**—Navigation has always been the dominant use of the St. Lawrence. The St. Lawrence Seaway project, together with the New York-Ontario power project, if and when completed, would supply a 27-foot navigational channel to the Great Lakes. Recent international developments have led to reconsideration of some type of navigation and power project on the St. Lawrence.

**Hydroelectric Power.**—The New York State-Ontario Power project to be developed in connection with the St. Lawrence Seaway project would have an installed capacity on the American side of 1,100,000 horse power, with a yearly primary energy output of 5 billion

kilowatt hours, plus three-fourths billion kilowatt hours of secondary energy. Auxiliary power will be supplied from Adirondack streams.

The development of St. Lawrence power awaits approval of a treaty with Canada. A plan for the coordination of power from Adirondack streams and for tying-in these sources with existing distribution systems has not yet been consummated. Specific projects totaling \$277,000,000 for the St. Lawrence, and \$13,000,000 for its tributaries have, however, been studied by State and Federal agencies.

Whereas this project has been the subject of controversy, the ultimate usefulness of the St. Lawrence for water power both for electric utility service and for industry is evident, because of the immense amount of cheap power near a great pathway of commerce.

**Recreation.**—For the preservation of recreational values of the St. Lawrence River, especially in the Thousand Island section, a well-considered regional plan and some form of zoning control is needed. An expansion of the existing inadequate State park facilities in this area is a primary requirement in the light of rapidly increasing public use. Improved transportation and the new international bridge have made this section doubly attractive as a tourist center. The unique picturesque character of this region is of national and international importance, and large parts might well be set aside as a national park.

#### Champlain Drainage Basin

Recreation and flood control are the major water problems in the Champlain basin. No specific recommendations are included relative thereto at the present time.

#### New York-New Jersey Coastal Drainage Basin

This basin shares with the Hudson the problems of the New York metropolitan area and includes Long Island, part of New York City, the southwestern corner of Connecticut and that part of New Jersey whose rivers drain directly into the Atlantic Ocean. Problems are largely ones of water supply, recreation,

coastal erosion, and proper use of tidal marshes and coastal water areas.

*Water Supply.*—With no single river toward which to turn for its water supply, northern New Jersey is urgently in need of water. An integrated system of supply is now under consideration, involving two optional programs:

1. Use of the Delaware and Raritan Canal to bring water supplies from the Delaware River, and
2. Development of supply from reservoirs in North Jersey hills.

The former program has been recommended by the Governor to the New Jersey Legislature. The use of the Delaware and Raritan Canal for water supply purposes, however, would mean partial or complete loss to the State of the extremely valuable recreational potentialities of the Canal property, capable of serving a large majority of the State's population. Development of supply from the northern part of the State would seem to have many long-term advantages and would not preclude the ultimate use of the Canal for water supply purposes.

*Coastal and Tidal Water Problems.*—Rapidly changing land patterns in the New York metropolitan region call particular attention to the problem of optimum use of coastal and tidal water areas, particularly along southern Long Island and along the New Jersey coast. Jamaica Bay illustrates this conflict between planning for industrial or recreational uses, with emphasis changing in the last ten years to the latter use, although limited industrial development is still recommended.

There is also need of retaining lowlands in north Jersey and along the Raritan River free from residential and industrial use. Preservation of river bottoms and tidal lands for recreation and for maintenance of badly needed "floodways" is the suggested program offered by State and regional planning agencies.

Prevention of coastal erosion and preservation of channels are considered further under *Recreation*. The many specific projects heretofore recommended by different State and Federal agencies require careful integration with overall State plans as to probable benefits to real estate, recreation, highways, and wildlife feeding grounds.

Provision of adequate seacoast and tide-water recreation areas has progressed rapidly in the Long Island part of the basin in recent years. Needs are still far in excess of facilities along the New Jersey coast and are discussed further under *Recreation*.

*Other Problems.*—These are illustrative of a large group of problems requiring intensive study, for which a sub-committee has been appointed by the New York-New Jersey Coastal Drainage Basin Committee.

Other problems requiring action include:

1. Ground water supplies in south Jersey and on Long Island.
2. Reduction of pollution in the New York area. The present program, if adequately financed, will accomplish this about 1944. No further specific recommendations are offered at this time.

#### Delaware River Basin

By reason of its location in relation to the New York and Philadelphia metropolitan areas, most of the development problems, and most of the present and potential uses, of the Delaware River are associated with one or another urban interest or activity. Fortunately, this basin enjoys the services of the Interstate Commission on the Delaware River Basin, set up through interstate agreement by New York, New Jersey, Pennsylvania, and Delaware.

The problems of flood control and pollution abatement are common to the entire length of the river—the former relatively insignificant as compared with other rivers of the country—the latter becoming more pronounced as the river reaches the more settled areas below Trenton. Otherwise, the river divides naturally into three parts, each with its peculiar range of problems and potentialities.

Above Trenton, major interests are those of potable water supply, recreation, and, perhaps ultimately, hydroelectric power. From Trenton to Philadelphia, navigation enters as a minor factor, recreational interest lessens, and potable water supply remains to the extent that Philadelphia still obtains its water from this section of the river. Industrial water needs are scattered along the entire river, but become more pronounced at Trenton and greatly

increased in volume at Camden-Philadelphia and below. From Camden-Philadelphia to the Bay, navigation becomes a primary concern, with fisheries becoming important in the lower river.

Assisted by State planning boards and other agencies of the four States concerned, the Interstate Commission on the Delaware River basin has developed a number of recommendations for the basin. Further specific recommendations will result from studies now under way. Outstanding problems and remedies proposed to date are outlined below:

*Public Water Supplies.*—Operating under a decision of the United States Supreme Court, New York City is now engaged in a project to take 440 million gallons per day from two tributaries of the Upper Delaware. Studies are now under way by the Interstate Commission on the Delaware River Basin designed to supply a factual basis for determining the question of equitable utilization of available water supplies by cities in the three States of New York, New Jersey, and Pennsylvania.

*Recreation.*—Recommendations for further recreational development in that part of the basin north of Trenton include:<sup>3</sup>

1. Abatement of domestic and industrial wastes, in accordance with standards for Zone IV set up for the river by the Commission (See *Pollution Abatement*).
2. Acquisition and development of extensive river frontage for public recreational use.
3. Improvement of opportunities for fishing through restocking and uniform State fishing laws.
4. Preservation and maintenance of portions of the Lehigh-Delaware Canal for recreational use.
5. Preservation of scenic and recreational equities along such scenic highways as N. Y. Route 97 from Port Jervis to Callicoon and possible extension of such "Delaware Trail" southward to Trenton and below.

*Pollution Abatement.*—Sanitary disposal of industrial and domestic wastes of the larger

cities, notably Philadelphia and Camden, is a prime need. Operating under a Reciprocal Interstate Agreement, Delaware, New Jersey, New York, and Pennsylvania have set up minimum standards of cleanliness and purity for the river. From 1936 to 1939, several sewage treatment plants were constructed at a cost of \$10,580,000. An estimated \$65,000,000 is needed to complete the program for abatement of water pollution from municipal wastes, on the basis of criteria suggested above, with Philadelphia and Camden recommended to contribute the largest part of the cost.

There is also serious need for reduction of industrial wastes in the main stream and in such tributaries as the Schuylkill, where refuse from coal mines (culm) tends to obstruct channels and seriously to interfere with recreational uses. A planned program of action does not exist and is badly needed.

*Navigation.*—Improvement and maintenance of a navigable channel to the Philadelphia and Camden Port is needed as both a peacetime and defense measure.<sup>4</sup>

#### Susquehanna River Basin

With a drainage area of 27,500 square miles, the Susquehanna is the largest stream on the Atlantic seaboard. Within the basin are important industrial centers, large anthracite and smaller bituminous coal fields, gas fields, and extensive transportation systems. Sixty percent of the Basin is in farms, ranging in quality from some of the finest agricultural land in the country to areas definitely submarginal for farming. The remainder of the basin, in forest and game lands, includes large areas of second growth timber. Much of the submarginal and forested land is particularly adapted to such multiple-purpose uses as timber production, game conservation, watershed protection, and public recreation. Much of it is tax delinquent and should be under some form of public ownership or control.

The more important water conservation problems of the Susquehanna Basin are: (1) Flood control, (2) Pollution, (3) Power development,

<sup>3</sup> Recommendations pertinent to this program are included in *Delaware River Basin, The Upper Valley -- Planned Development or Exploitation*, a publication of the Interstate Commission on the Delaware River Basin.

<sup>4</sup> In this connection, reference is made to existing reports of the Corps of Engineers.

(4) Drainage of anthracite mines, (5) Water and soil conservation.

*Flood Control.*—This is the basin's most urgent problem. In the 1935 and 1936 floods alone, property damage exceeded \$85,000,000, not to mention the number of lives lost. An extensive program for protection of cities and towns by means of levees and protection walls along the main river, and by dams, channel improvement, and flood walls on the branches is partly constructed, partly under way, and partly under consideration by the Corps of Engineers. Improved land practices offer partial solution for retardation of run-off. This program is being further developed by the Soil Conservation Service. Zoning of flood plains so as to prevent construction on such plains offers one of the best plans for protection of private lands and has been recommended repeatedly by the State planning agencies involved.

In the Pennsylvania section of the Susquehanna basin, \$10,000,000 worth of levees and related works are now under construction by the Corps of Engineers. Additional levees to the amount of \$6,000,000 have been authorized, but this program is now being revised in the light of recent conditions. The more extensive Southern New York flood control project includes two reservoirs and six local improvements completed or under construction and twelve other proposed projects, the total cost estimated to exceed \$33,000,000. In considering questions of justification of flood control programs, intangible social and psychological injury chargeable to floods is an extremely important factor that should not be overlooked.

*Pollution Abatement.*—Most of the municipalities in the Basin discharge untreated sewage into the streams. The hazard of contamination has been aggravated by discharge of industrial wastes, of which the most serious are waste and culm from coal mines. Cooperation of coal producers and State and Federal agencies is now needed in stabilizing mine refuse banks, together with a progressively stricter enforcement of existing sanitary legislation, where necessary.

*Hydroelectric Power.*—Although river regulation will improve hydro power potentialities,

and although the river offers fine future prospects for power, specific recommendations must await further study and development of markets.

*Drainage of Anthracite Mines.*—This is an increasingly vital problem in the lives of over one and a quarter million people, directly or indirectly affected by flooding of "drifts." Anthracite coal, valued at over \$200,000,000 (at the breaker), is produced yearly in the 480 square miles of the Pennsylvania anthracite region.

The drainage problem arises from past practices of allowing surface water to accumulate in abandoned workings and drain into currently operated mines. The latter are thus responsible for the drainage of the increasing number of abandoned mines. Pumping costs per ton of coal mined now range from 14 cents to 25 cents in most instances. This problem cannot be solved by the mining companies alone; both State and Federal aid in making a comprehensive study of the situation is needed, a study involving consideration of economic and engineering aspects. Such a cooperative investigation costing \$300,000 has been requested by mine operators. The Susquehanna Drainage Basin Committee has recently recommended a preliminary examination to determine the advisability and the character of such a study.

*Other Water Problems.*—These include protection of watersheds for public water supplies and improvement of streams for recreational use. This latter will be greatly facilitated with the reduction of pollution and by progressive restocking with fish.

#### Chesapeake Drainage Basin

This drainage area includes the upper and lower Chesapeake, the Potomac, and the James basins. The most important water problems are abatement of pollution, recreation, fish and wildlife conservation, and flood control. These vary in importance in different parts of the area.

*Land and Water Conservation.*—Studies by State planning boards and Federal agencies indicate that at least five million acres of land in this Basin are unfit for agriculture and better adapted to forestry, recreation,

watershed and wildlife protection. Protection of public water supplies, reduction of silting in river channels, soil conservation, and flood control are all related to this problem of land-water management in up-stream areas.

Studies now under way by the Department of Agriculture in the Potomac basin are designated to present a factual basis for flood control work involving improved agricultural and silvicultural practices. In order to reduce flood damages 20 percent to 25 percent certain land-water conservation measures are recommended including: public ownership or control of much of the low-value farm lands in the basin for forests, improved large scale timber management, flood plain zoning, improved cropping and soil conservation measures.

*Seafood Conservation.*—Both commercial and recreational fishing present serious problems in the Chesapeake and Potomac estuaries. Steps toward a Virginia-Maryland interstate compact have been taken to control shell fish harvesting. Continued efforts along this line are needed if commercial fisheries in this area are to survive and prosper. Pollution does not seem to be serious enough to have affected oyster beds.

*Pollution Abatement.*—The James River-Hampton Roads area still finds this a major problem. Health, navigation, and wildlife interests are all affected. Virginia cities on Hampton Roads now are taking steps to install sewage disposal plants.

An interstate compact between the States of Maryland, Virginia, Pennsylvania, and West Virginia for consideration of the water problems of the Potomac, particularly pollution, has long been discussed and is about to be consummated.

*Recreation.*—With the extension of the George Washington Memorial Parkway westward above the Potomac and the opening of part of the Chesapeake and Ohio Canal for public recreational use, the development of important recreational values along the Potomac River is of immediate interest. (See *Recreation*).

#### Carolina Coastal Drainage Basin

The rivers of this basin, the Roanoke-Chowan, Tar-Neuse, Cape Fear, and Yadkin-Peedee, drain large sections of North Caro-

lina and part of Virginia. Total land area is about 60,000 square miles, with a total population in excess of 4,000,000, of which 79 percent is rural and 21 percent urban. Primary development needs are:

*Adequate Water Supplies.*—This involves improvement and integration of urban water supplies, particularly in the rapidly growing industrial Piedmont area. New sources of supply are needed in many instances.

*Pollution Abatement.*—Reduction of both domestic and industrial pollution, aggravated in late years by the rapid industrialization and urban growth of certain sections of North Carolina, is required.

*Recreation.*—The vast area of inland sounds, river estuaries and lakes provides a great natural resource for recreation that calls for comprehensive planning if its values are to be conserved and adequately used.

*Other Problems.*—In the coastal plain, the problem of gradually receding ground water tables and water supplies is intimately tied up with the need of a comprehensive plan for the undeveloped areas in this part of the basin. In coastal areas, such problems as salt water infiltration, land drainage for malaria control, protection and propagation of fish, and beach erosion are serious. Much more study of specific water problems in the coastal plain is needed before specific recommendations can be made.

In the Piedmont area, a well-rounded program of soil conservation and water utilization is needed. Both potable water supplies and industrial water needs will be improved by cropping practices designed to retain much of the present run-off. At present, detailed plans for improvement of water supply in the Piedmont area are definitely dependent on some overall study designed to recommend a program for land use, both agricultural and urban. While hydroelectric power has already been developed to the extent of more than one million horse power in the Piedmont area of North Carolina alone, an equal amount is still available for development when the regional market is prepared to absorb it.

#### Industry

Containing some of the largest industrial centers in the country, such as those in New

York, Philadelphia, and Baltimore port areas, the Pittsburgh steel section and the Buffalo-Niagara district, the Region accounts for nearly 35 percent of the value of the Nation's industrial output.

Some of the major industries, such as steel, machinery, aircraft, shipbuilding, and clay products used for building, are subject to wide cyclical fluctuations in output and employment. Subject to less violent cyclical fluctuations are many other important manufactures such as paper and printing, tobacco, confectionery, malt liquors, silk and rayon textiles, and many chemical industries, especially paints, drugs, fertilizer, and petroleum refining. Clothing, one of the largest of the Region's industries, is subject to high seasonal unemployment but remains reasonably steady from year to year.

Although, as a whole, the Region has a rather well balanced industrial structure, certain sections, such as the Pittsburgh and Newport News areas, suffer from undue dependence on a single industry.

In some cases, industries are located to take advantage of nearby raw materials or power resources, such as tobacco in Virginia and North Carolina, hydroelectric power at Niagara, and coal and oil in western Pennsylvania. More frequently, location is governed by proximity to the great eastern metropolitan markets, wholesale centers, specialized service facilities, and pools of labor with many diversified skills. Assembly of raw materials and marketing of finished products is facilitated by good, although often crowded, highways, low freight rates of the "eastern" territory, and cheap water transportation by sea, lake, navigable river, and canal. Major handicaps to industry are high taxes, high living costs, and wage levels higher than in many parts of the country.

#### Major Objectives

A program for industrial development for any region or locality should seek to encourage a healthy, diversified, articulated, and stable industrial structure. Such a structure would create conditions favorable to better hours, wages, working conditions, and labor relations, and would form a basis

for sound long-term investments in each community in housing, commercial establishments, transport, utilities, and public improvements of all types.

The Middle Atlantic States will benefit themselves and the Nation by recognizing their industries as an integral part of a national and world economy. Instead of fighting a rear-guard action to prevent flight of certain industries to the South or elsewhere, they will do well to develop markets in the rapidly industrializing South for the many products in which their industries have a large margin of advantage. Higher incomes elsewhere create wider markets for the machinery, drugs, typewriters, clothing, cigars, and cigarettes of the Middle Atlantic Region.

#### Program

An industrial development program for this important manufacturing Region cannot be satisfactorily formulated except on the basis of careful appraisal of the industrial functions and industrial prospects of its several parts in relation to national industrial structure and world-wide economic trends and possibilities.

In Maryland, for example, detailed economic studies give evidence of reasonable diversity in the State's manufactures, and better stability than in the Nation as a whole. Collectively, her industries have experienced generally increased employment and output, and have bettered national trends by a substantial margin. Employment losses in some industries, notably textiles, non-ferrous metals, and lumber products, have been compensated by gains in others such as steel, food, and leather products. Recent developments at the Bethlehem Steel and Martin Aircraft plants at Baltimore suggest that manufacturing expansion is continuing and demonstrate further Maryland's ability to make necessary industrial readjustments to keep abreast or ahead of national economic development.

Industrial orientation studies, in many respects similar to those of Maryland, are under way in New York. The Pennsylvania State Planning Board has carefully analyzed emerging industrial opportunities and recommended the stimulation of those industries

that bid fair to form permanent assets of the State's manufacturing economy. New Jersey and Virginia are also carrying forward industrial analyses of varying types.

All States in this Region would do well to carry on studies along these lines, parallel to national industrial studies, with free interchange of information on sources, methods, and analyses. Cooperative work in developing such industrial studies might pave the way for subsequent planning, and complementary action by public and private agencies on the regional and national, as well as the State and local levels.

Pending such studies by all States concerned, and possibly by the Federal Government, the following program is recommended:

1. Revision and reasonable equalization of industrial taxation and subsidy policies through interstate conference with participation by all levels of government.
2. Elimination of uneconomic differentials in freight rates, and wage levels between the northern part of the Region and southern areas.
3. Formation of local industrial planning councils recognizing the mutual interests of manufacturers and the community. Such councils should encourage industrial plant investments only when:
  - a. Comprehensive investigation of facts reveals reasonable ability of industry to become a permanent community asset.
  - b. Location of plants promotes desirable community development.
4. Particular recognition of the serious problems of the anthracite coal areas of northeastern Pennsylvania and the bituminous coal areas of western Pennsylvania, Maryland, and southwestern Virginia. These areas contain large populations, major portions of which are economically dependent on a single mineral resource. Due to the mechanization of mining operations and the depletion of the most easily mined and better quality coal reserves, present high unemployment will probably increase rather than decrease over a long period, unless new or supplementary economic support can be found either in the coal areas or elsewhere. Cooperative action by mining, industrial, commercial, agricultural, forestry, and other interests, private and governmental,

is required to minimize some of the serious economic problems.

#### Transportation

In the Nation's most industrialized Region, adequate facilities for rapid movement of both people and freight are most important. Add to this the fact that this same area is most important for movements for defense purposes, and we find that mobility is a paramount necessity. Consideration must therefore be given to highways, railways, waterways, and airways.

#### Highways

The following highway needs in the Region are not meant to be all-inclusive. They illustrate specific examples of representative types of highway improvements for which recommendations have already been advanced.

As perhaps is common to all heavily developed sections, and in spite of the great amount of money spent upon them, the highways of the Region have undergone and are still experiencing an unprecedented rate of obsolescence. Hindsight shows that this obsolescence and present resulting inadequacies in the highway system are due chiefly to: (a) underestimate of increase in vehicular traffic; (b) lack of planned integration of highway locations with the development of contiguous areas; (c) failure in appropriate instances to develop highways on the freeway principle; (d) failure to acquire rights-of-way of sufficient width; and (e) failure to protect highway frontage against deleterious development of a nature diminishing both highway safety and utility.

Such as they are, improved highways now exist to serve the principal point-to-point requirements of the Region. But, while the basic system of major highways is virtually complete, the service remains inadequate. Many of the existing highways need to be modernized; relief highways must be constructed to supplement or take the place of the more over-crowded and the more obsolete of the existing roads; and all major highways need protection against the uncontrolled development and use of abutting frontage, such as is to be achieved through zoning,



the establishment of set-back building lines, and the regulation of land-subdivision activities.

As State and interstate highway plans are developed and new construction is undertaken, increasing emphasis should be placed upon the freeway and parkway type of road—this not only in the interests of safer and more pleasurable driving, but as an element in improved capacity, individual and public economy, and reduced rate of obsolescence.

State and sectional plans for the Region are not yet sufficiently developed to permit the listing of any considerable number of needed new interstate highways of assured merit.

*Atlantic Coastal Highway.*—Among the several current proposals, however, is one which appears especially deserving of commendation, at least in principle—the proposed coastal highway from Washington to New York with extensions north into New England and south into the southeastern and southwestern States. Because of the area to be served, this proposed highway is likely to be the most important ever to be built in this country. It is eminently fitted for both peacetime and defense purposes. Properly designed and properly located, it will become the backbone of the highway system of the East Coast. As a facility for efficient mobilization of military forces and for the rapid movement of troops and munitions, it would be indispensable.

Of the alternative proposed locations for this road—one generally heading directly to and through the principal cities enroute—the other placed near but inland from the principal cities, the latter appears to have a number of important advantages, including those of economy and reduced vulnerability in case of war. It is believed that by use of roads leading into and out of principal centers of interest along the way, the "inside" location will prove as serviceable, if not more so, than the city-to-city location.

*Baltimore-Washington Freeway.*—A second urgently needed highway link is the proposed city-to-city highway between Washington and Baltimore. This is planned to include a 400 foot right-of-way and will be built on the "freeway" principle. The cost to Maryland

alone will be at least \$7,000,000. Much of the right-of-way will be on Federal-owned land with cost of acquisition reduced to a minimum. This road is planned for completion in the near future.

*Washington-Annapolis Freeway.*—A similar parkway is needed between Washington and Annapolis as recommended in the Baltimore-Washington-Annapolis Area plan. The very considerable recreational traffic between these cities warrants integration of this highway with existing and proposed park and forest reserves as outlined in the above Baltimore-Washington-Annapolis Area plan.

*Pennsylvania Turnpike.*—The freeway principle in highway design has already been applied to the Pennsylvania Turnpike. This toll road, nearly completed at a cost of over \$70,000,000, stretches 160 miles through the Appalachians, linking Harrisburg and the Pittsburgh industrial area. It is estimated that over 2 million vehicles yearly will use the turnpike by 1945. The value of this type of highway for interregional and trancontinental traffic suggests the need for an early extension of the road to the Philadelphia industrial area and its ultimate tie-in with the proposed coastal highway. A prorated cost of the extension would approximate 39 million dollars.

Other proposals are noted in considering parkways, under Recreation.

#### Railways

The Region has few rail freight transportation problems peculiar to itself other than those growing out of the convergence of many competing lines upon New York and upon other principal ports. Particular problems include those of an improved coordination of terminal facilities and the elimination of unnecessary duplication of facilities, in the interests of economy. The Middle Atlantic Region shares with the rest of the country the need for modernization of rail transportation facilities, including rolling stock. The East feels this need more, perhaps, than some other sections where modernization of rolling stock in particular is more advanced than in the industrial East.

New construction needs appear to be limited largely to improved terminal facilities to

expedite trans-shipment, and service tracks for new industrial areas. The tendency, and probably the need, is for reduction rather than extension of track mileage.

Unwarranted freight rate differentials between the eastern territory and the southern territory unduly restrict industrial opportunities in North Carolina, as in States farther south. Further equalization in ton-mile rates seems desirable.

Additional passenger rapid transit facilities are proposed for some suburban areas as from Philadelphia into Camden County, and from Manhattan Island into Metropolitan New Jersey, but these projects do not seem to be imminent; their need may be obviated by improved bus transportation; and there is considerable question as to whether, in stimulating still further concentration of population and of central-city activities, they are wise in principle. If there were no other guide, the current experiences of Europe are sufficient indication that excessive centralization of either population or industry is socially and physically hazardous.

#### Waterways

This Region contains four major seaports and numerous other important ports and harbors. Large-volume shipping includes widely dispersed pleasure boating by means of countless small craft, much inland commercial traffic as on the several canals and navigable rivers and bays, as well as naval and commercial sea-going activity.

*Commercial Traffic.*—Except for the proposed controversial St. Lawrence Deeper Waterway project, most of the basic present port and channel requirements of the area have been, or are in the process of being, met. Most of the remaining requirements of ocean-going traffic are those of channel improvement and maintenance. The one proposed intra-regional waterway project of major proportions, a ship canal across New Jersey connecting the ports of New York and Philadelphia would be so costly in proportion to its utility as to be of doubtful economic justification.

*Pleasure Traffic.*—Perhaps most neglected in the Region have been facilities for pleasure boating, apparently increasing in popularity.

Designed in considerable part to serve such boating interests is the recently proposed project for deepening the inland water channel along the Jersey Coast to 12 feet, to connect with a proposed canal across Cape May, providing a further link in the inland waterway extending now from the Delaware Bay to Florida. The inland channel improvement for the Jersey Coast has much merit, but the proposed 12-foot channel depth may be somewhat excessive. It is doubtful if potential use by pleasure boats requiring channel depths greater than 8 or 10 feet is sufficient to warrant the expense of the deeper channel. Extensive commercial use of the bays that comprise a considerable part of this waterway would be seriously detrimental to the primary utility of these waters, that of recreational use.

There is, however, some need for improvement of channels leading to smaller harbors on the lower reaches of the Potomac, and along the Maryland, Virginia, and North Carolina coast, particularly for recreational traffic, but also for local commercial purposes. The former is considered later under Recreation.

A problem allied to channel silting is that of eroding beaches—severe along parts of the Jersey and Carolina coasts. In determining the value of levees, jetties, and other coastal protective measures, it is extremely important that such coastal improvement program be considered carefully in the light of State and local development and land-use plans.

*Water-borne vs. Highway Transportation.*—Wherever in the Region minor channel improvements are proposed, they should be carefully scrutinized for their effect upon present and prospective land transportation convenience and costs, since increasingly dense development in many parts of the Region brings out the old conflict between the water-borne and highway transportation. Many waterways of little and decreasing use, usually small tributary streams, still have the right-of-way over much more important and voluminous highway traffic. To the already disproportionately great costs of channel improvement and maintenance, in many such cases, must be added the extra costs of bridge construction that will not obstruct water traffic. Such conflicts are probably most frequent for the lower tribu-

taries of the Delaware River, and are noticeable along the New Jersey Coast.

#### Airways

Size of population, volume of commercial and industrial activity, strategic position on the eastern seaboard and overseas air terminals at New York and Baltimore, all contribute to the large importance of air transportation in the Region. Shorter average-travel distances and the extent and convenience of other forms of transportation in the Region result in less per capita commercial intra-regional air mileage here than in some other parts of the country, but the total volume of air traffic is great and rapidly increasing for this Region, as for all others, and the need for additional land facilities is pressing in many places.

Illustrative of the many deficiencies in the Region is the fact that the removal of the New York metropolitan commercial terminal from Newark to North Beach, and the shift of terminal in the Philadelphia area from Camden to the Philadelphia Municipal Airport, leaves the whole State of New Jersey with no air terminal for passenger or express transportation. Access to air terminals from this State are across the full breadth of the City of New York or Philadelphia. This and similar situations elsewhere in the Region discourage air travel for distances less than several hours duration.

With the assistance of State departments of aviation, State planning boards and other State agencies, the Civil Aeronautics Administration has now nearing completion a national airport plan. Major objectives of this plan include:

1. Duplication of airport facilities in areas of most intense use to allow for the greater separation of commercial-transport and private and training uses, two activities that cannot be safely or satisfactorily mixed, and to provide for future contingencies;
2. Additional port facilities to accommodate the current national training program;
3. Well distributed regional airports to serve groups of neighboring communities and concentrated industrial areas.

In its present form, the airport plan now being drawn up proposes the construction of

300 new civil airports in the Region, in addition to about 150 airports now in operation. Furthermore, many of the existing airports are recommended for extensive improvements. Those given first priority include eight major Class 4 airports, three to serve the New York metropolitan area, North Beach, Floyd Bennett, and Newark, and one each for Philadelphia, Baltimore, Washington, Pittsburgh, and Buffalo. In this connection, there should be noted the newly completed LaGuardia Field at North Beach, and the Philadelphia Municipal Airport at Hog Island, both now in operation, and the new Washington Airport nearing completion. In addition, there are over 75 Class 3 fields proposed for first priority, requiring the same minimum standards as Class 4 airports, except that landing strips and runways need be only 3,500 feet instead of 4,500 feet long. Nearly 150 Class 2 and Class 1 fields are also given first priority.

Although indicating the large volume of airport development work needed, this plan has not yet been sufficiently integrated with other local and regional development factors to provide in all respects a satisfactory frame of reference for safe initiation of an extensive airport construction program. Further, while peacetime aviation facilities should serve many defense purposes almost equally well, State and Federal plans are being adjusted to meet the requirements of defense objectives.

Chief drawback to the rapid advancement of airport construction, especially in the metropolitan parts of the Region, is the continued great degree of dependence upon local and municipal development, maintenance, and operation. Airports are essentially regional, if not national, in service. Because of their physical requirements, they frequently must be located in small outlying municipalities, too poor and too little concerned to finance them.

#### Recreation

The large number of cities in the Middle Atlantic Region, particularly in the New York-Washington "population belt" containing 20 million people, greatly accentuates the need for out-door recreational facilities. Recreational resources are abundant in the forested

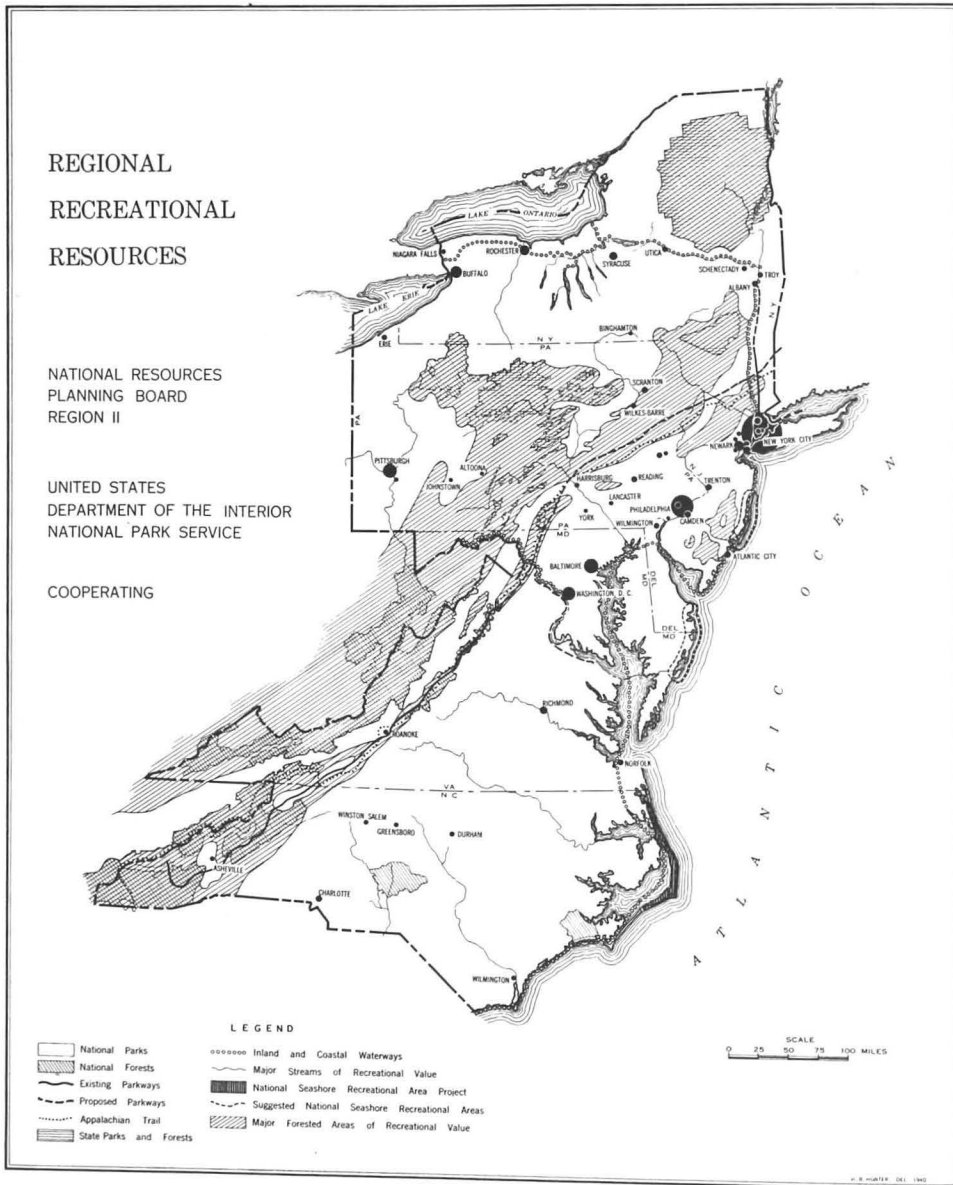


Figure 2.—Regional Recreational Resources

Appalachian "backbone" and on seashore, lakes, rivers and bays. However, public parks, forests, and other areas are inadequate to handle the serious recreational need, particularly of large metropolitan centers, while, with the exception of recent New York developments, very little public beach is available, especially near crowded cities. Exploitation of natural features and overcrowding of existing facilities require early action in order to preserve a greater portion of these resources for public use.

The major areas of recreational importance, the larger State and Federal reservations, together with the largest cities of the Region are shown in the map on page 46. Specific proposals referred to herein are also shown. Many smaller State and Federal parks, forests, and other recreational attractions are omitted here because of lack of space and not necessarily because of their lack of importance, particularly to local communities.

Public expenditures by State governments in the Region for parks, forestry, and fish and game conservation in 1937 total seven and a half million dollars and average 21 cents per capita, throughout the Region. The importance of recreation in the Middle Atlantic States is indicated in part by the retail expenditures of recreation travelers, estimated to total one and a half billion dollars in 1939—27 percent of the total for the Nation.

#### Deficiencies in Recreational Facilities

Recreational development of the Region must go forward along many lines. Current deficiencies, while variable in degree and intensity for different parts of the Region, are evident in all classes of facilities at all levels of government. A recent study of New Jersey, by the State planning board, discloses that the urban recreational facilities of that State meet less than a third of present need. In Pennsylvania, the State planning board recommends an increase in the public park land of from 43,000 acres to 187,000 acres. Virginia, once the mecca for small-game hunters, by neglect of its game population, now loses much of the profitable business and pleasure of small-game shooting

to less conveniently located places. Except in New York State, which excels in State parks and parkways, the Region has few conveniently placed, large, non-urban recreational areas and no public seashore parks quickly accessible and properly developed to serve the crowded hinterlands in New Jersey and Pennsylvania. In this connection, there is need for acquisition of beach and water front areas by all levels of government. The States in the Region have approximately 3,300 miles of seacoast and great lake frontage, of which only about 135 miles or 4 percent is in State and Federal ownership. Adequate access by the public is almost entirely lacking in the case of most of our large cities. Advances, however, have been made in the New York City area and on Long Island and in the case of State and Federal park developments in Virginia and North Carolina. Studies by the National Park Service indicate that at least 10 percent, appropriately distributed, of the frontage of our seacoast, great lakes, and major streams should be in public ownership.

Generally throughout the Region, most strategically placed rivers and streams are so severely polluted as to have a much diminished recreational value and, in some instances, none at all. New York State and Pennsylvania are considerably advanced in the matter of State-forest holdings. Virginia and North Carolina lead in national park and forest lands and improvements. But in some degree, there is a recreational lag in all States of the Region in all classes of facilities. However, rapidly maturing park and recreational plans now in process in several of the States, and by Federal agencies, including the National Park Service, should shortly produce more specific and inclusive recreational-development plans and programs for this Region.

Particularly in suburban and rural areas, greater attention should be given to the possibility of utilizing consolidated schools and grounds as community recreational centers. In general, school grounds throughout the Region—urban, suburban, and rural—are totally inadequate to meet the needs of ordinary school recreation. Often little can be done to remedy this situation. In rural and suburban sections, however, a little foresight

can generally provide a adequate playground space adjacent to the school at relatively little expense. The amount of land will vary in each instance. Twenty acres is recommended as a minimum in the case of high school and rural consolidated schools. There is a wide variety of recreational uses to which such recreational centers could be put, as shown on the accompanying plan. These include the common intensive games, playground and nursery school activities, and adult recreation.

Historic areas of national and regional importance not shown on the accompanying map include thirty-one historical sites under the jurisdiction of the National Park Service, in addition to many administered by State, local, and private agencies. Outstanding examples include Colonial and Morristown National Historic Parks, Gettysburg National Military Park, Valley Forge, and Mount Vernon. Mention is made in this connection of the Historic Sites Act of August 21, 1935, which provides that the Federal Government may enter into cooperative agreement with State and local groups for preservation and use of historic sites, regardless of whether ownership is vested in the United States.

#### Proposed Recreation Developments

Many recreational needs in the Region are clearly a responsibility of cities and counties. These include adequate neighborhood recreation facilities, both urban and rural. The following proposals of regional importance are the result of studies undertaken by such agencies as State conservation commissions and State planning boards and the National Park Service. The Park, Parkway and Recreational-Area study being conducted by the National Park Service, in cooperation with States, under authority of the Act of June 23, 1936, has been instrumental in forwarding the State recreational plans of many States. A number of recommendations below are particularly emphasized in these State studies. The list below illustrates some of the major proposals:

1. Development of large outlying parks and reservations in the neighborhood of our eastern cities, in order to carry out recreational aspects of interstate regional plans for such

metropolitan areas as New York, Philadelphia, Baltimore, and Washington. As an example, immediate attention is directed to the proposed Hackensack Meadows (N. J.) State Park to provide badly needed open space for the crowded north Jersey cities. Half the population of New Jersey and the tremendous reservoir of people in New York City are within 10 miles of this site.

2. Establishment of adequate seashore recreational opportunities. Major proposals include public seashore areas in New Jersey and south of Delaware Bay, in addition to the Cape Hatteras National Seashore Recreational Area project in North Carolina being undertaken by the National Park Service. In addition, further acquisition of public beach frontage by cities and counties—possibly outside their own limits—is also to be encouraged.

a. Best remaining sites adequate for such development in New Jersey are stretches of virgin beach north and south of Barnegat Inlet. Both areas are considered appropriate for inclusion in a suggested "national seashore" by the National Park Service. Particularly recommended for purchase and development as a State park by New Jersey conservation and planning agencies is Island Beach—eleven miles of unspoiled coast just north of Barnegat Inlet.

b. Authorization for Federal acquisition of large portions of the 70 miles of coast stretching from Cape Henlopen in Delaware through Maryland to Assateague Island in Virginia is now before Congress (H. R. 9718). This stretch of coast contains excellent recreational reserves which will undoubtedly be needed in the near future. By reason of their potential service area, extending over several States, both of the above projects would appear to be logical subjects for Federal development or Federal aid.

c. Proposals for Maryland include badly needed public beaches on Chesapeake Bay serving Baltimore and near-by metropolitan areas.

3. Development of public forests, watershed protective areas, and submarginal land-purchase areas discussed under *Land* for extensive recreational use consistent with other purposes. Such areas as the upper Delaware River basin and the southern Jersey pine barrens with 1,000,000 acres recommended for public acquisition have relatively high recreational value, due to their character and availability to large metropolitan centers.

4. Development of specific river, canal, and mountain parkway projects such as:

a. The extension of the George Washington Memorial Parkway from its present proposed terminus at Great Falls to connect with the proposed Blue Ridge Parkway extension in the vicinity of Harpers Ferry; and from Mt. Vernon to the George Washington Birthplace National Monument. This project has particular merit in the light of rapid expansion of the Washington metropolitan area.

b. Blue Ridge Parkway extended from Skyline Drive through Pennsylvania to New York and to New England, integrated with existing and proposed recreational areas in each State.

c. An extension of "The Delaware Trail"—a proposed scenic highway generally paralleling the Delaware River from the vicinity of Trenton to Port Jarvis.

d. Utilization of the Delaware and Raritan Canal property of New Jersey and appropriate adjacent areas for a "recreational way" if not required for water-supply purposes. Recent acquisition by Pennsylvania of the scenic Lehigh-Delaware Canal for park purposes exemplifies the type of use to which out-dated canals may be put.

5. Improvement and preservation of the recreational values of highways, as recommended under Highways in this report, with special application to the proposed coastal highway and the Maryland project. In this connection, there is needed a much more adequate system of roadside rest and picnic areas, located possibly 20 to 30 miles apart. In highway as in recreational planning, much more consideration should be given, in certain instances, to the highway as a "recreational way," involving sufficient right-of-way for bicycle paths, riding trails, hiking trails, and water recreation where highways parallel rivers or canals. Many individually small but cumulatively great recreational opportunities are lost in this connection because of lack of integration between highway and recreation plans.

6. Further improvement of the fish and game population of the Region, in recognition of the fast increasing popularity of the related sports and of both their recreational and commercial potentialities, with special emphasis to be placed upon pollution abatement (see *Water*) and the restoration of fish and game life in the most depleted areas, stocking of interstate streams, and more adequate regulation of the taking of salt-water game fish.

7. Adequate provision of facilities for camping, hiking, bicycling, skiing, and allied winter and summer "action" sports. These show a tremendous recent increase in popularity and should be provided for in State and regional recreational plans and in the specific projects noted herein.

8. Preservation for recreational use of appropriate historical and archaeological areas. National monument and national historical park projects in this category include those at Cumberland Gap, Virginia; Saratoga, New York; and the estate of Patrick Henry in Virginia.

#### Housing

Throughout the Middle Atlantic Region, it is conservatively estimated that at least a million and a half dwelling units, 15 percent of the total, should be replaced. Real property inventories conducted in 1934 and 1936 show that in New York City and Philadelphia 14 percent of the homes lack indoor toilets; in New Jersey 25 percent of the urban dwellings need major repairs; and in Norfolk 34 percent have no bath facilities.

#### The Need

Because the cities in this Region are among the oldest in the country, because many of their slum districts were built from 40 to 70 years ago, before the era of adequate housing or health codes, because rapid city growth has encouraged high speculative land values in residential areas outside of central business districts and adjacent to outlying subdivisions, and because building requirements and costs are high, this Region faces particularly difficult obstacles in attacking its housing problems. Nevertheless, local housing authorities in many of the larger cities in the Region have begun to provide decent housing for a small portion of the low-income groups, totalling 85,000 dwelling units already constructed, under construction, or under loan contract with the United States Housing Authority. However, twenty cities of over 50,000 population in the Region do not even have a local housing authority.

In very few cities north of the Potomac, where over 80 percent of the Region's population live, have new homes been built by private enterprise within the economic reach of families earning less than \$1,000 a year. Approximately a third of all families fall in this group. Unless public funds for housing these low-income families are provided much more liberally than in the past, or unless large scale "low cost" housing can be made more attractive for private capital through lowering of urban land and building costs, a considerable portion of urban families will continue to exist in unsafe and unsanitary dwellings in submarginal social environments. With this great need existing for the last decade, it would seem that private capital cannot profitably fill that need or it would have done so.

#### Meeting the Need

Bearing the above in mind and pending release of 1940 census data on housing conditions the following suggestions are made:

1. Each urban center in the Region should have a housing authority.
2. New housing for low-income families should be constructed at a considerably more rapid rate to cope effectively with the problem. Federal funds for loans and grants to local housing authorities should be available in large amounts.
3. Housing plans should be integrated with city plans through review of location, design, and rent levels of housing projects by local planning and zoning authorities as well as by local housing authorities.
4. Continued attempts should be made to attract private capital to the field of low-cost housing through lowered land, building, and financing costs.
5. Dwellings shown to fall below reasonable minimum standards of safety, sanitation, light and air should be demolished or improved at least to meet such minimum standards as rapidly as practicable.
6. While housing conditions of rural families in many sections of the Region need to be improved, such housing needs should be carefully studied in relation to social, economic, and land-use trends. Rural housing

programs should be coordinated with agricultural land-use programs and rural land plans.

#### Education

The States in the Middle Atlantic Region spend over half a billion dollars a year on primary and secondary public education. More public money is spent for education than for any other public service. Each of the States north of the Potomac spends more per pupil than the average for the Nation, with current expenditures in New York, New Jersey, and Delaware over \$100 annually per pupil.

#### Some Facts of School Planning

Although this Region has some of the best educational plants and programs in the Nation, in many areas an excessive price is being paid for relatively inferior public education service, and it is doubtful if, in the region as a whole, there is any public function more unplanned than the public school system. In New York and Pennsylvania together, there are still 10,000 one-room schools. An extensive inquiry by the New York State Regents reported 1,288 one-teacher schools with an average daily attendance of ten or less, and 245 of these with five or less pupils. When a school has five or less students, the cost per pupil is four times the average, and twice the average when there are from six to ten pupils in attendance. The New York State Planning Council has shown that schools situated in submarginal areas or areas recommended for farm abandonment are generally much more costly on a per pupil basis than those on better land, because of the lower average daily attendance. In the 20 one-teacher school districts in submarginal areas of Tompkins County, New York, for example, per pupil costs averaged \$162, with 87 percent of this amount provided through State aid. To a greater or less extent, the same situation exists in most submarginal rural areas in the Region.

The Pennsylvania State Planning Board reports that, due to the smallness of local units of school administration, there is a lack of educational opportunity throughout most of the State. Two thousand, two hundred and sixty-four school districts, or 87 percent



of the total, are too small to maintain, with any degree of economy, a high school program that provides an adequate curriculum. New York State recommends that its 7,000 districts be combined into a few hundred large enough to support adequate educational programs economically. Reorganization of school districts undertaken in coordination with a policy of submarginal land purchase would provide better education per dollar.

In New Jersey, studies by the State planning board indicate unnecessary duplication of high school facilities, due in many cases to the ambition of each of the many small municipalities to have its own local high school. Regional consolidation in future high school construction programs would frequently provide economy in service and generally improved instruction facilities.

In Virginia, the State planning board, at the request of the State Department of Education and of local school districts, makes studies of pupil distribution and transportation systems for existing schools. Against the background of submarginal land studies and county highway plans, recommendations are made for school abandonment, consolidation, and revised transportation systems for pupils.

In North Carolina, the State supports a uniform eight months school system, with provision for supplementary appropriations by individual school districts, if desired. A school consolidation plan has been in effect for at least a decade and one-teacher schools are now rare. The State supplies bus transportation for every school child needing it and has more school busses and bus mileage than any other State in the Union.

#### Decline in School Enrollments

Rapidly falling birth rates since 1920 have resulted in a decline in grade school enrollments in the Region, as well as generally throughout the Nation. This is particularly true in urban areas and is just beginning to be felt in city high schools. In Richmond, for example, the white high schools enrolled 42 fewer students in September 1940 than a year before. Disregarding possible migration, it is estimated that ten years from now Penn-

sylvania alone will have a quarter of a million fewer young people, and the five States in the Region north of the Potomac, a half million less children of grade school age. The result of these trends, however, is not necessarily a decline in the need for new school facilities. In New York City, although there are more seats than pupils in the city as a whole, some of the buildings in lower Manhattan are half vacant, while schools in new outlying sections cannot provide enough seats. In New Jersey, many school plants are obsolete and substandard in regard to proper daylight for each desk, fire resistance and protection, and play space; furthermore, classes are being held in halls, basements, and rooms without adequate teaching and laboratory facilities. Such conditions are common in many parts of the Region and require modern school building programs to replace obsolete structures and to provide for school consolidation in the interests of economy and more adequate educational opportunities. Such programs should be based on careful estimates of school population trends by age groups and by localities, with due allowance for probable future development.

Much more attention should be given to advance purchase of sites of from 15 to 50 acres for school plants of optimum size. With such sites of adequate size, many localities could provide for combined educational and recreational programs to meet the needs of adults and young people, as well as of children.

Actual or prospective declines in school enrollment call for re-examination of teacher training facilities. With decline in teacher demand imminent in most States, development plans for State teachers' colleges should be reviewed, and careful consideration given to the teacher supply being trained in private institutions and in neighboring States. Such studies and plans have been undertaken by the Virginia State Planning Board.

#### Vocational Training

In Pennsylvania, over 85 percent of all students are receiving an educational emphasis pointing toward commercial occupations, while only 24 percent of the present jobs in the State are in commerce and trade. Adequate

educational counseling, vocational guidance, and extensive curriculum changes are needed to fit youth for available jobs. In addition to more flexible curricula to meet a wide range of abilities and occupational opportunities, there is urgent need for more adequate training in all-around social competency to enable youth to meet in a democratic way the crucial political and economic problems of this era of rapid change. In Pennsylvania, for example, on a State-wide front, an effort is being made to gear vocational planning and direction to the actual needs of the community as in the Williamsport Plan in Lycoming County.

#### Education in the South

Virginia and North Carolina, in common with other southern States, do not provide funds for adequate educational programs, although both have made rapid advances in recent years in their educational system. Not only is per capita general income much lower than in the States north of the Potomac, but, in addition, high birth rates, coupled with heavy emigration of young people and adults, results in a considerably higher ratio of children needing education to working adults able to pay for it, than farther north. With little foreign immigration expected, and with birth rates in many eastern cities lower than those required to maintain present population, it is anticipated that future increments of population in eastern cities will depend, in large measure, on migration from southern rural areas. Consequently, the States north of the Potomac would do well to encourage any plan for better education of their future citizens now residing south of the Potomac.

#### Rural Library Facilities

*The Need.*—Of the States in Region II, only New York, New Jersey, Delaware and Maryland have anything like adequate library services, with public facilities being available in each case to at least 70 percent of the population. In the case of North Carolina and Virginia, such service is available to less than 50 percent of the people. Per capita circulation of books in the latter states is less than half

that of New York, and less than one-third that of New Jersey.<sup>5</sup>

With no attempt to minimize the need for generally improved library facilities, the urgent need, from a social and educational standpoint in this Region, is in the rural districts, particularly in the States of Virginia, North Carolina, and Pennsylvania, with serious inadequacies in rural school libraries.

The following figures illustrate the need in each State of the Region:

State	Percent population without Library service
Virginia	87 percent
North Carolina	55 percent
Pennsylvania	45 percent
Maryland	20 percent
New York	13 percent
New Jersey	5 percent

*Recommendations.*—Recognizing the library problem as part of the overall problem of school and adult education, it is recommended that library service, particularly in rural areas, be made available to those not receiving it, as indicated above, either by:

- a. Adequate school or community libraries,
- or
- b. Direct "bookwagon" or house-door service, following patterns already successful in such communities as Hagerstown, Maryland, and New Rochelle, New York.

#### Toward Planned Regional Development

The preceding sections have outlined some of the outstanding needs and recommendations for regional development in the Middle Atlantic States. At the present stage of planning in this Region, the program presented above does not attempt to touch all phases of regional development, nor to indicate the relative importance of the several functional fields. Rather, it represents a bird's-eye view of the results of planning progress up to the present time, with some suggestions for the future.

#### State Planning Progress

State planning boards have been established in all the States in this Region except

<sup>5</sup> Report of Advisory Committee on Education - 1934.

Delaware. In each State, however, public funds provided for these boards are inadequate. Appropriations for the current year vary from approximately \$54,000 in Pennsylvania to none in North Carolina. Some planning boards have been successful in getting additional funds for special jobs from other governmental agencies and from private sources. To Virginia, through its State planning board, for example, the General Education Board has made available \$177,000 for a four-year program of studies on population, industry, and land use, to be conducted by the State planning board, the University of Virginia, and the Virginia Polytechnic Institute. In Virginia, also, the State planning board has had considerable success in establishing itself as an integral part of the governmental structure, in co-operating with State departments in preparing plans for the development of certain governmental functions, particularly parks, highways, and schools, and in stimulating the application of planning techniques to the daily work of State administrative departments. Maryland is further advanced than other States in the Region in its analysis of problems of finance, taxation, and uniform accounting, in developing administrative procedures for public works programming, and in laying bases for industrial planning. Industrial studies are now receiving major emphasis in New York and Pennsylvania. New Jersey, probably further advanced to a master plan, has given particular consideration to problems of urban expansion, recreation, and land use.

Most State planning boards in the Region have made recommendations for reshaping governmental structure to render more efficient service. In Virginia, for instance, the mere rerouting of school buses according to the suggestions of the State planning board resulted in potential savings of nearly a half million dollars annually. The New York State Planning Council has pointed out the economies possible through reorganization and consolidation of local governments in areas of declining population, and in areas where State purchases of forest and submarginal land is increasing. In New Jersey, in addition to its recommended State land-purchase program, the State planning board recommended that inequitable tax

assessment of rural lands, causing tax delinquency and undue hardship in certain areas, should be remedied by centralization of the assessing function over wider jurisdictions than single municipalities, perhaps on a county or even a wider basis. Recommendations for improved tax-collection and foreclosure procedures and for efficient management and sale of tax-reverted vacant lots have been advanced by the New York, New Jersey and Maryland boards.

#### Local Planning

State planning boards have also been vitally concerned in the stimulation of regional and local planning. In the field of regional water planning, outstanding work is being done by the Interstate Commission on the Delaware River basin. Planning for interstate metropolitan regions is being carried on as a permanent function in the New York area by the Regional Plan Association, and in the Washington area by the National Capital Park and Planning Commission and the Maryland-National Capital Park and Planning Commission. A few counties and municipalities in the Region have adequately staffed and efficiently functioning local planning boards, such as in New York City; Washington; Pittsburgh; Norfolk; Monroe County, New York; and Montclair, New Jersey, to mention a few at random. Few cities, towns, and counties, however, have any truly adequate planning machinery. Many of those with official planning boards are without adequate funds or direction to carry on broadly conceived planning programs.

#### The National Interest

Just as stimulation and coordination of local planning should be the function of State planning boards, so the regional office of the National Resources Planning Board seeks to stimulate and coordinate the work of State planning boards in problems of common interest, particularly those overlapping State boundaries. The regional office, in cooperation with the national office, is also charged with the responsibility of guiding Federal planning and public works programming, so as to meet the needs and fit the plans of State and local agencies.

Planning for regional development, however, depends very largely on progress in State and local planning. Without planning by all levels of government properly coordinated, millions of dollars can be spent on ill-advised and wasteful public and private construction. Although many projects have such obvious merit as to be initiated at once, many others should await further study of their implications in many related fields. These can be thoroughly explored only through the further advancement of planning programs. In many States and localities, stimulation, encouragement, and considerably augmented funds are essential. Since the Federal Government has such a big

stake in this work, it should extend increasing aid to State and local planning, if necessary, in the form of Federal grants.

By demonstrating the economies that can be made by advance planning and programming of public works to carry out plans, planning agencies can become indispensable units in advising those engaged in the administration of the public business, whether Federal, State or local. Only such coordinated planning, geared into the administrative structure at all levels of government, will bring wise and efficient development of this crowded, strategic, and industrial Middle Atlantic Region.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

REGION 3 SOUTHEAST ATLANTA, GEORGIA  
1940

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Report of the  
SOUTHEASTERN REGIONAL PLANNING COMMISSION

*A. J. Hawkins, Director  
Alabama State Planning Commission  
Montgomery, Alabama*

*Lucien Burns,  
Mayor of Selma  
Selma, Alabama*

*George G. Gross, Executive Secretary  
Florida State Planning Board  
Tallahassee, Florida*

*Samuel Teague  
Tallahassee, Florida*

*Robert F. Meddow, Sr.  
Atlanta, Georgia*

*Dr. T. F. Abercrombie, Director  
State Board of Health  
Atlanta, Georgia*

*Mundell M. Bush, Executive Secretary  
Mississippi Board of Development  
Jackson, Mississippi*

*W. O. Tatum  
Hattiesburg, Mississippi*

*Homer M. Pace  
South Carolina Power Company  
Charleston, South Carolina*

*Howard Danner, Vice Chairman  
South Carolina State Planning Board  
Beaufort, South Carolina*

*P. D. Houston, Chairman  
Tennessee State Planning Commission  
Nashville, Tennessee*

*E. W. Palmer  
Kingsport Press  
Kingsport, Tennessee*

*William R. Davlin  
Associate Planning Technician*

*E. Bruce Wedge  
Associate Planning Technician*

*Henry T. McIntosh, Chairman  
National Resources Planning Board*

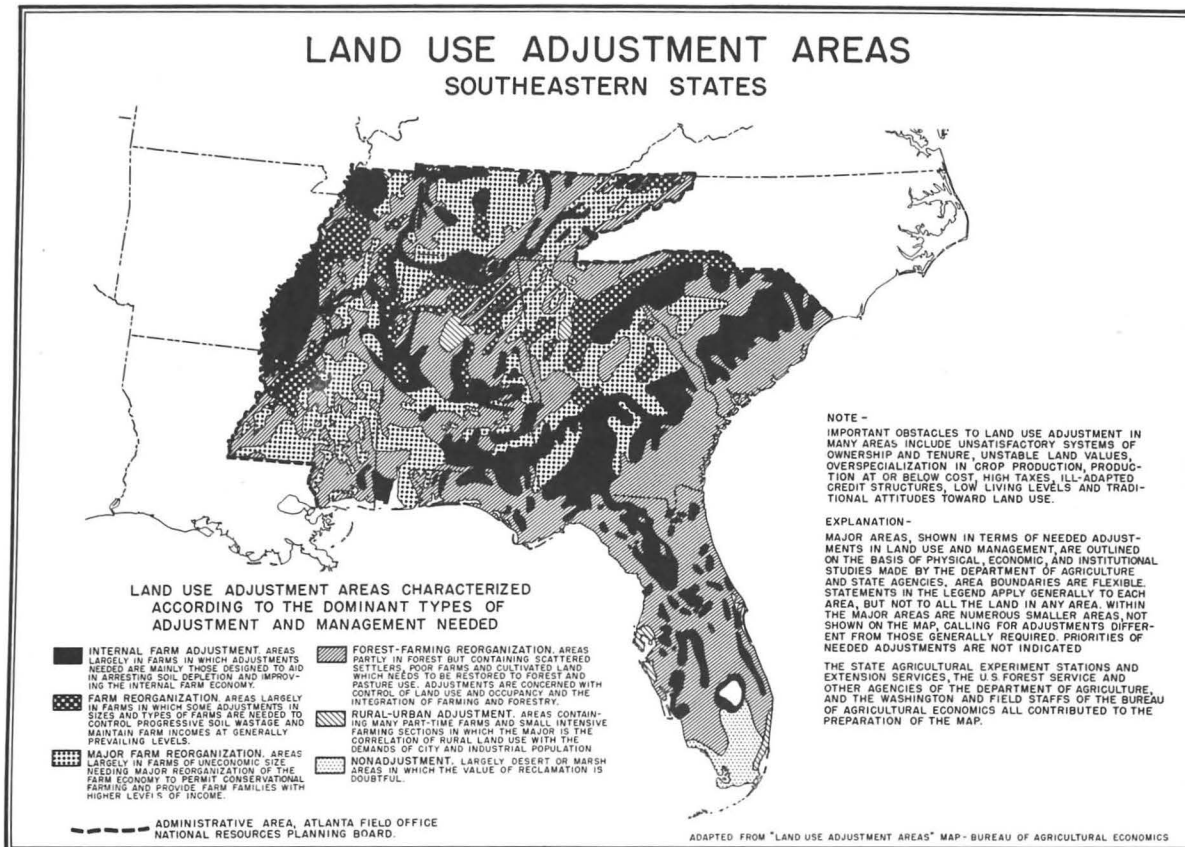


Figure 1.—Land-Use Adjustment Areas

NATIONAL RESOURCES PLANNING BOARD  
FIELD OFFICE  
ATLANTA, GEORGIA

October 30, 1940

Mr. Charles W. Eliot, Director  
National Resources Planning Board  
Washington, D. C.

Dear Mr. Eliot:

I have the pleasure of transmitting herewith a statement developed in the Atlanta Field Office at your request entitled "Elements of Action Within a Program of Regional Development." The statement sets forth a picture of the basic resources, central economic problems, and the lines of action which appear to be required at this point for the development of the administrative area within which the Office operates - Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee. In its present preliminary form, the statement is intended to provide a point of departure in the preparation of a comprehensive program of regional development. During the coming year, in collaboration with the State planning boards and other State agencies, the newly formed Southeastern Regional Planning Commission and its constituent organizations, and the regional offices of Federal agencies, the Atlanta Field Office will attempt to secure a refinement of this initial effort looking toward the comprehensive program.

In transmitting the present statement it is necessary that I note the indebtedness of the Field Office for many of the ideas and much of the material which has gone into the text. While the six-State administrative area over which our Office operates does not, in itself, constitute a social or economic "region", we have been led to view the area in relation to the literature of "regionalism" through the writings of Dr. Howard V. Odum and his associates in their work, *Southern Regions*. Since our States comprise six of the eleven which are there set up as the "Southeastern Region", the attached statement considers them in relation to the larger whole rather than as isolated political subdivisions. Further, with reference to the overall ideas incorporated on such points as basic economic problems and development needs, we have leaned heavily upon two articles published by the *JOURNAL OF FARM ECONOMICS* in February, 1940, as follows: "Cotton, Land and People: A Statement of the Problem", by I. W. Duggan of the Agricultural Adjustment Administration, and "How Can the Southern Population Find Gainful Employment?", by Rupert B. Vance of the University of North Carolina. Finally, we have found particularly helpful the September issue of the *MANUFACTURERS RECORD*, devoted to "The South's Resources", notably the section on the industrial use of farm products by Dr. Henry G. Knight, Chief, Bureau of Agriculture, and the section on Georgia industry by Dr. W. Harry Vaughan of the Georgia School of Technology.

In those sections of the statement which set forth proposed lines of action within specific functional fields, we are considerably indebted to the State planning boards of our area. In response to our invitation, they provided us with a rich fund of proposals derived from their own studies and special reports of other State agencies submitted for this purpose. With reference to the discussion of needed developments within the field of agriculture, we have been assisted with advice and information from the Atlanta office of the Bureau of Agricultural Economics, U. S. Department of Agriculture. Again, in the discussion of developments within the field of forestry, we are under obligation to the State forestry agencies, the Region VIII Office of the U. S. Forest Service and the Southern Forest Experiment Station, the Work Projects Administration, and the six Southeastern State planning boards. We have adapted, essentially, the recommendations contained in the report *The Southern Forests* which was prepared by the Atlanta Field Office of the Board in collaboration with these agencies under the sponsorship of the Regional Committee on Southern Forest Resources. Finally, among other obligations must be mentioned that to the Santee-Altamaha, Peninsular-Florida, Tennessee-Cumberland, Pearl-Pascagoula, and Mobile-Suwannee drainage basin committees. In the discussion of needed developments within the field of water resources, we have leaned heavily upon the thinking and information brought forth in several recent meetings of these committees.

The statement in its present form is now circulating among State and Federal agencies and among private organizations and individuals working for the development of the Southeast. Their collaboration in its refinement and further development is being invited. It is our sincere belief and earnest hope that there may come out of this process a thoroughgoing statement of a program for the correction of maladjustments and the sound economic development of our area.

Sincerely yours,

HENRY T. MCINTOSH,  
Chairman, Region 3.



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PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
T H E S O U T H E A S T

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### 1. The Southeast

The six States that make up the administrative area of the Atlanta Field Office of the National Resources Planning Board—Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee—lie at the core of the Southeastern Region as defined by Odum.<sup>1</sup> This Region also includes Arkansas, Kentucky, Louisiana, North Carolina, and Virginia.

These States possess a number of common characteristics in history, soils, climate, people, and in social and economic activity, which tie them together so uniquely that they stand out as one of the major regions of the United States. One of the most important of these common characteristics is the predominance of agriculture over the area and, within agriculture, the predominance of the single cash crop—cotton or tobacco—as a source of income. This characteristic has created something of a "regional economy" within the national economy—a system of producing, distributing, and consuming food, shelter, clothing, and services that is common among a majority of the people. While many of the difficulties of the Region stem from maladjustments in this "economy," the system is itself something of a major regional asset, since it provides a handle or key to the solution of problems and the attainment of a sound regional development.

#### The People

According to preliminary releases of the 1940 Census, nearly fifteen million people live in the States of Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee. Previous censuses have indicated that the white population accounts for approximately 70 percent and the negro population for the remainder of the regional total. In none of these six States did the rate of growth

between 1930 and 1940 fall below the national figure of 7.0 percent; in Florida the rate was as high as 27.9 percent. Considering the entire Southeastern Region, holding about one-fifth of the Nation's people, only Arkansas failed to keep pace with the growth of the Nation as a whole. As in former census periods, the Southeastern Region has grown faster than the rest of the country. While growth of this magnitude imposes burdens upon these States—in education, in the use of the land, in the migration of middle-age group workers out of the area, for example—it also means workers to produce wealth and consumers to buy the products of farm and factory.

#### Basic Resources

The area covered by the States of the Southeastern Region embraces between one-fifth and one-sixth of the Nation—over one-half million square miles. In the area are rich and varied soil types that provide the basis for great potential diversity in agricultural production. This potentiality becomes even more real when it is noted that the area falls within both the temperate and sub-tropical zones, that in it is located nearly a third of the Nation's land with a frostless growing season of six months and over, and nearly two-thirds of the Nation's area with an annual precipitation of 40 inches or more.

Leaving out Kentucky and Virginia and adding eastern Texas to the southeastern group of States, approximately three out of every five acres in the "Southern Forest Area"<sup>2</sup> is forest land—58 percent of the entire area—169 million out of a total of 294 million acres. All but 3 million acres of this forest area is classified as productive commercial

<sup>1</sup> Howard V. Odum, *Southern Regions of the United States*, University of North Carolina Press, Chapel Hill, 1939.

<sup>2</sup> This is the area covered in a study sponsored in 1938-1939 by the Regional Committee on Southern Forest Resources, the results of which have been published in a pamphlet, *The Southern Forests*, by the National Resources Planning Board, Atlanta Field Office.

forest. While the proportion and quality of this forest resource vary from State to State, over half of the acreage of each is in forests. Of the 169 million acre area, about 13 percent is covered with old growth saw timber; second growth saw timber covers 36 percent; fair restocking timber, 14 percent; and the remaining 16 percent contains very poor restocking timber. The southern forest area produces a rich variety of tree types—the pines, short and longleaf, slash and loblolly, the gums, hickory, oak, ash, and cypress from the swamps. Of the total saw timber, well over half is in pines, about 4 percent in cypress, and the remaining portion in other hardwoods. Perhaps the most vital fact about the southern forest resource is not its present size and variety but the fact that over much of the area, pine growth is rapid enough to make pulpwood out of seedlings in a period of fifteen years. Here is an area that must always devote a substantial part of its land to farming—yet well over half of this land is still in forests, a resource far from exhausted. Moreover, it comes to this juncture at a time when the economics of forest industry and the science of sustained-yield management make possible the continued growth and increased industrial use of its forests.

The Southeastern Region is rich in minerals. Of the world's soft coal reserve, 5 percent is to be found here, approximately one-tenth of the national soft coal reserve. The Region supplies the Nation annually with a fifth of its soft coal supply—yet 88 percent of the coal seams of the area remain untapped. In 1930, the Region provided the Nation with 10 percent of its iron ore supply and nearly a tenth of its pig iron production. Available also are other minerals and materials, limestone, granite, fuller's earth, basalt, slate, marble, copper, cement, bauxite, manganese, clay, petroleum, natural gas, soapstone, barite, sand, gravel—these provide a source of raw materials and building materials adequate, in the opinion of mineral experts, to furnish almost all the major needs for chemical and other processing industries.

In addition to coal, oil, and gas, the Southeastern Region's water resources provide another major source of energy for its indus-

trial development. There is in the Region a potential water power supply of over five million horsepower available for use 90 percent of the time—approximately one-eighth of the Nation's total; over seven million horsepower is available for use 50 percent of the time. In 1930, the Region's capacity of installed water wheels in plants having 100 horsepower or more amounted to 4,199 thousands of horsepower—approximately one-fourth of the Nation's total.<sup>3</sup> The rivers in which this water power is stored dissect the Region with navigable streams providing trade routes from its heart to the Atlantic and Gulf coasts and into regions to the west and north. Coastal cities, large and small, are provided with port facilities, capable of serving ocean-going vessels.

To this brief inventory of population, of land area and soils, of climate, forests, minerals, and water, other regional assets might be added—commercial trapping and fishing grounds, railroads, highways, and airlines. It is evident that the future development will not be retarded by the absence of rich human and natural resources.

## II. An Agrarian Country

Up to the present, the rich and varied resources of the Region have been devoted largely to agricultural production. Of the Region's gainfully employed workers, 43 percent earn their livings in agriculture, as against only 21 percent for the Nation as a whole; 60 percent of the Nation's cotton crop and 85 percent of its tobacco crop are raised by a farm group divided about equally between owners and tenants.<sup>4</sup> However, farm acreages in the Region, steadily declining, are lower than in the Nation as a whole, and although it contains approximately 40 percent of the Nation's farms, the proportion of the Nation's wheat, corn, beef cattle, milk, butter, eggs, hay, many vegetables and fruits that the Region produces in few cases rises over 20 percent, in contrast to the figures for cotton and tobacco.<sup>5</sup>

<sup>3</sup> National Resources Committee, *Energy Resources and National Policy*, January 1939, p. 240.

<sup>4</sup> *Ibid.*, op. cit., pp. 65-69, 66-67.

<sup>5</sup> *Ibid.*

The predominance of agriculture is further sharpened when contrasted with industrial development. In 1937, the value of manufactured products in the Southeastern Region amounted to only one-tenth of that for the Nation as a whole; 1,216,412 Southeastern wage earners, about one-eighth of the Nation's total, were involved in its production. Of the Nation's 166,794 manufacturing establishments reporting, only 20,560 were located in the Region. Despite a leadership in cotton textiles, forest products, tobacco processing, and a distinct prominence in iron and steel, it is obvious that, considered in relation to the Nation as a whole, the Southeastern Region remains a land of farms.

The six States within the administrative area of the Atlanta Field Office share a full part in this agricultural economy, since, with the exception of Florida, they number among the ten principal cotton producing States. Among these ten States, the annual average cash income from cotton alone exceeds the combined income from all other crop and livestock sales. The gross per capita farm income between 1930 and 1935 averaged \$127 and the cash per capita farm income, \$95.

It is this problem with which citizens of the Region are grappling through the several movements that they have organized. In the words of the Citizens' Fact Finding Movement of Georgia, "It is a challenging fact that nearly every report in the Georgia 'Inventory Series' of the Citizens' Fact Finding Movement points to the low incomes of our people as a factor seriously limiting the welfare and development of the State. When we consider that the 'Inventory Series' dealt with all major phases of life and work in Georgia, the widespread significance of our limited incomes is apparent. Unquestionably, these incomes must be raised before the solution of many of our problems can be carried forward."<sup>6</sup>

In the single crop system resides one major cause of low income. Since in both cotton and tobacco the Region produces export surpluses, its prosperity rests in large

measure upon world market conditions. Trade restrictions and growing foreign production of these products have long since depressed the export market, a condition that may now be indefinitely aggravated by maladjustments rising out of the present war. All of this has meant, and continues to mean, depressed prices and the problem of assimilating surpluses.

There are other factors within the cash crop system that have contributed to low regional income. Emphasis upon the single cash crop has been accompanied by only minor effort at diversification since, traditionally, the crop produced money with which to buy products not produced on the farm. No other crop has produced such high returns per acre and per man hour of labor. The direct consequence has been to keep down real income, the value of goods produced and sold plus those produced and consumed on the farm. While the cash crop lessened incentive for diversification, the pressure of a large rural population against existing available cropland reduced farms below a size adequate for raising livestock. It has meant also a deficiency of soil building and conserving crops, lowered fertility, lowered yields, increased expenditures for fertilizers, and less net cash income.

Finally, the cash crop system and the history of the Region conspired to create a system of land tenure under which a major proportion of farm operators rented rather than owned the land they worked. Thus, tenant farmers have shared with owners a farm income hardly adequate for either; they have moved about in the hope of betterment with little incentive to build up soil or maintain buildings and equipment in good repair. Again, soil deteriorates, production costs rise, and income is lowered. It is estimated that 84,600,000 acres within the 10 principal cotton States have been seriously damaged by erosion.

Outside of the cash crop system are to be found other factors contributing to a low farm income. The depression following 1929 deprived the farmer of a part of his domestic market and further depressed his prices. The outlet of northern industrial employment, to which thousands of younger workers had turned during the 1920's, was closed.

<sup>6</sup> Georgia Citizens' Fact Finding Movement, *Industry and Commerce*, Atlanta, December, 1935.

The absence of industrial development within the area has been a major non-agricultural factor in the story of low income. Local financial and commercial facilities serving in the production of export surpluses for a world market failed to produce a surplus of capital available for industrial investment. An artificial barrier to industrialization was imposed by an obsolete system of freight rates that made distribution costs on manufactured goods produced in the Region prohibitive. When industrial development did come, it was financed by capital from the North and East; industrial earnings were then exported also.

#### Consequences

Low individual income has meant inadequate expenditures for housing, food, clothing, education, and health care by families on the farm and in the cities. It has meant, also, an inadequate source of tax revenues for city, county, and State governments and, in turn, for school buildings, teachers and teacher salaries, and public health programs. These conditions not only result from but also contribute to the central problem of low income.

#### III. Program of Regional Development

At a time when democratic government is being put to a real test for world survival, the task of making the social and economic adjustments required to effect an increase in the level of regional income has been taken as a challenge. There is not a single regional problem upon which the beginnings of an attack have not been launched by citizens, separately and in cooperation with agencies of the local, State, and Federal governments.

#### Forces at Work

The greater body of thought and discussion in the Region is characterized by a desire for the wise use of all regional resources in the building of a system of agricultural and industrial diversity. With this basic income-raising adjustment completed, the remedy for other problems becomes a real possibility. A population protected from malaria, tuberculosis, pellagra, and other diseases and housed in comfortable homes—its children

plentifully nourished and in school, its workers employed on farms and in factories earning adequate incomes—is expected to flow first from this integrated development. The new system of agriculture would replace tenancy in part with ownership and in part with a combination of farm and industrial employment. The remaining tenants would be assured of a stake in saving and improving the soil. A new educational system would provide for the training of the youth of the Region within the Region for participation in the future of the Region.

The private efforts being made to bring about this future for the Region are considerable. The daily newspapers and the shelves of libraries throughout the area bring daily testimony that citizens are actively engaged in myriad individual and organized attempts to further it. The organization and activities of the Southern Policy Committee, the Decade of Progress committees in each of the States, and the Citizens' Fact Finding Movement in Georgia are a few of the indications of the earnest and practical thought being given specific problems and programs. The Southern Governors' Conference has already made a major contribution in stimulating action that has led to a partial elimination of the artificial barrier to industrial development imposed by the interterritorial freight rate differential. The work of the Herty Foundation Laboratories in Georgia, in developing the use of southern slash pine for newsprint, has set an example which has vigorously stimulated activity in industrial research in the Region's colleges and has led to wide interest in a series of industrial research institutes. The Industrial Development Council in Georgia has inaugurated a program of laboratory and economic research with reference to site locations for new industries which provides a model for more general adoption. Chambers of commerce in the Region have come increasingly to base promotional activities on the scientific and economic findings of such industrial research work. In community, county, and State land-use planning committees, which blanket most of several States, farmers are evolving from plans for the use of their own land plans for their neighborhoods and

counties. These and other similar movements enlist the joint participation of hundreds of citizens in cities and on farms with experts from business, industry, finance, education, and from a host of agencies of the State and Federal governments.

A partial list of the activities of agencies of government dealing in a special way with key factors in the development of the Region will suggest the scope of the efforts that have been initiated through government. Thus, for example, the agitation over a period of many years for an attack upon the problem of tenancy has, in recent years, led to Federal action. Beginning with the Bankhead-Jones Act, there is now operating in the Region a small but significant tenant-purchase program. The Farm Security Administration is administering a rehabilitation loan program among thousands of low-income farm families and developing the homestead and resettlement projects established in the early 1930's. The problems of erosion and soil depletion are being widely attacked by the local soil conservation districts, State agricultural agencies, extension services of the land grant colleges, and the Soil Conservation Service. Thousands of acres of land throughout the area, formerly devoted exclusively to single cropping, are now farmed in accordance with proper soil conserving standards. Again, through the leadership of the State forestry commissions, the land grant colleges, and the Forest Service, an extensive program of fire control and reforestation is proceeding, which now offers a reasonable assurance for a sustained pulpwood yield even with a considerable increase in the annual "cut" of pulpwood for the growing southern paper industry. These programs of State and Federal agricultural agencies are assisting the farmers on the land in putting into effect the plans of the community and county land-use planning committees. Large multiple-purpose dams are being built along the Tennessee River and on the Santee River in South Carolina. Representatives of Federal agencies concerned with health, wildlife, navigation, and water resources are engaged in joint programs with representatives of State and local agencies and private organizations.

#### The Pattern

Earlier sections of this discussion have indicated, in summary, that the six States within this administrative area, and the Southeastern Region as a whole, though rich in resources and in population, are struggling, through agriculture and industry, to increase a low per capita income and make possible higher standards of living and the expansion or improvement of public services, particularly in relation to schools and health. The private and public efforts that are now being made toward this general goal already suggest the appropriate pattern around which future activities should be organized. Within that pattern, it is possible to suggest several needed lines of action, and a brief description at this point of the pattern of development will provide a clarifying setting for a discussion of these lines of action.

Adjustments in the use of the soil, which will conserve it, improve it, and at the same time raise the real income of farm families, constitute a major need throughout these States. The general nature of the required adjustments within the field of agriculture and the specific areas in which they must be made are indicated on Figure 1, "Land-Use Adjustment Areas—Southeastern States." Until recently, agricultural practices have led to erosion and depletion over wide areas. Upon some of these lands farming cannot be economically conducted—submarginal lands must be retired. The beginnings that have been made in soil conservation and soil management practices must be intensified if present soil wastage is to be checked and a major resource preserved. Some of these practices require emphasis upon crop practices that necessitate larger farm units per family and a shift in emphasis from the cash crop to forage crops and pasture land for livestock. While a wider variety of farm products is thus provided for home consumption and the real income of farm families increased, larger farm units for the existing rural population create an urgent need for the employment of a portion of the present farm population outside of farming; diversified crop practices require stimulation from an expanded market for the sale of raw materials, livestock, vegetables, fruits,

and eggs. The attainment of a higher level of farm income cannot, then, be reached entirely within the field of agriculture.

Consequently, the creation of new employment and market opportunities in non-agricultural industries and services is a key factor in the development of the Region and an integral part of a program for the rehabilitation of its agricultural economy. The vigorous industrial utilization of the States' raw materials and resources—minerals, farm products, forests, and water power—is one of the Region's primary needs.

A program of adjustments within the field of agriculture and of expansion within the field of industry, providing higher per capita incomes, will ultimately assure a more adequate source of revenues for city, county, and State governments and make possible expansion of their facilities and service. While certain of these facilities and services—schools, health programs, and roads, for example, are essential to facilitate this agricultural and industrial development, their ultimate expansion must wait largely upon the attainment of a higher level of regional income.

Within each section of this three-fold pattern, there is much activity in progress, but also, within each there is much work still to be done by citizens in all walks of life, by private organizations, and by agencies of the local, State, and Federal governments. It remains now to describe several lines of action needed in specific functional fields within that pattern, through which the end toward which it is designed may be brought closer.

#### IV. Agriculture

There is widespread knowledge of and agreement upon the general nature of the adjustments required within the field of agriculture—on the farm itself—to provide for a permanent increase in the level of agricultural income. For the maintenance of soil fertility and for the reduction of erosion on lands subject to erosion, the following familiar practices may be adopted: Rolling lands can be planted in permanent pastures and perennial hays; cropland can be terraced, and plowing can be done along contour lines; sheet erosion can be

checked through the planting of crops in strips; rotation practices can be adopted that will provide soil with winter and summer cover; the production of close-growing crops can be increased and the production of inter-tilled crops decreased; the turning under of cover crops increasing the absorption of water will serve to lessen run-off; drainage outlets can be built into the soil to carry off heavy rainfall; gully erosion can be checked mechanically and with vegetative plantings; certain of these practices making for soil fertility—crop rotation and the planting and plowing under of cover crops—must be supplemented through the use of lime and artificial fertilizers. Involved in many of these soil conserving and improving practices is the necessity for using the soil for grazing and feeding a larger number of livestock and for producing a larger share of the family needs for food. In order to provide incentive to undertake and continue such farm-management practices, pride of ownership and security of tenure must be extended to all farm families, a majority of whom are now without it. Finally, areas of farm land now so seriously damaged by erosion that they cannot be farmed economically must be retired from cultivation and reforested.

In all phases of farm management and particularly in the field of land-use practices designed to conserve and improve the soil, there is available an entirely adequate fund of knowledge and advice accumulated over the years and constantly being enriched through the activities of the land grant colleges and the agricultural agencies of the Federal Government. Further, as has been previously indicated, there is hardly a current problem vexing the farm population for which there is not a corresponding program of governmental action in operation. However, this advice and these programs result in action only when they are put into effect on thousands of farms by individual farm operators.

In each of the six Southeastern States, in 148 counties, and in several hundred rural communities, farmers, collaborating with county agents, home demonstration workers, and extension representatives of the land grant colleges, have organized land-use planning

committees. These committees, now in the second year of their existence, are administered by the farmers themselves. Several thousand are at work in community committees classifying the land they know and then farming it according to the wisest uses to which it should be put; they are also developing plans for almost all other aspects of farm management and farm life. In their committees and on their farms, they have access to the technical facilities and advice of county agents, representatives of the State agricultural extension services, and field workers administering the agricultural programs of the Federal Government.

Their activities are organized around a guiding outline, "Work Outline Number 1," which was derived out of the experience of farmers, the Program Planning Division of the Agricultural Adjustment Administration and the State agricultural extension services of the land grant colleges. The program stems from the Mount Weather Agreement between the land grant colleges and the Department of Agriculture, arrived at in the summer of 1938 and providing for a revitalized approach to land-use planning.

The joint participation of individual farm operators and agricultural technicians in community and county land-use planning committees provides a meeting ground for technical advice and governmental programs, on the one hand, and a practical knowledge of local farm conditions, on the other. In this process, the administration of Federal agricultural programs is being adapted to individual farm needs within the framework of existing legislation. Present hopes for the formulation of a wise and workable land-use plan for the six Southeastern States are dependent upon it. The encouragement of this process becomes a major item in a program for the development of agriculture among the six Southeastern States. The following lines of activity appear appropriate.

#### County Land-Use Planning

An increase in the number of counties in which county land-use planning committees have been organized from the present 148, out of a total of 516 counties within the six

Southeastern States, to cover at least all predominately agricultural counties in the area should be fostered. The scope of the need within each State can be indicated as follows: county committees have been organized in 56 out of 67 Alabama counties, in 11 out of 67 Florida counties, in 30 out of 159 Georgia counties, in 10 out of 46 South Carolina counties, in 9 out of 95 Tennessee counties, and in 32 out of 82 Mississippi counties. Counties now engaged in the program and the status of their work are depicted in Figure 2, "Status of County Land-Use Planning Program." Present efforts to increase the proportion of farmers participating in the work of the committee should be facilitated in all possible ways. In order to enlist all possible cooperation in putting land-use and other farm-life recommendations of the committee into effect, a constant and broad dissemination of information concerning their activities should be made to the general public and to agencies of the local, State, and Federal governments.

Since the organization and conduct of community and county land-use planning work require the advice and guidance of county agents, home demonstration agents, and representatives of State agricultural agencies and extension services, the allocation of county, State, and Federal funds for adequate personnel should be given a high priority in the budgets at these levels of government.

Since many of the means for translating into action the recommendations of community and county land-use planning committees are found within the agricultural programs of the Federal Government that relate directly to land use, these programs require continued support and increasing adaptability to the needs determined in the land-use planning work of the local committees.

The process of planning for the proper use of the land by farmers and technicians on individual farmsteads can be supplemented with lines of action in several other directions, of which the following are some of the more important.

#### Opportunities for Settlement

Extensive use of farm land in pastures and cover crops makes it imperative that the

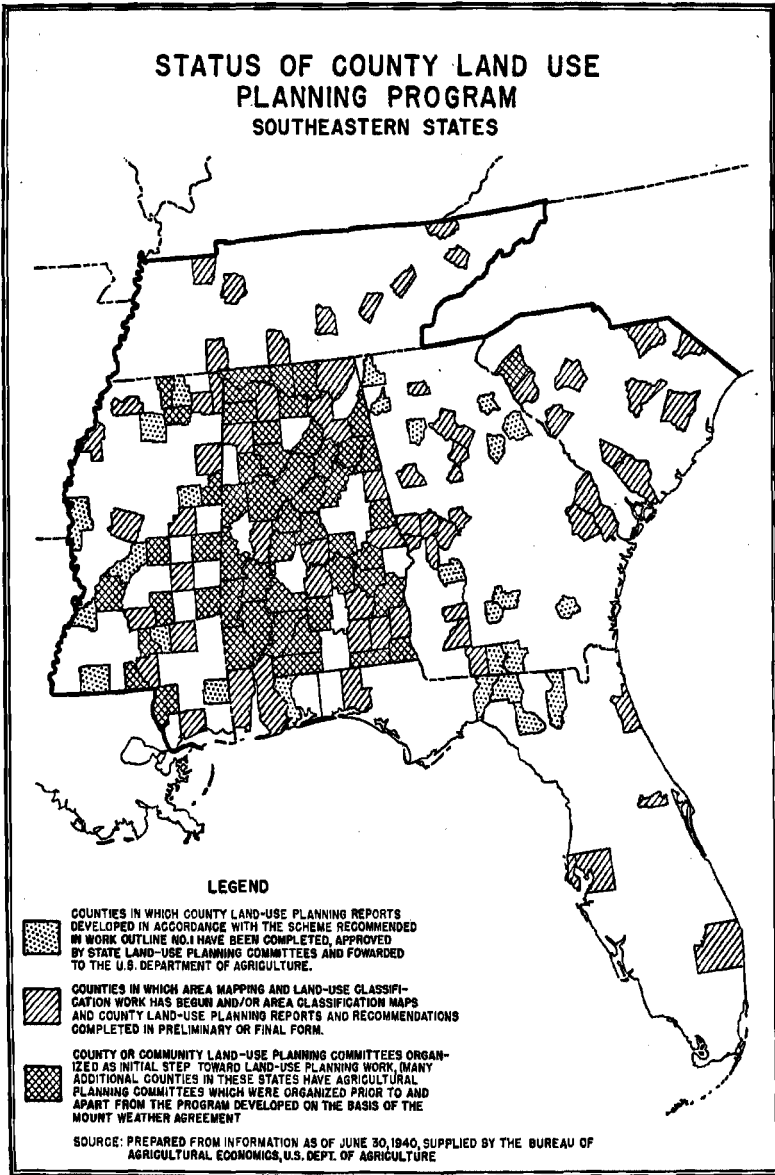


Figure 2.—Status of County Land-Use Planning Programs



total area of land available for farming in these six Southeastern States be extended. There is reason to believe that the improvement and extension of drainage facilities in rural areas affected by the backwaters of the Mississippi River may provide the basis for extensive land settlement. A thoroughgoing study of conditions within its official drainage districts authorized by the Mississippi Legislature in 1938 is now nearing completion. A joint Mississippi Backwater Area Study by the Department of Agriculture, the Fish and Wildlife Service, the Department of the Interior, and the U. S. Corps of Engineers is attempting to classify a vast area of flood-damaged land on the basis of its use capabilities, in order to provide a basis for directing its settlement and to determine the amount of backwater development justified in light of land-use possibilities and the cost of development and management. Translation of the recommendations of these studies into State and Federal action is a major consideration in a program for the agricultural development of all of the Southeastern States.

#### Written Tenant Leases

The problem of tenancy can be considerably minimized by the widespread adoption of written tenant leases assuring land owners of good farm-management practices and tenants of a formally recognized return on time and money spent in improvement of soil, buildings, and equipment. The adoption of such formal leases can be materially aided by the sympathetic support of those who depend indirectly upon farming for a livelihood—business and professional groups, bankers, and publicists.

#### Tenant Purchase

The scarcity of long term credit at low interest rates for farm mortgages and the necessity of putting private capital to the service of creating employment and market opportunities outside of agriculture require a continuance of the allocation of Federal funds for investment in financing farm purchase among tenants.

#### County Zoning

With the advent of county plans laying out a pattern of desirable uses for rural

lands, the counties of the six Southeastern States will be in a position to inaugurate programs of rural zoning such as have been undertaken by counties in Wisconsin, Michigan, Pennsylvania, Virginia, California, Indiana, and Washington. Such programs, incorporating into county ordinances the land-use patterns devised by farmers and county agents and State extension workers, would permit the continuance of existing land uses but confine future uses for farms, forest, and recreation purposes to specified areas. Land deemed submarginal for farming would be closed to future settlement, impoverishment and tax delinquency resulting from unsuccessful attempts at farming them forestalled, and the cost of maintaining county schools and roads in such areas saved. An experimental study of Hamilton County, Tennessee, made jointly by county officials, and State and Federal agricultural technicians, has provided the basis for a rural zoning program in that county; and the legislatures of Florida, Georgia, and Tennessee have passed acts enabling a few counties to proceed with rural zoning.

#### Rural Electrification

Further extension of private and public facilities for rural electrification within areas outside of Tennessee, northern Alabama, Georgia, and Mississippi, now being served increasingly with electricity from the dams of the Tennessee Valley Authority, is a necessary adjunct to a program of sound land use. Aside from normal household uses, such facilities can be put to a number of income-producing uses—in the fast freezing of fruits and vegetables and in household and community refrigeration of farm produce for home use and for market, for example—which would foster and support diversified crop practices.

#### Cooperative Production and Marketing

As a contributor to the higher real farm income, the cooperative production and marketing of farm products should be considerably expanded. At present, the field of cooperatives is characterized by a few scattered but highly successful undertakings, such as the cooperative marketing of handicrafts by the Southern Highlanders, and the cooperative production of potatoes for starch by

some 1,200 farmers near Laurel, Mississippi, which is netting them income in excess of that from cotton sales.

Other lines of action, treated below, are required to make possible the changes that lie ahead in crop and livestock, soil conserving and improving practices. Such practices will be possible provided there is a regional market for a diversity of farm products and a field of non-agricultural employment opportunities for a large portion of the present rural population of these States. Since industrial expansion is the initial stimulus for the creation of both, its discussion at this point is appropriate.

#### V. Industry

The six Southeastern States and the larger Southeastern Region, however much tied together in an agricultural economy, are similarly tied into the economy of the Nation as a whole. It is hardly possible for these States to experience an industrial expansion without the stimulus of similar expansion elsewhere. This relationship takes on particular significance in light of the current impetus to industrial activity resulting from expenditures for defense preparations and the cutting off of imports from European nations. These States have been strikingly reminded of these developments in terms of enormous orders for textile products, of a new aircraft industry at Nashville, Tennessee, and of the effects of the stoppage of Scandinavian pulp imports upon the pulp-paper industry along the Atlantic and Gulf coasts.

But whatever the emergency or long-range factors conditioning general expansion, the area must, in its day-to-day work, continue to seek new employment-creating and income-producing uses for its labor, power, and raw materials. It is noted that on the basis of almost exclusive cost advantages, a certain degree of industrialization has already developed—textiles on the Piedmont, iron at Birmingham, aluminum in Tennessee—and may be expected to develop further. The South has been witness to a dramatic example of the fruits of research looking toward the industrial use of its raw materials and farm products in the growth of the new pulp-paper

industry based upon the experiments of Dr. Herty and others with slash pine. Earnest questions are raised concerning the possibilities of building up additional industries that will find economic justification for location within the Region.

The answers are encouraging. Referring to scientific studies of the opportunities for industrial diversity in the Southeast, Odum notes that ". . . perhaps the Southeast could well develop either new or increased plant capacity in a hundred or more industries, in addition to certain major fields . . . such as paper pulp from loblolly pine, fertilizer from special processes, and various chemical industries which utilize raw materials of forest and field."<sup>7</sup> Industrial chemists have pointed to a number of demonstrated uses for the cellulose from straw, stalks, hulls, and other waste in crops now grown in the Southeast. After partial refinement, this waste can be developed into paper, absorbents, insulating material, building board, and after purification, into compounds that are useful in producing celluloid and other plastics, explosives, and rayon. Lactic acid derived from corn, sugar, and milk is being utilized in the preparation of artificial resins belonging to a class of plastic that is a constituent of such varnishes, paints, and lacquers as are being used in the automobile industry. Competent economic and technical research has pointed to operating advantages within the area for ceramics, paper finishing, and food processing industries, among others. A much wider field for the industrial utilization of manganese, bauxite, and other minerals is indicated. Technicians engaged in making such findings see even greater possibilities ahead with further work.

To facilitate the establishment of industries to develop these industrial opportunities, several desirable lines of action can be listed.

#### Industrial Research

The development of industrial activity upon the basis of laboratory findings and

<sup>7</sup> *Op. Cit.*, See also articles by Dr. Henry G. Knight, "Industrial Utilization of Southern Farm Crops," and Dr. W. Harry Vaughan, "Profits in Georgia Industry" in *Manufacturers Record*, September, 1940.

the promise of richer future findings makes imperative the extension and continued support of existing private and public facilities such as those maintained by the Herty Foundation, the Industrial Development Council in Georgia, the land grant colleges, and the new Regional Research Laboratory of the Department of Agriculture at New Orleans, established by Congress in 1938. In addition to chemical and mechanical investigations, further economic research is required in analyzing specific industrial processes with reference to possible locational criteria, inasmuch as those new industries are to be preferred which:

- a. Possess an advantage in production costs at their chosen sites as against other possible locations, thus assuring permanence and eliminating dependence upon regional wage differentials.
- b. Produce for a diversified regional and national market.
- c. Are small and capable of operating at a distance from areas of industrial concentration.
- d. Carry materials through several stages of production and possess high ratios of value added by manufacture to total value of the product, thus assuring that the maximum of wage payment will be left in the Region.
- e. Will harmonize with or supplement existing industrial and employment patterns within the community.

#### Industrial Promotion

The closest possible liaison should be maintained between State and local development commissions and chambers of commerce, on the one hand, and private and public agencies doing industrial research on the other. In order that industrial promotion activities may be based upon the best available technological and economic knowledge, proof of positive economic advantage should replace costly artificial subsidies in attracting industries into the community.

#### Freight Rate Adjustments

Recent adjustments in interterritorial freight rates on several commodities have served partially to remove an artificial barrier to the expansion of manufacturing in Southeastern States. With the reduction in the cost of railroad operation in the area and

with the increase in traffic that increased industrial activity brings, reductions in the rates for shipment of an increased number of manufactured products are possible and should be forthcoming.

#### Investment Capital

It is important that new industries be financed, insofar as possible, with local capital in order that capital wealth created through industrial production may be left in the area as the basis for further expansion and the maintenance of a higher standard of living. There is reason to believe that a large share of the financing of smaller industries can be so provided, the proportion of stock and bond sales to investors outside of the area considerably reduced, and a maximum share of the interest and dividend payments of new industries left in the Region. Present industrial loan policies of the Reconstruction Finance Corporation are a necessary supplement to local financial resources.

#### Defense Industries

The necessity of building additional plant capacity for the production of defense materials provides an opportunity to increase the industrial capacity of the Southeastern States without injury to industrial areas elsewhere. Southeastern government and business leaders are exerting strenuous efforts in working with prospective industrialists toward this end. The deliberate direction of a portion of new plants and orders for defense materials into the area, when compatible with the necessity for speed and efficiency in defense preparations and with considerations of military strategy, should be given serious consideration within the Federal Government.

#### Community Planning

The influx of new workers and the construction of new plant facilities within the community will necessitate adjustments in all municipal facilities and services—schools, streets, water supply, and sewage disposal. The obvious need is for community planning that will anticipate and provide in advance for these adjustments so that housing shortages,

overcrowding of schools, sanitation problems, and disruptions of municipal finances may be forestalled.

#### VI. Forestry

Provided the forests of the Southeastern States are scientifically managed, their use can be further extended in the expansion of both the agricultural and industrial development of the area. Forests are one immediate and practical type of use to which submarginal farm land can profitably be devoted, and soil, water, and flood control advanced. The sale of raw forest products even now provides a major source of income to farm families. New forest industrial development has provided work for those unemployed, or only partially employed in agriculture. Its expansion may prove to be one important way of providing non-agricultural employment for those who leave the farm as more extensive land uses and mechanized farming develop.

Considerable difficulties confront private and public efforts to conserve and develop this regional asset, but they are not insurmountable.

According to the report of the Regional Committee on Southern Forest Resources, "were it not for the loss due to fire, insects, disease, wind, and the choking off of young trees through failure to thin them out properly, the annual growth of Southern timber would substantially exceed the drain upon it."<sup>8</sup> In 1936, the total growth was slightly in excess of the total drain, and 27 percent of this drain resulted from natural forces and destructive agencies, a loss which might in large measure have been prevented by more adequate fire protection and better forest management.

#### Fire Protection

One of the basic requirements for the protection and expansion of southern forests is the provision of adequate facilities for the control of fire—ranger stations, fire towers, telephone lines, truck trails, and artificial fire breaks. Private forest owners are sharing the costs of extending and

maintaining protection together with their State governments and the Federal Government. A sum of \$2,500,000 is annually authorized under the Clarke-McNary law for the Federal contribution to this work, but funds actually provided under the law have not reached this figure in recent years. The South has received approximately a quarter of the total. Only about half of the southern forest area is currently receiving organized protection. It is estimated that a \$9,000,000 yearly contribution would be required from the Federal Government for the full protection of all lands. It has been demonstrated that Federal contributions matched with State and private funds will bring a return of 30 cents an acre for each 4 cents invested.

#### Forest Management Education

An adequate educational program teaching the possibilities and methods of modern forest management is a second basic requirement. It is estimated that the annual yield of Southern forest might be doubled or tripled if such methods were followed in planting, cultivation, selective logging, and in insect and disease control, especially by small woods owners and farm forest operators. Again, under the Clarke-McNary law, the Department of Agriculture is authorized to spend \$100,000 yearly, if matched by State funds, in furthering farm forest production, although appropriations for this purpose have averaged only about \$50,000 annually, with approximately \$13,000 going to southern States. By 1937, more than ten thousand farmers were practicing selective logging, and over one hundred and twenty thousand, or 10 percent, were engaged in organized fire protection, due to the work of trained foresters, vocational education teachers, and the general dissemination of advice on forest management. In 1937, the Norris-Doxey law authorized \$2,500,000 of Federal funds to be expended in cooperation with State forestry agencies, land grant colleges, and universities in providing advice and assistance in farm forestry, and an initial appropriation for 1940 was made for this purpose. The required State-Federal farm forestry educational program depends in large part upon full and continued appropriations under these two laws.

<sup>8</sup> *Op. cit.*, p. 4.

#### Reforestation

So great is the area of reforestable land in the Region and so favorable is the climate that, in the main, natural reseeding under adequate fire control and forest management must be depended upon for reforestation. The planting of seedlings, however, makes possible the controlled reforestation of submarginal lands in the interests of soil conservation and watershed protection. It is estimated that the 173 million nursery seedlings furnished by State, Federal and private nurseries in 1938 do not constitute an adequate planting program. To meet the increasing demand for seedlings, it is necessary that the nursery and planting programs of State and Federal agencies be extended and operated in close conjunction with each other, especially in securing a balanced distribution of seedlings over reforestable lands.

#### Public Forest Program

An extension of the State and national forest program is required as a means of building up a public forest reserve, conserving scenic and recreational values, demonstrating scientific forest management, promoting flood control, and reforesting submarginal lands. In order that these reserves be widely distributed, there is room for expansion in the number of State forests in each of the southern States, as well as in the number of county and community forests. The Fulmer Act provides Federal aid for the purchase of State forest areas, although no appropriation has yet been made. The States will be in a position to benefit from the terms of the act by making the review and public reservation of tax-forfeited land required after 1942 under this law. The purpose behind a public forest program can be furthered also by Congressional approval of the temporary leasing of private land for public operation; such approval would make possible the use of Work Projects Administration labor on private forest land needing planting, thinning, and general improvement.

#### Outdoor Recreation

Recent water conservation developments and submarginal land policies of State and

Federal governmental agencies have provided opportunities for the use of potential forest lands as non-urban outdoor recreational areas. Inventories and plans providing for park and wildlife areas have been made under the Park, Parkway and Recreational-Area Studies by each of the six Southeastern States, collaborating with the National Park Service. The implementation of these plans through public land acquisition, tax reversion, and gifts will serve the triple purpose of better land use, a public forest program, and recreation.

#### Forest Credit

Since the necessity of paying recurrent annual interest and tax obligations is a factor making for wasteful cutting practices on private forest lands, serious consideration should be given to a Federal guarantee of forest mortgages and to the possibilities of direct, low-interest-bearing Federal loans. With adequate credit at reasonable rates, the private owner would be enabled to refrain from cutting during the relatively profitless years of waiting for a mature stand of timber. Once the stand had matured, he would be able to begin a program of yearly cuttings and sales that balanced with the yearly growth.

#### Uniform State Legislation

Finally, the wide variation in State laws relating to forestry—to taxation, timber theft, arson, burning permits, and delinquent tax procedures, among others—and in their enforcement suggests the need for an interstate conference to formulate a uniform system of such State laws for the Region.

#### VII. Water Resources and Transportation

The water resources of the six Southeastern States, as previously noted, constitute one of the major assets of the area. Nevertheless, the combination of heavy precipitation, long seasons of high temperatures, and wide expanses of lowlands near sea-level creates problems in health. Some of the uses to which ground water and streams are put in industrial development and urban growth create added problems—for example, depletion of city water supplies and pollution. Before the States

can take full advantage of the power and navigation resources provided in their rivers and coastlines, it will be necessary to have devised effective means of dealing with water problems. An enumeration of some illustrative cases will serve to point up this need.

#### Problems of Water Use and Control

One forceful example of the need for conservation of ground water supplies for industrial and municipal uses is provided by the serious ground water shortage experienced by the population of the Miami and Tampa areas in Florida. The drainage of the Everglades for agricultural uses may have contributed substantially to this depletion. Heavy industrial uses and wastage of water have seriously impaired ground water supplies in large Alabama cities. Again, largely as a consequence of poor drainage in coastal lowlands, deaths from malaria from 1930-1935 averaged 372 per 100,000 of population. Water pollution and contamination from the dumping of industrial wastes into rivers along the Piedmont section of South Carolina seriously jeopardize fish and wildlife.

While ground water shortages may be forestalled by the capping of artesian wells and other conserving practices and malaria control effected through construction of proper drainage facilities, and while adequately enforced legislation can correct for pollution and contamination, these water control problems affect many phases of life among these States, and there are grave deficiencies in hydrologic and other data concerning them. To remedy these deficiencies requires continuous cooperative study by private organizations and agencies of the State and Federal governments concerned with public health, flood control, fish and wildlife, and land use, in order that their programs may be brought into common attack upon these problems.

The Southeastern States have been the scene of action for the inauguration of a national policy looking toward the multiple-purpose development of water resources. The Congressional Act establishing the Tennessee Valley Authority expressly directed that the Tennessee River be developed for flood control through a series of dams so constructed that

they would serve for the generation of electrical power as well as for navigation. The U. S. Corps of Engineers, charged with the responsibility of developments on the Nation's river systems, has undertaken studies looking toward the multiple-purpose development of other rivers within the Southeastern States and is engaged in further investigations with agencies of the Federal Government concerned with agriculture, health, wildlife, recreation, and water control. The construction of such multiple-purpose projects simultaneously with the execution of the joint plans of State and Federal agencies in these corollary fields may make an important contribution to the economic development of the Southeastern States.

#### Power

While Florida and Mississippi have relatively small amounts of potential and undeveloped electric power, the possibilities in Georgia, South Carolina, and Alabama are abundant. In 1937, Georgia's hydroelectric output was slightly more than 1.4 billion kilowatt hours, while it is estimated that almost twice that amount could be produced from undeveloped sources. Preliminary plans for the Clarke-Hill project on the Savannah River provide for power facilities. In South Carolina, where the Santee-Cooper project is being constructed at the confluence of the Santee and Cooper rivers, 1937 output stood at 1.7 billion kilowatt hours with an estimated 2.2 billion available in undeveloped power. Alabama, with important power reserves in the Tombigbee and Warrior River systems, had a potential undeveloped output of 4.3 billion kilowatt hours. Even greater undeveloped output was available in Tennessee for development by the Tennessee Valley Authority. Since electrical energy is easily and cheaply transmitted from the source of generation, this backlog of undeveloped power in four Southeastern States can play an important part in the decentralized development of industries using electrical processes in the conversion of raw materials near the sources of supply.

#### Navigation

A more industrialized economy in the Southeastern States would make profitable use of

the rivers for low-cost movement of freight in bulk, where speed is not important. Multiple-purpose developments on the Tennessee and Santee rivers, cited above, provide for transportation locks, which will permit access from ocean ports to present inland agricultural and industrial areas. Where future needs are clearly indicated in preliminary joint investigations, the inclusion of navigation locks in multiple-purpose projects under consideration will provide a necessary supplement to facilities for which provision has already been made. To the extent that economic development is found to require improvements in river navigation facilities, the maintenance of adequate port facilities and coastwise canals will be essential.

#### Other Transportation Facilities

As in the case of navigation facilities susceptible of development on the coast lines and in the rivers of the Southeastern States, each of the other modes of transportation possesses respective advantages to be evaluated in light of the type of transportation services that the future economic development of the area is likely to require.

*Railways.*—The existing network of railway facilities can probably meet the needs of an even more highly diversified agriculture and industry in the Southeast for long-haul heavy freight and for long-distance, low-cost passenger transportation, without physical extension. However, two imminent changes in the nature of these services may contribute substantially to the attainment of that agricultural and industrial diversity, (1) the expansion of the recently inaugurated express pickup and delivery plan, which coordinates rail and highway services, and (2) the expansion of the high-speed Diesel-electric passenger service now operating between the Southeastern and the North Central States.

*Highways.*—When highway transportation facilities are considered in light of the future economic development of the Southeastern States, it is evident that they must provide first for a system of farm-to-market roads permitting the free movement of farm produce (foods and raw materials) to industrial centers. They must provide equally for an inter-

state movement of finished and partially processed industrial products. The need for early development of a system of inter-city express highways does not become as pressing in such an area as it does in areas of greater urbanization, although there are obvious needs for through routes to serve perishable produce movements and tourist travel between the North Central States, Florida and the Gulf coast, and the mountains. While there is at hand no completed proposal for a regional highway system, the State highway agencies of the Southeastern States, cooperating with the Public Roads Administration in the State Highway Planning Surveys, have accumulated nearly all of the essential data on traffic and motor freight movements, existing facilities, and ability of States to finance construction. The next appropriate step is the use of these data to formulate an interstate or regional highway system, which, though neither static nor final, would serve as a guide to future construction. Such a system would conform to the following standards:

1. Continuous through routes corresponding to major streams of through traffic.
2. Consideration of specific requirements of through traffic (by-passes, separated intersections, control of access, and roadside developments).
3. Uniformly high construction standards for such elements as alignment, grade, curvature, road surface, etc.
4. Modern highway legislation and advanced highway planning policies.

*Airways.*—While the function of air transportation among the Southeastern States might appear likely to remain one of providing rapid communication between major cities in the Southeast and metropolitan centers elsewhere, current national defense programs and the dynamics of the relatively new aircraft industry inject elements of uncertainty into the picture. For example, a survey made by the Civil Aeronautics Authority in 1939 indicated a need for expansion of two-thirds of the existing airports in these States in light of the demands then being made upon them. Appropriations for airports by the present Congress have initiated construction on a program that will probably more than fill these needs.

Similarly, present commercial airport facilities are being designated for use in military training, and new military facilities are to be constructed so as to serve future commercial use. In the meantime, the function of constructing, maintaining, or regulating airport facilities has not been fully provided for within the administrative organization of local and State governments. In order that present rapid defense construction in this field may be smoothly related to existing patterns of transportation and physical layout, and in order that the greatly increased facilities that will result from this construction may be properly developed and used, the immediate need is to provide adequately for this function.

#### VIII. Health and Education

If the six Southeastern States and the larger Southeastern Region were at the moment as richly endowed with public and private facilities for education and public health as they are in people, climate, forests, minerals, and streams, the making of the adjustments necessary to bring about an economy of agricultural and industrial diversity would be much surer. "Buoyant" health, trained minds and hands would be speedily adaptable to new land uses and factory jobs, but for this, present health and educational facilities within the area need major extension. Local and State revenues are now adequate only for the maintenance of existing schools and public health programs at prevailing qualitative standards. It is on this score, more than any other, that the States are faced with the impossibility of lifting themselves by their bootstraps. Proposals for increased Federal aid to schools and for public health work have been prominently voiced by the Advisory Committee on Education and in the public work-hospitalization plans that have been under discussion both within these States and in the Federal Government.

Perhaps the only significant contribution that these States can make to the improvement

and extension of existing school facilities, pending an increase in the level of regional income, lies in the field of savings through consolidation of facilities and more efficient operation. If present facilities were more nearly adequate, it would be possible to point out, in light of likely changes in employment patterns, certain special requirements to guide the extension of new facilities. For example, a more highly industrialized Region will require vocational education facilities away from areas of urban concentration. Such needs could, perhaps, be met by the enlargement of the vocational education program of the National Youth Administration now under way in the area.

The immediate need in the field of public health is for the extension of the county public health service program to all counties not possessing the service, and an increased personnel in all counties now being served in order that the excessive burden upon the present staff may be relieved. Increased personnel would make possible more extensive coverage and more adequate attention to individual cases. As indicated in the discussion of water resources above, drainage programs along the coastal plain offer a singular opportunity to reduce the incidence of a major health problem in the Region; the expansion of the present rural housing work of the Federal Government would offer a second.

Finally, it is not unimportant to point out that an economic change as thoroughgoing as that described in earlier sections of this discussion involves far-reaching changes in the way of life of a major segment of the Nation's population. Once before in its colorful economic history, the South has experienced a similar change. The coming of the cotton textile industry southward brought with it many model villages but many more "mill towns." The social cost involved in the physical squalor of those developments has not yet been compensated for in pay rolls. It must be the first concern of all to see that the new industrialization is a healthier one.



PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

REGION 4

LAKE STATES AND OHIO VALLEY

INDIANAPOLIS, INDIANA

1940

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Report of the  
LAKE STATES AND OHIO VALLEY REGIONAL PLANNING COMMISSION

Lawrence V. Sheridan  
Regional Counselor  
National Resources Planning Board

Paul E. Middleton  
Planning Technician  
National Resources Planning Board

NATIONAL RESOURCES PLANNING BOARD  
FIELD OFFICE  
INDIANAPOLIS, INDIANA

September 30, 1940

Mr. Charles W. Eliot 2d, Director  
National Resources Planning Board  
North Interior Building  
Washington, D. C.

Dear Mr. Eliot:

I have the honor to present herewith a Regional Development Plan for Region 4, comprising the states of Illinois, Indiana, Kentucky, Michigan, Ohio, West Virginia, and Wisconsin.

The basic objective of this plan is the utilization of the resources of the Region in a manner which will promote their conservation and contribute to the welfare of all of the people who reside and work in the Region or depend upon its activities. It is a step towards better understanding of the opportunities of the Region and the manner in which they may be grasped and utilized.

In reaching the conclusions set forth in the plan, the staff of the Field Office had the cordial cooperation of many persons familiar with the complex qualities of the Region. Grateful acknowledgment of their advice and assistance is extended to those included in the list of contributors attached to the plan and to many others with whom the regional plan was discussed.

Respectfully submitted,

L. V. SHERIDAN,  
Counselor, Region No. 4.

CONTRIBUTORS TO PREPARATION OF REGIONAL DEVELOPMENT PLAN

- Benton J. Strong, Regional Information Advisor, Region 3, Farm Security Administration, Indianapolis, Indiana
- Louis A. Wolfanger, Research Associate and Associate Professor in Land Use, Michigan State College of Agriculture and Applied Science, East Lansing, Michigan
- Fred Ferguson, Director, Bureau of Mines, Indianapolis, Indiana
- B. B. Clark, State Coordinator, Soil Conservation Service, Urbana, Illinois
- G. E. Young, Integrator, North Central Area, Bureau of Agricultural Economics, Milwaukee, Wisconsin
- O. K. Quivey, Manager, Agricultural Development, Baltimore and Ohio Railroad Company, Baltimore, Maryland
- Ralph M. Nelson, Acting Director, Appalachian Forest Experiment Station, Asheville, North Carolina
- Burr Simpson, Commissioner of Highways, Charleston, West Virginia
- John E. Ulrich, Director, State Planning Staff, Louisville, Kentucky
- D. E. Perfect, Acting Chief, Regional Project Plans Division, Soil Conservation Service, Milwaukee, Wisconsin
- M. A. Mattoon, Assistant Regional Forester, U. S. Forest Service, Washington, D. C.
- Anton J. Tomasek, Assistant Director, Department of Conservation, Springfield, Illinois
- D. J. Jones, State Geologist, Department of Mines and Minerals, Lexington, Kentucky
- Fred C. Taylor, Director, Planning Division, State Highway Department, Lansing, Michigan
- Floyd E. Evans, Director, Department of Aeronautics, Lansing, Michigan
- Albert L. Toenges, Supervising Engineer, Coal Mining Section, Mining Division, Bureau of Mines, Pittsburgh, Pennsylvania
- A. H. Paschall, Chief, Physical Surveys Division, Soil Conservation Service, Dayton, Ohio
- J. S. Cutler, Regional Conservator, Soil Conservation Service, Dayton, Ohio
- J. L. Beven, President, Illinois Central System, Chicago, Illinois
- Anderson Pace, General Industrial Agent, Illinois Central System, Chicago, Illinois
- Harry S. Muir, Regional Director, Farm Security Administration, Milwaukee, Wisconsin
- Jay H. Price, Regional Forester, U. S. Forest Service, Milwaukee, Wisconsin
- R. L. von Trebra, Acting Regional Conservator, Soil Conservation Service, Milwaukee, Wisconsin
- M. W. Torkelson, Director of Regional Planning, Wisconsin State Planning Board, Madison, Wisconsin
- Jacob Crane, Assistant Administrator, U. S. Housing Authority, Washington, D. C.
- Ernest J. Bohn, Director, Regional Association of Cleveland, Cleveland, Ohio
- R. E. Glos, Dean, School of Business Administration, Miami University, Oxford, Ohio
- Arthur R. Weed, Executive Secretary, The Ohio Development and Publicity Commission, Columbus, Ohio
- W. C. Weidler, Dean, College of Commerce and Administration, Ohio State University, Columbus, Ohio
- R. B. Wiley, Head, School of Civil Engineering, Purdue University, Lafayette, Indiana
- Charles M. Thompson, Dean, College of Commerce and Business Administration, University of Illinois, Urbana, Illinois
- J. I. Falconer, Department of Rural Economics, Ohio State University, Columbus, Ohio
- H. A. Woods, State Forester, Department of Conservation, Indianapolis, Indiana
- A. A. Potter, Dean of Engineering, Purdue University, and Consultant in Engineering Education of the U. S. Office of Education, Lafayette, Indiana
- Bruce Poundstone, Assistant in Land Use Planning and Field Agent in Farm Management, College of Agriculture, University of Kentucky, Lexington, Kentucky
- Kenneth M. Kunkel, Director, Division of Fish and Game, Department of Conservation, Indianapolis, Indiana
- H. J. Reed, Dean and Director, School of Agriculture, Agricultural Experiment Station, Department of Agricultural Extension, Purdue University, Lafayette, Indiana
- Alvin C. Watson, Assistant Regional Conservator, Soil Conservation Service, Upper Darby, Pennsylvania
- Charles C. Colby, Department of Geography, University of Chicago, Chicago, Illinois

- Richard Lieber, National Park Service, Indianapolis, Indiana
- Guy-Harold Smith, Chairman, Department of Geography, Ohio State University, Columbus, Ohio
- F. J. Keilholz, Extension Editor, College of Agriculture, University of Illinois, Chicago, Illinois
- J. J. Doland, University of Illinois, Urbana, Illinois
- Paul H. Price, State Geologist, Morgantown, West Virginia
- M. M. Leighton, Chief, State Geological Survey Division, Urbana, Illinois
- H. L. Kellogg, State Planning Engineer, Chicago, Illinois
- H. P. Rusk, Dean, College of Agriculture, University of Illinois, Urbana, Illinois
- Ernest L. Bailey, State Director, Office of Government Reports, Charlestown, West Virginia
- Howard Friend, Research Director, Indiana State Chamber of Commerce, Indianapolis, Indiana
- L. R. Schoenmann, Director, Conservation Institute, East Lansing, Michigan
- Edwin E. Witte, Department of Economics, University of Wisconsin, Madison, Wisconsin
- Wilbur Stout, State Geologist, Ohio State University, Columbus, Ohio
- H. J. Schwieterl, General Agricultural Agent, Illinois Central System, Chicago, Illinois
- Eugene B. Elliott, Chairman, Michigan Planning Commission, Lansing, Michigan
- Don Waters, Commissioner, Division of Conservation and Natural Resources, Columbus, Ohio
- Ralph E. Day, Central States Forest Experiment Station, Columbus, Ohio
- J. C. Bottom, Farm Management Associate and Leader in Land Use Planning, Agricultural Extension Service, Purdue University, Lafayette, Indiana
- Charles S. Hoffman, Research Analyst, Farm Security Administration, Indianapolis, Indiana
- Lewis A. Dumond, Chicago Association of Commerce, Chicago, Illinois
- P. G. Beck, Regional Director, Farm Security Administration, Indianapolis, Indiana
- Clarence E. Jackson, Indiana State Chamber of Commerce, Indianapolis, Indiana
- C. R. Orton, Dean and Director, College of Agriculture, West Virginia University, Morgantown, West Virginia
- A. H. Wait, Regional Airport Engineer, Civil Aeronautics Authority, Chicago, Illinois
- Arthur Weimer, Dean, School of Business, Indiana University, Bloomington, Indiana
- George E. Lommel, Chairman, State Planning Board of Indiana, Purdue University, Lafayette, Indiana
- Edward C. Elliott, President, Purdue University, Lafayette, Indiana
- Robert Kingery, General Manager, Chicago Regional Planning Association, Chicago, Illinois
- Sam Teper, Senior Statistician, Wisconsin State Planning Board, Madison, Wisconsin
- A. G. Anderson, Consultant, National Resources Planning Board, Urbana, Illinois
- A. F. Dodge, Industrial Education, University of Illinois, Urbana, Illinois
- H. C. M. Case, College of Agriculture, University of Illinois, Urbana, Illinois
- Rexford Newcomb, Dean of College of Fine and Applied Arts, University of Illinois, Urbana, Illinois
- P. R. Farlow, Agricultural Agent, Illinois Central System, Chicago, Illinois
- N. L. Burlison, University of Illinois, Urbana, Illinois
- T. H. Frison, Chief, State Natural History Survey Division, Urbana, Illinois
- Charles L. Stewart, College of Agriculture, University of Illinois, Urbana, Illinois
- V. B. Fielder, U. S. Department of Agriculture, Bureau of Agricultural Economics, Urbana, Illinois
- W. H. Voskuil, State Geological Survey Division, Urbana, Illinois

## S U M M A R Y

The utilization of the resources of the Region in a manner that will promote the conservation of these resources and contribute to the welfare of all of the people who reside and work in the Region or depend upon its activities may be promoted by adherence to these definite policies:

1. Development of the use of the natural resources of the Region in a manner that will conserve their potential capacity, insofar as conservation is compatible with utility.
2. Restoration of renewable natural resources that have been depleted.
3. Expansion of appropriate industry to provide greater diversified opportunities for employment throughout the Region.
4. Provision of ample facilities for research and the equipping and educating of people to take advantage of employment opportunities.

The general policies of development logically divide into functional policies, related to outstanding regional resources. There is general agreement upon the sound doctrine of the following elements of the regional development plan.

### Forests

Restoration through public ownership and operation of forests on at least one-half of the hilly and mountainous areas of Indiana, Ohio, Illinois, Kentucky, and West Virginia, and most of the cut-over forest lands of Northern Michigan and Wisconsin, to renew the forest resource, provide immediate employment in restoration, and continuous work in the sustained-yield forests of the future.

Preservation of existing merchantable timber areas by operation on a sustained-yield basis.

Use of local areas of hilly or submarginal land for farm forests.

Expedite the acquisition of forest land in Federal forest purchase units.

The Forest Service should be alert to new agricultural methods on poor land and, where successful, be ready to release public land for private and other agricultural use.

Establishment of forests on the stripped soils of open-pit coal mines, where such procedure has been determined to be the most suitable method of rehabilitation.

Expansion of the research work of the Forest Products Laboratory as a step to establishment of new industries using forest products.

### Pasture Lands

Expansion of the research, educational, and extension services of State agricultural colleges and demonstration projects to promote preservation and conservational use of pastures in the hill sections and inferior soil areas of the Region.

Purchase by appropriate governmental or other agencies of experimental areas of pasture land in the submarginal farming areas of Kentucky, West Virginia, and southern Illinois, Indiana, and Ohio, to permit establishment of pasture grasses, followed by leasing or reselling as grazing areas, where farmers cannot economically carry on restoration themselves.

### Cropland

Expansion of research, educational, and extension programs of the agricultural colleges and experiment stations, particularly within the counties, to bring about better use of cropland and more diversified production of food and industrial crops, and expansion of technical service available to land-use planning committees.

Adjustment of land use in the general farming areas of the southern part of the Region, so that approximately half of the land will be in forest, one-fourth in pasture, and one-fourth in crops.

Rearrangement of farms on the land suitable for crops in the northern cut-over regions so that each farm will possess enough cropland to support a family.

Expansion of the experimental Farm Security Administration program of good cropland purchase for individual farmers in the northern cut-over area and in the southern submarginal areas.

### Land Classification

Continuation of the land classification work of the county land-use planning committees, working in cooperation with the Agricultural Experiment Station and the Bureau of Agricultural Economics in all counties of the Region.

Enactment of county zoning enabling acts in Kentucky, West Virginia, and Ohio, and strengthening the Indiana act, followed by enactment of county zoning ordinances, based upon the advice of county land-use planning committees.

Adoption of a soil conservation district act in Ohio, and establishment of soil conservation districts where recommended by county land-use planning committees.

Public purchase of forest areas and non-conforming farms in forest districts of zoned counties, where the people cannot be employed in the area.

Enactment of laws establishing sound policies of reversion of tax delinquent land to the State in Ohio, Illinois, and Kentucky.

Under State or county direction, bring isolated or scattered populations into closer settlement, to avoid costs of maintaining roads and schools.

### Recreation

Development of recreational land and facilities in accordance with the principles and recommendations of the State recreation plans of the National Park Service and State agencies.

Establishment of river forests or parkways along the principal streams of the Region.

Control of lake levels to insure continued use of northern lakes for recreation.

Acquisition of more areas of beach along the Great Lakes shores near large population centers.

Control of beach erosion.

Expansion of program of building small recreational lakes, and establishment of conservation pools in flood control reservoirs.

Expansion of research, educational, and extension services of State universities to bring about higher standards of recreational services.

### Wildlife

Ratification of treaty regulating commercial fisheries of the Great Lakes by Canada and the States involved at once.

Continuation of wildlife development under direction of the Fish and Wildlife Service of the Department of Interior and the appropriate State agencies.

### Minerals

Expedite systematic topographic and geologic mapping of State and Federal geological surveys as an essential aid to the discovery and development of the mineral resources and to comprehensive studies in land utilization.

Expand researches on high volatile coal and combustion devices to develop the potential capacity of the coal industry and improve standards of living in coal mine areas and in cities and communities dependent upon such resources.

Accomplish a readjustment of freight rates to enable river transportation of coal from Illinois, Indiana, and western Kentucky to Minnesota and to ports in Wisconsin and Michigan, in order to aid summer employment of miners.

Low rates exist on the Great Lakes for summer haul from the eastern coal fields to Lake Michigan and Lake Superior ports that give them an advantage over the Illinois, Indiana, and western Kentucky coal region.

Promote fundamental research on the nature and constitution of coal to increase the use of coal as a chemical raw material. Coals of different ranks require somewhat different researches. The Illinois Geological Survey, for instance, is carrying on researches adapted to the high volatile coals of the Illinois field.

Institute vocational education for mineral industries workers under qualified education auspices to aid in the rehabilitation of displaced miners.

Promote geological and chemical research that will furnish fundamental information needed in the discovery and development of oil and gas reservoirs, and in the conservation and efficient utilization of oil and gas.

Encourage the use of clay products in areas where timber resources are depleted. Lumber from as far distant as the State of Washington is being used widely in Illinois, and it is thought that the use of local clay products would be of advantage to Illinois farmers and others because of their permanence and lowering of fire hazards.

Promote fundamental research on the nature and constitution of the clay and shale resources to provide new information for manufacturing improved and new clay prod-

ucts. There have been great advances made in ceramic engineering, but until recent years, the raw material itself has not been studied from the standpoint of its mineralogical constitution because the means for such research had not been developed. Opportunities are great for such research.

Promote the use of local stone resources suited to construction. This will also apply to local deposits of sand and gravel, local cement products, etc.

Extend research on local mineral resources for metallurgical and other processing uses.

Encourage chemical research on the use of fluorspar in the chemical manufacture of fluorine compounds, which will find wide use in the chemical industry, with a view to ameliorating the depressed conditions in the Illinois-Kentucky fluorspar area.

Expedite field investigations of local suitable agricultural limestone deposits and mineral fertilizers for soil rehabilitation.

#### **Industry**

Development of suitable industry in all parts of the Region to stabilize employment for the 18,000,000 urban dwellers and the surplus population in farming and mineral areas.

Establishment of sufficient industrial research laboratories, working in close alliance with private industry, to meet the demands of industrial development in the Region.

Research in each State as to the types of industry that may be successful in different parts of the State, and the extent to which local resources may be used.

Development of a pattern of industry for each State by the State planning board, with the advice of research agencies, chambers of commerce, development commissions, local planning commissions, and other competent advisors.

Establishment of a regional industrial committee composed of the chairmen of State planning boards, working with the Indianapolis Field Office of the National Resources Planning Board, to reconcile State industrial patterns into a regional pattern.

Development of coordination between fact-finding, planning, and research agencies and private industry, in order that industry, which finally decides where new industries will locate, may have essential facts readily available for its decisions.

#### **Water Power**

Determination by the State planning boards of power needs and possibilities as a part of the State and regional industrial patterns.

Investigate the possibilities of power development in coal mining areas, as an aid to industrial development.

Scrutiny of the relationship of power development at the Gilbertsville Dam of the Tennessee Valley Authority to the possibilities of industrial development in southern Illinois and western Kentucky by the State planning boards of Kentucky and Illinois.

Similar investigation by the Kentucky and West Virginia State planning boards of power-industrial relationships in other portions of Kentucky and West Virginia where TVA power is available.

#### **Ground Water**

Promote research on the ground water and surface water resources, including research on brines, to aid in their proper conservation and development. The quantity and quality of water available in a community frequently determines whether or not certain industries could be brought in. There is also great public need for such fundamental information.

#### **Industrial Pollution**

Continuation of research and cooperation with industry to control industrial pollution.

#### **Flood Control**

Readjustment of flood plain uses in both urban and rural areas to provide additional channel storage in high water periods without damage to property.

#### **Transportation**

Coordination of the present use and future development of all transportation facilities.

Development of the system of express and limited access highways between important industrial and population centers.

Determination of primary and secondary roads and streets having significance in motor transportation regardless of governmental jurisdiction.

Adjustment of land use to bring about abandonment of many miles of unneeded and costly roads.

Adjustment of the highway pattern in relation to the industrial pattern of the

States by State planning boards, and their coordination by the regional committee mentioned under *Industry*, above.

Early completion of the St. Lawrence waterway to provide access to the Great Lakes of a large portion of ocean-borne shipping.

Completion at an early date of the Little Calumet-Grand Calumet waterway, joining Lake Michigan with the Illinois River, including the deep draft channel from South Chicago to Lake Calumet and the lake carrier-barge interchange terminal in Lake Calumet.

Completion of State airport plans by State planning boards, in cooperation with State air authorities.

Provide additional airports in accordance with a construction program based on State and regional airport plans.

Provide feeder routes to make air traffic facilities available to all communities eventually.

#### **Personnel**

Development of a coordinated program of industrial personnel training by planning, industrial, educational, and labor authorities.

#### **Housing**

Development of a housing pattern adjusted to the industrial pattern of the Region by the associated State planning boards.

#### **Municipal Planning and Government**

Development of formulae for control of development in suburban fringe areas by the Land Committee of the National Resources Planning Board.

Determination of methods of rehabilitating the central districts of cities by the National Resources Planning Board, in cooperation with State planning boards, local planning agencies, real estate, loan, and civic organizations.



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## A REGIONAL DEVELOPMENT PLAN FOR THE LAKES STATES AND OHIO VALLEY REGION

### REGIONAL DEVELOPMENT POLICIES

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The basic objective of this plan is the utilization of the resources of the Region in a manner that will promote their conservation and contribute to the welfare of all of the people who reside and work in the Region or depend upon its activities. Attainment of this objective involves thorough understanding of many complex factors that influence regional prosperity. Land and the forests, which originally attracted people here, continue vitally to affect the welfare of the residents and regulate to a large extent the way of life of the Region. Water, forming the Ohio River, the Great Lakes, and the Mississippi avenues of transport in the days of the pioneers, is an essential element of regional life and activity and involves far-reaching physical, social, and economic problems. Minerals--coal, iron, copper, building stone, clays--have exercised predominating influences upon human welfare in varying degrees and in many localities. Transportation has played a predominant role in the development of the Region since its original settlement and is, today, a basic regional resource.

The early crafts brought in by the first settlers have expanded into a vast industrial pattern. Based upon the natural resources of the Region, and the traditional skills of its people, industry has itself become a primary basic resource. Intense industrial activity has brought more than half of the people of the Region into cities, and these urban areas are also a vast resource, demanding the application of sound principles of conservation and development, so that they may contribute most completely to the welfare of their inhabitants and industries. The maximum use of these and other regional resources for the satisfaction of its people is dependent upon thorough understanding of the manner in which they may be used and yet not diminished in potential value. Many people and agencies have focused their attention upon separate phases of the problems of regional resources. It is the purpose of this plan to bring all of these separate plans and needs of the Region into a single focus, and to see them

as planes of vision in relation to each other. Thus may be gained an intelligent perspective of the activities of the Region, forming a picture of the Region of the future as we would like to see it.

Unity of thought throughout the Region as to its ultimate development would be of distinct advantage to those in every kind of activity. This would lead to more concerted action toward the attainment of desirable goals for its continued improvement. It must be recognized at the outset that the plan must, of necessity, be complex. It could not be otherwise in view of the great diversity of life within these seven States where people earn their livelihoods in all sorts of ways, from almost primitive tilling of submarginal land to most highly developed industry. Economic life within the Region has advanced so far beyond merely agrarian pursuits during more than a century of industrial history that the simple types of plans suitable for areas that have a limited number of easily recognizable problems are wholly inapplicable. The plan for Region 4, to be effective, must consist, not of many details, but of a group of broad policies, upon which regional thinking may unite and upon which the support of governmental and private development agencies may be based.

The highly urbanized character of the Region, in which almost one-fourth of the population of the Nation reside and 60 percent of which live in cities, defies its subdivision into areas where problems may be treated in a similar manner. Some of the country's largest cities, including Chicago, Detroit, Cleveland, Milwaukee, Cincinnati, Indianapolis, Columbus, Toledo, and Louisville, are located in the Region. St. Louis, Pittsburgh, St. Paul, and Minneapolis embrace large portions of the Region within their trade areas. Sizeable cities are scattered widely, and it is evident that urban problems should be considered functionally for the entire Region rather than attempting to focus attention upon smaller areas.

With respect to the land, there are several definable areas. These, shown on Figure 1, are the agricultural regions desig-



Figure 1.—Situation Map, 1938

nated by H. B. Bennett in his book, *Soil*.

### Conservation

Within each of these areas, the original opportunities were associated with the land, its cover, and the minerals beneath it. These were natural resources and were there for the taking. The pioneers unwittingly destroyed many of these basic resources or depleted them so that they could not support the population. Their profligate use is the underlying cause of most of the problems in the Region. But the picture is not wholly dark. The better land of the Region, which comprises a very large proportion of all the good land of the Nation, is still producing surpluses. Even where the land is poor, there are many evidences of improved farming practices, and it has been demonstrated that even the very poorest land, in some instances, may be farmed profitably. A vast industrial economy has been erected upon the foundation of the land and mineral resources of the Region and expanded so that it uses many of the raw materials from beyond this area. The highly favorable location of the Region, with respect to markets, raw materials, reasonably safe distance from the seaboards, and superior transportation facilities, assures its continued industrial development. During the past six years, personal reconnaissance by the regional counselor of the National Resources Planning Board has extended into 540 of the 609 counties of the Region, and into many areas far removed from well-travelled highways. Impressions gained from these visits, from discussions of regional problems with people in many lines of activity, and, specifically, with State planning agencies and Federal authorities have led to the definite conclusion that planning for importunate or urgent development is wholly incompatible with the character of the Region and with the tenor of thought of its people, and its State and local governments. This does not imply that a great many people in the Region are lacking in appreciation of the necessities for development, but expressions of individuals and officials indicate unanimity in the conclusions that the development of the Region may best be promoted through continual research into the opportunities available to this complex population, accompanied by a strong educational program to develop the local understanding and team work essential to accomplishment. It is quite evident that the development plan must consist of a group

of policies.

There is general agreement that the future welfare of the people of the Region depends to a large extent upon adherence to these long-term policies:

1. Development of the use of the natural resources of the Region in a manner that will conserve their potential capacity, insofar as conservation is compatible with utility.
2. Restoration of renewable natural resources that have been depleted.
3. Expansion of appropriate industry to provide greater diversified opportunities for employment throughout the Region.
4. Provision of ample facilities for research and the equipping and educating of people to take advantage of employment opportunities.

Previous research by many institutions and educational efforts participated in by people throughout the Region have so advanced the thought of the States and localities that there is general agreement upon the soundness of certain specific policies and demonstrated methods of conservation and development of resources. Upon other policies, there is still some diversity of opinion. The following programs for functional fields of regional action reflect the current composite judgment of official and private authorities as to what policies should be followed in developing the Region.

### Forests

The forest of the Region formed the first resource that was exploited. Vast lumbering operations were carried on in the Appalachian mountains of West Virginia and Kentucky, the hills along the Ohio River and its tributaries, the northern portions of Michigan and Wisconsin, and to a large extent throughout the whole Region except on the prairies of Indiana and Illinois. In the best agricultural sections, great areas of hardwoods were cut down and burned so that the land could be brought into production. The Region was clothed with a natural forest that could have been maintained indefinitely for the use of succeeding generations.

Sound policies for the future dictate that much of this forest be restored, a process that would provide employment for many persons during the course of its regrowth, followed by continuous opportunities for forest work when it had been established upon a sustained-yield basis. The remaining areas of merchantable timber should be operated so as to preserve their potential val-

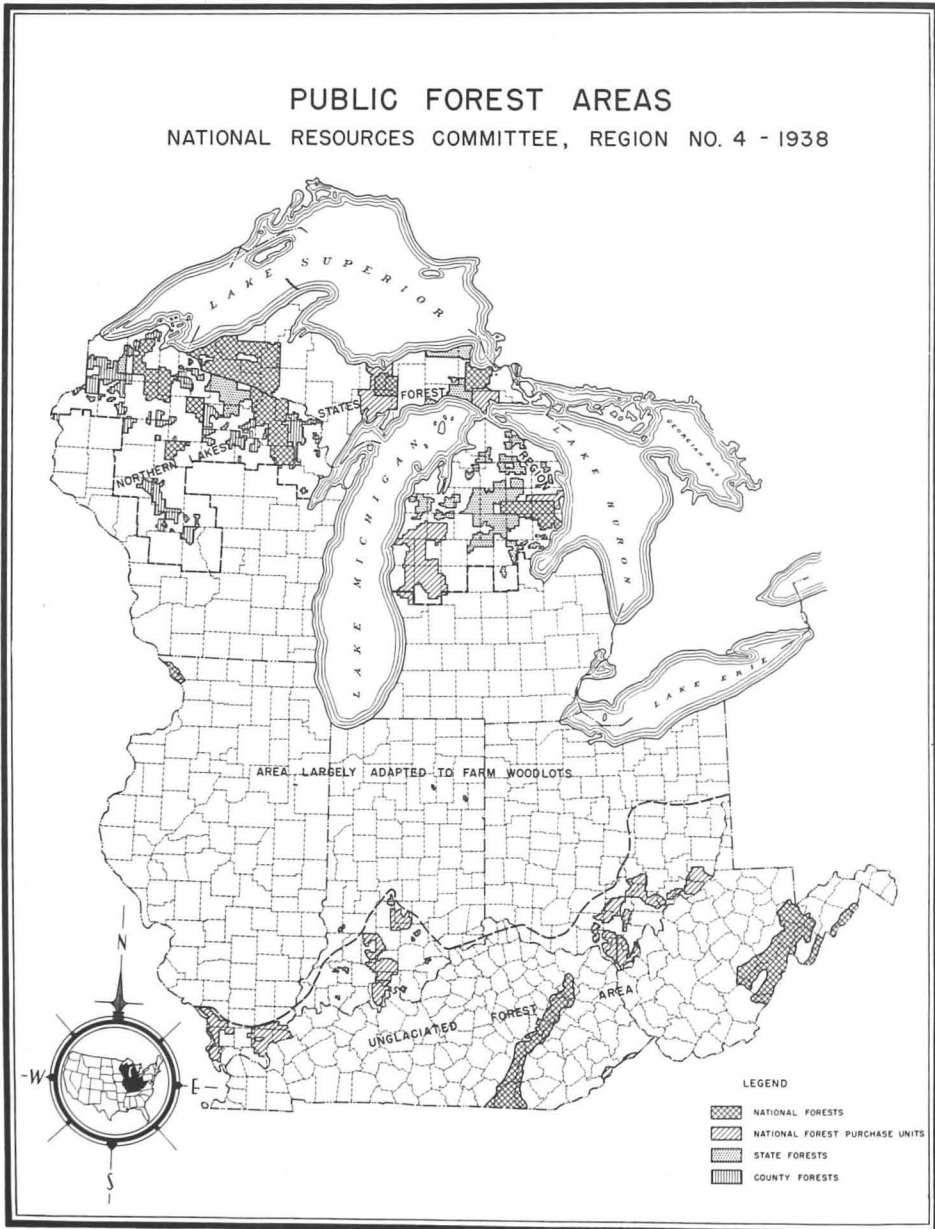


Figure 2.—Public Forest Areas

ues and establish the methods of sustained-yield cropping.

Figure 2 shows the areas that are suitable for forest development, the remaining areas of merchantable timber, the areas where a large proportion of the land should be wooded, and existing public ownerships of forest land. The undesignated areas on the map are predominately agricultural, but within such districts, there are many small tracts that are topographically or otherwise more suitable for forests than for cropping or pasture. The use of these tracts for farm woodlots or local forests should be encouraged through the research, educational, and extension services of State agricultural colleges and by acts such as the Indiana forest classification act and the county forest laws of Wisconsin.

There are 16 national forest purchase areas in the Region comprising 13,375,624 acres as shown on Figure 2. The Federal government now owns 4,476,177 acres. Programs for acquisition of authorized purchase areas should be expedited. Work programs for restoration of the forests, using local relief and farm labor in all forest areas, should be instituted and expanded. Consideration should also be given to the policy of extending restoration activities to private lands under regulations similar to those of the Soil Conservation Service. Figure 2 also shows the location of county forests in Wisconsin and State forests in the Region. The extent of Federal forest purchase areas in each State of the Region is shown in the following table:

State	Net Area Approved For Purchase of Federal Forests	Approved Areas Purchased as of June 30, 1939
	Acres	Acres
Illinois	173,809	153,956
Indiana	34,000	33,542
Kentucky	421,280	374,602
Michigan	1,792,267	1,697,237
Ohio	38,754	35,110
West Virginia	899,473	860,622
Wisconsin	1,325,373	1,301,108

In order that the forest resources may be adequately restored, it appears to be desirable to expand the forest acquisition program to bring into public ownership the major portion of the land that basic land-

use studies, especially those prepared by rural land-use planning committees or supported by zoning ordinances, have determined to be best suited for forest restoration. This calls for a closely coordinated program between local, State and Federal authorities. However, it is evident that increasing attention is being directed to the use for crops of land in forest and other submarginal agricultural areas that have heretofore been regarded as useless. Improved methods of cropping have already been demonstrated in the poor land areas, and some farms on very inferior land, using new methods, have shown better records than better land nearby. This points to the necessity of increased research into the use of such lands and the demonstration of new methods, accompanied by education of farmers on poor land. It further indicates that permanent public retention of all land purchased for forests may be unwise and that the Forest Service should be alert to improve agricultural methods and be ready to lease or convey appropriate land to individuals when they are ready and equipped to farm it profitably and in accordance with approved practices. This is particularly essential in those areas where large populations now exist and must be given greater opportunities for gaining a livelihood where they now live, and not at some more distant place where "the pastures are greener" but already used to capacity.

Restoration and operation of the forests will provide sufficient opportunities for full or part-time employment for most of the rural residents of the northern cut-over area, where population densities are small. In the Appalachian forests of Kentucky and West Virginia, similar work opportunities would provide valuable supplemental and full-time employment but would only be a partial factor in raising the economic level, because of the large families and dense population. Forest work in the south must therefore be considered as only one element of an opportunity program composed of agricultural, mining, industrial, and forest pursuits. Nevertheless, it is an extremely important element, and the only work opportunity that will result in the restoration of a basic resource. Throughout the remainder of the Region, the opportunities for forest work bear a relationship to all work opportunities inversely proportional to the quality of agricultural land.

In areas where open-pit or strip coal

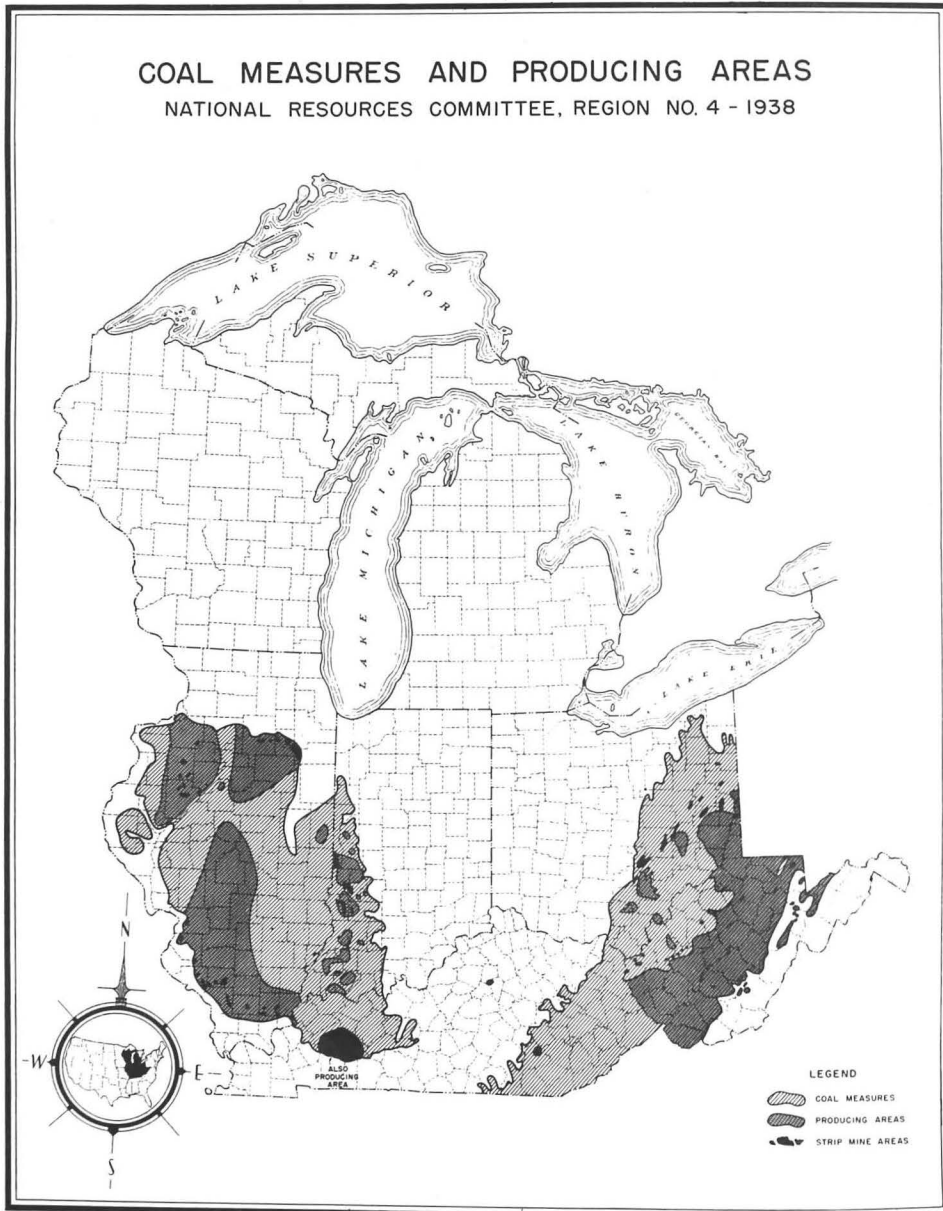


Figure 3.—Coal Measures and Producing Areas

mining is practiced, programs are already underway or being considered for the establishment of forests on the stripped material as one method of rehabilitation. These programs are being developed through cooperation of private operators, Federal and State authorities. There is general agreement that reforestation of the strip piles would be highly desirable in many instances, and the work opportunities connected therewith rank high locally. Figure 3 shows the location of strip-mine areas.

As the forests were exploited, large numbers of wood-working industries were established throughout the Region. Many of these still operate, but most of them disappeared as the forest products diminished. Replacements for these industries are greatly needed. Restoration of the forests to a sustained-yield basis will eventually bring back some manufacturing. Extensive research is being carried on by the Forest Products Laboratory at the University of Wisconsin, particularly in the use of young trees and inferior species. A wide variety of useful products and new structural uses has been developed, including plastics of high quality. It is highly desirable that the research work of this laboratory be expanded, and as new products are proven to be valuable, that steps be taken to establish new industries near the forests, which will provide additional work opportunities for local residents.

#### Agriculture

More than three-fourths of the Region is now devoted to agriculture. This is divided generally into the categories of the Corn Belt, Dairying, General Farming, and Subsistence Farming, as shown on Figure 4. Many acres of inferior farm land, mostly within recommended forest areas, should be retired from cultivation as discussed above under Forests, and the struggle for existence on self-sufficing farms displaced by work opportunities in the forests or in supplementary industrial programs. The remainder of the land of the Region falls into two classifications, namely, cropland and pasture land. The problems of maintaining the quality of these two types of land are quite different, but their operation is often closely associated. The predominance of one type or the other determines to a large extent the basic economy of the locality.

#### Pasture Land

Areas in which pasture land is predominant include most of the States of West Virginia and Kentucky, southern Illinois and Indiana, eastern and southern Ohio, southern Wisconsin and northwestern Illinois. The maintenance of permanent pastures and sufficient cropland to produce winter feed are essential elements of the livestock economy of the region of predominant pasture land. The desirable size of the farms will depend upon quality of the pastures. Therefore, if the maximum number of people are to be supported by use of the land for the raising of livestock, it is essential that programs in the livestock areas be directed towards continual improvement of pastures. A major part of this program of pasture improvement should be accomplished through education based upon the research of the agricultural colleges and brought directly to the farmers through the established State extension services. The educational program should be supplemented by expansion of the demonstration projects conducted by the Soil Conservation Service.

In the portion of the B8 and D3e areas shown on Figure 2, which lie in Indiana and Ohio, there are more than one-quarter of a million acres that are not suited to farming but would be more productive in pasture than in woods. It has been suggested by some agricultural authorities that this land be purchased by the public and "regressed" instead of reforested, based upon the theory that under private ownership, these lands cannot be retired for rehabilitation for the same reasons that individuals cannot afford to reforest lands themselves. If these lands are to be kept from deteriorating to the point of uselessness, they must be restored as pastures, and this would have to be done at public expense but could be followed by leasing or resale of these lands for private operation. These lands would cost from \$9.00 to \$18.00 per acre, and an equal expenditure for public works would be required to put them into a state of production so that they could be used by farmers of the communities in which such tracts would be located. This situation also exists in most of Kentucky and West Virginia, and in areas on flatter land, such as the "tight cracks" of Illinois.

The economic situation varies markedly in the pasture areas of the Region. Normally,

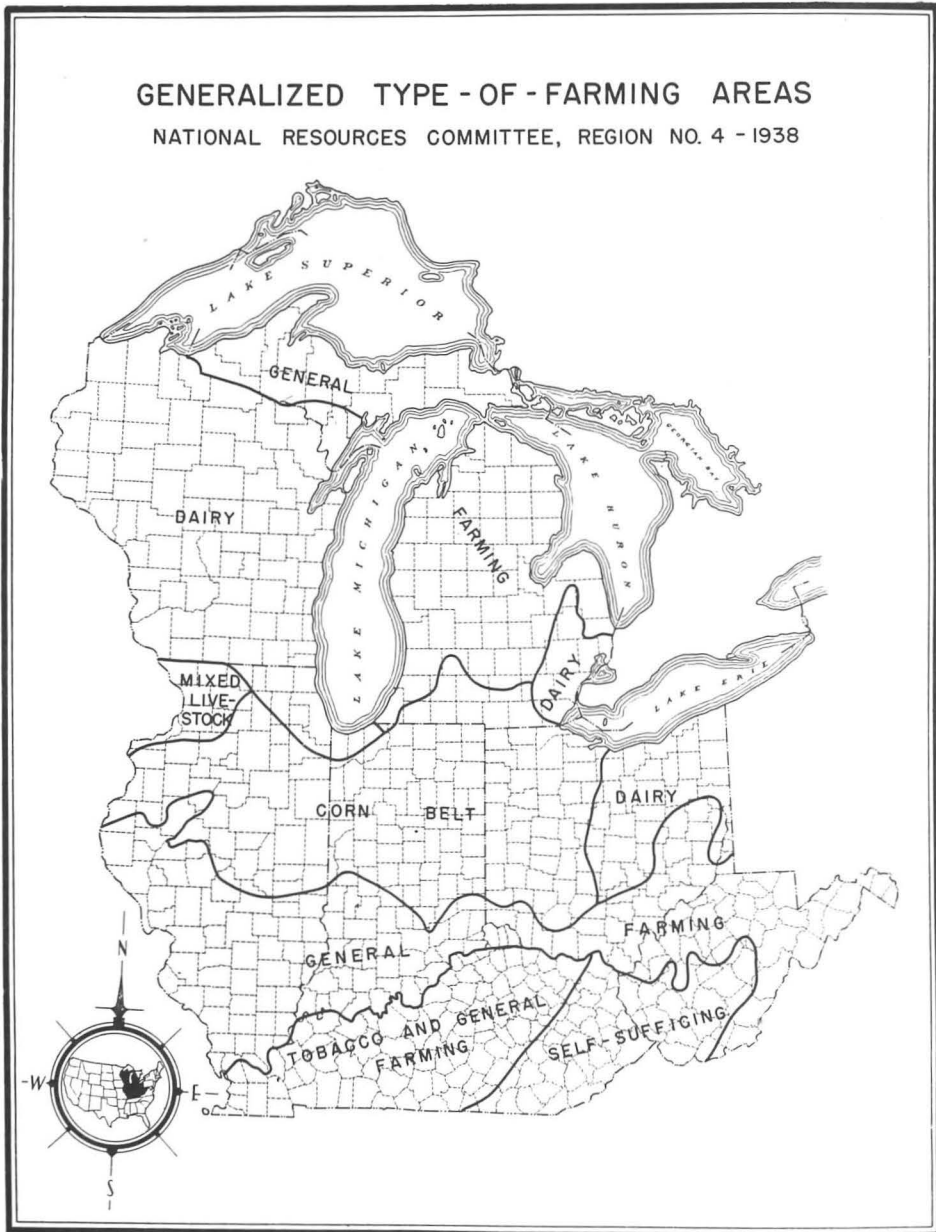


Figure 4.—Generalized Type-of-Farming Areas



a livestock economy denotes a light population, and the ultimate development of livestock possibilities would result in a lowering of population density. In the southern reaches, the areas most suitable for livestock are interspersed with small subsistence farms, and the number of people on the farms cannot, under present methods, be supported at a desirable standard of living. Reversion to livestock will displace many of these self-sufficing farmers. They must seek other opportunities. Those who are near the forests may expect to secure some work in the woods. Those who remain on the land may improve their situation by acquiring more land so that they may operate adequate areas of cropland to supplement pastures and to feed themselves. But the large portion of the rural residents can only improve their lot by supplemental industrial employment. However, the conviction is growing that these lands can be profitably cropped in the manner discussed above under *Forests*.

It must be recognized that most of the residents of the southern agricultural areas are not skilled industrial workers. Younger people and those susceptible of training may migrate to established industrial areas and be successful, but there is a definite need in these regions for forms of industry for part or full-time operation, that will be commensurate with the skills of the people of the area. These may be home or handicraft industries or small industries utilizing local products. Research leading to an industrial program is a responsibility that should center in the State universities, cooperating with the Forest Service, the State planning boards, and other research agencies. Promotion of the program should be carried on by State development commissions cooperating with State chambers of commerce and local official and private authorities.

In the dairy sections of the Region, as shown on Figure 4, the slopes are not so steep, and the pastures are of higher quality. A high type of economic development has been reached in the dairy areas, particularly in southern Wisconsin. Normal dairy operations within economical marketing distances of large urban centers have been supplemented by processing plants that provide employment for many persons. Much of this area is also suitable for the growing of truck crops and farm products for canning, thus providing additional industrial employ-

ment. These areas, as a whole, do not constitute problem areas but serve, rather, as good examples of balanced agricultural-industrial development.

#### Cropland

The area designated on Figure 4 as the Corn Belt contains 30 percent of the Grade 1 and 23 percent of the Grade 2 land of the Nation. In this area, corn is grown and fed to hogs and cattle, and grains are produced for sale. A great variety of crops is raised. Thriving canning plants consume great volumes of tomatoes, corn, peas, and other vegetables. Recently, a train of 43 cars of Indiana tomato juice was shipped to New York at one time. Many special crops are raised in the muck lands of northern Indiana and southern Michigan, including peppermint, onions, and excellent vegetables. No higher type of agricultural economy exists. Yet in various parts of the area, erosion has taken place, and soil fertility has been depleted through too intensive cropping. Not long ago a prominent agricultural economist stated that 80 percent of the farms in Ohio were not being operated so as to conserve the soil, but the same man lately expressed encouragement at the effects of the educational programs that have been under way. In spite of unwise cropping, the good land in this region still produces surpluses. Insofar as the land itself is concerned, the corn belt is not a problem area, but continued education is needed to bring about better crop rotations and control of sheet erosion. The research programs of the agricultural experiment stations and the educational efforts of the extension services of the State universities should be expanded and strengthened to bring about better use of cropland and the growing of more diversified crops and products suitable for industry. This should include demonstration projects and the expansion of technical services available to land-use planning committees. It is also emphasized that additional personnel is needed in county agents' offices.

Mechanization of the farms has developed an employment problem of no small proportions. Whereas formerly four or five men were needed to operate an average corn belt farm, one or two can now perform the work with mechanical equipment. The farm labor released thereby must find employment elsewhere. Even with more intensive cropping to produce agricultural crops for industry, only a few more men will be needed on farms.

The greatest opportunity for the young people of the corn belt who are not needed on the farms will be found in industry, and their generally good health and education fit them for a high type of industrial work. Cities of considerable size are scattered over the corn belt, and such expansion of industry as takes place will doubtless be in those cities that have an industrial tradition. It is evident that there is close association between good farm land and industry.

Bordering the corn belt on both the north and south are areas devoted to general farming as shown on Figure 4. The northern area extends into Michigan as far as the cut-over region. It has many of the characteristics of the corn belt, but the land is not so good, the farms are smaller, and drainage is a problem in much of the area. There is much more land submarginal for crops. On the south, the general farming areas are definitely problem areas. Where there are areas of reasonably good farm land, the farms should have enough cropland to support the farm family living upon it. At least half of this southern area should be returned to forest, and at least one-fourth should be devoted to pasture, leaving one-fourth or less for cropping. The principles and remedies outlined heretofore for the livestock areas south of the Ohio River apply in appropriate degree to this area, but the standards of living and education are higher in the regions north of the Ohio River, and the younger elements of the population are thus better fitted to go into industry.

The primary problem of cropland in the northern cut-over area is occasioned by the size of farms. There are some 18,000,000 acres suitable for cropping. Each farm should have an area of cropland sufficient to maintain a family. The Farm Security Administration has been authorized to expend \$700,000 in assisting farmers in the Wisconsin and Michigan cut-over regions to secure enough cropland to support a family. It is expected that this expenditure will produce successful results, and when its value has been demonstrated, the program should be expanded and extended to the southern hills, where the size of farms is too small for a subsistence level.

#### Land Classification

It is generally recognized that thorough and accurate classification of land is a prerequisite to a sound program of land use.

The agricultural experiment stations and the Department of Agriculture have been devoting much thought and effort to rural land classification for many years. But it has long been recognized that the essentials of the land classification program must be brought to the attention of the owners and operators of farm land. The device of securing the advice of representative farmers upon the most desirable use of farm land has proven very successful. Land-use planning committees have been set up in most of the counties of the Region. Composed of representative farmers under the general direction, but by no means the compulsion, of the County Agricultural Agent, a representative of the Bureau of Agricultural Economics of the Department of Agriculture, and an extension worker from the State agricultural college, they have placed on maps themselves their recommendations for the use of all of the rural land of the county. Many of these reports have been completed and published and given wide circulation in the counties. From the county reports, State maps showing recommended land-use patterns are being made. As a basis for future land-use programs and adjustments, the work of the land-use planning committees is of inestimable value. The committees should be continued and keep their work up to date.

There are five methods of bringing about the desired land use in each county, namely, by:

1. Education
2. Zoning
3. Soil conservation districts
4. Public ownership
5. Financial assistance to farmers.

It is recommended that the research, educational, and extension services of the State agricultural colleges be strengthened, where necessary, to bring about a widespread understanding of the principles of proper land use. As a definite part of the educational program, the demonstration projects of the Soil Conservation Service should be continued and expanded.

Zoning has proven to be a successful device to check unwise use of land and unwarranted settlement of land unsuited to agriculture. It is not a method whereby adjustments in land use may be effected but prevents the spread of improper land use. Wisconsin has been a leader in rural zoning. Starting with simple ordinances in the cut-over counties designating forest zones closed to further settlement and agricultural areas, it has spread to more populous

counties in the southern part of the State, where more diversified classifications have been adopted. Michigan and Illinois have passed a few county zoning ordinances, and Indiana has the authority to zone but has not yet exercised it. Eventually, every county should have a zoning ordinance. Before this can be accomplished, enabling acts of State legislatures will be required in Ohio, West Virginia, and Kentucky, and the Indiana act should be strengthened. The same principles that were outlined under *Forests* relative to permanent use for forests apply to permanent zoning of forests. It is altogether possible that research may discover ways in which land now relegated to forests may be profitably cropped, and when such research has been proven in practice, appropriate lands now zoned for forest should be released for crop use.

A second method of bringing about desired land use is the soil conservation district, which, under authority of a State enabling act, permits land owners to form a district of suitable size and adopt a land-use program participated in by the land owners in the district that will insure adequate soil conservation measures in the district. All of the States of Region 4 except Ohio have passed State enabling acts for soil conservation districts. Based upon recommendations of the land-use planning committees, these districts should be formed where authorized by State enabling acts.

Public acquisition of land unsuited to agriculture is the most effective way to bring about land-use adjustment. There are three ways in which land may be acquired by the public, namely, by outright purchase, gift, and by tax reversion. Federal acquisition would be by purchase or gift only. The forest purchase program should be hastened, and in zoned counties, non-conforming uses in forest areas should be among the first lands acquired.

Acquisition of land by tax reversion has been most effective in Wisconsin, where the land reverts to counties, and in Michigan, where it reverts to the State. Indiana and West Virginia also have tax reversion laws, but the other States of the Region do not. Legislation establishing sound policies for reversion of tax delinquent land should be enacted in Ohio, Kentucky, and Illinois.

The costs of local government are among the chief financial burdens of the counties in which land submarginal for agriculture exists. A major portion of such costs are

occasioned by the expense of maintaining roads and schools, and the transportation of pupils for the benefit of isolated settlers. Much of the isolated land is tax delinquent and by tax reversion returns to the public. Wisconsin counties, through land committees of their county boards, have acquired many of the isolated holdings, either by reversion or by trading county-owned land closer to settlements for the isolated holdings, and have thus been able to abandon roads and schools and reduce governmental costs. Each State should profit by Wisconsin's experience and, under either State or county auspices, bring isolated or scattered rural populations into closer settlement wherever possible.

#### Recreation

This Region possesses land and water areas that offer abundant opportunity for recreational development reasonably close to large concentrations of urban population. West Virginia, with the highest average elevation east of the Rocky Mountains, contains areas of splendid scenery and forested wildness. Kentucky has attractive scenery and beautiful streams. The Illinois Ozarks and the hills of southern Indiana and Ohio are increasingly used for recreation. The lakes and woods of Wisconsin and Michigan have long been a mecca for vacationists. In addition, there are many fine developed and potential recreational sites throughout the better farming areas of the Region. Increasing throngs of tourists pass through the Region and demand all sorts of travel accommodations, food, and shelter. This is a great industry in itself, will continue to increase, and provides work opportunities associated with land and water areas. The provision and operation of recreational sites and public facilities is a joint responsibility of the National Park Service, the Forest Service, and the State agencies. The States of Wisconsin, Illinois, Indiana, and Kentucky have completed recreation plans under the direction of the National Park Service. Michigan is preparing a plan. Ohio has not cooperated in this endeavor, and West Virginia has ceased to work on its plan. Both States should prepare such plans. These plans direct attention to the need for provision of many more recreation areas in the vicinity of large population centers. Recommendations for specific locations have been avoided for various reasons, but there is a general agreement that this is a primary need of the Region.

The recreational plans also point out the possibilities for parkways along the principal streams of Illinois, Wisconsin, and Indiana. As a general principle, river forests or parkways should be established along the larger streams throughout the Region. The maps contained in the Wisconsin and Illinois reports show the location of proposed parkways, but the Indiana recommendations have not been made public. There are great opportunities for parkway development in Kentucky, Ohio, Michigan, and West Virginia also, but specific recommendations have not been made by the States.

A planning committee has been working for three years upon a proposed parkway along the Mississippi River from Lake Itasca in Minnesota to the mouth. Nine States have passed enabling acts permitting them to cooperate in the development. It is proposed to have a complete survey made of the parkway by the National Park Service. This has not been started, and definite recommendations for the parkway must await the completion of the survey. It extends through four regions and in this region affects Wisconsin, Illinois, and Kentucky.

Water areas provide suitable sites for recreation. In the northern sections of Wisconsin and Michigan, small lakes abound. These have been used for many years for recreation, but drainage operations have lowered lake levels so much that critical study of the problem of maintaining reasonable levels is being undertaken in Wisconsin and Michigan. The shores of the Great Lakes afford sites for recreation, but very little of the shore is in public ownership. Acquisition of beach reservations to serve the large urban populations is very much needed, and closely associated with it is the problem of shore or beach erosion. Beach erosion is particularly acute along the south shore of Lake Erie and the lower end of Lake Michigan. The National Beach Erosion Board has given attention to the general principles involved, the district engineers have made preliminary investigations of acute situations, and local authorities have presented the problem for consideration by appropriate drainage basin committees.

The reservoirs of the Corps of Engineers' plan for flood control on the Ohio River will provide vast recreation possibilities. Each of these reservoirs will contain a good sized recreation pool, suitable for various forms of water recreation including wildlife conservation. Certain reservoirs, such as the Tygart Reservoir near Grafton, West

Virginia, built for low flow control include greater water areas than the flood control reservoirs and have already attracted throngs of sight-seers and recreation visitors. The large reservoirs are being supplemented by numerous recreational lakes in the forest areas of the Region and in State parks and land-retirement areas. This program should be expanded under the direction of the State conservation departments. Development of recreational land and public facilities should be in accordance with the principles and recommendations of these plans.

The regional and local value of recreational services as employment possibilities depends upon the quality of such services. This necessitates State regulation, and inspection and educational programs to instill into providers of recreational services and people generally an appreciation of the long-term value of high standards of service as a contribution to stabilized work opportunities in this field. It is specifically recommended that the research, educational, and extension services of State universities conduct State and local conferences on this subject to bring about higher standards of recreational services.

#### Wildlife

The land and water areas of the Region were the original habitat of a wealth of fur-bearing and game animals and fresh water fish. In the Report of the Land Planning Committee to the National Resources Board in 1935, the following statements were made:

"Wildlife is as essentially a product of land (or land and water) as is timber, agricultural crops, or domestic livestock. A multitude of kinds, bearing importantly upon human welfare, are especially adapted to various kinds of habitat, from dense forest and open range to cultivated fields, water and marsh. It follows, therefore, that wildlife cannot be ignored in any comprehensive, well-considered plan for land utilization. Mammals, birds, fishes, and other wild vertebrates constitute a major national resource that is becoming more generally appreciated, as evidenced by increasing interest in every phase of nature study.

"Many of the various forms, fur bearers and fishes especially, are of direct economic value. An example is the income derived from the sale of hunting, trapping, and fishing licenses; the furs of course have a great commercial value also, and in some cases the meat supplies a highly prized form of food. That the meat and fur value of wild animals and birds is considerable is

indicated by an estimated total for 1 year of more than \$190,000,000 for the whole country. Capitalized on a low-percentage basis the total value of wildlife would far exceed \$1,000,000,000. Other economic values are receipts from the sale of hunting and fishing equipment, including guns, ammunition, fishing tackle, and clothing, expenditures of sports-men for transportation, board, hire of guides, and for hunting and fishing privileges on private lands. To the foregoing may be added the output of the fur trade, including the fur manufacturing industry, the annual expenditures for the maintenance of the numerous and widely distributed hunting and fishing clubs; also the general expenses of tourists and others attracted primarily by an abundance of wildlife. It is these various wildlife values that go to make up the estimated grand total of at least \$1,100,000,000 annually.

"Last but not least should be mentioned the incalculable value of wildlife, chiefly birds, as destroyers of the insects that prey on agricultural crops and forest trees."

Development of wildlife, both from a recreational standpoint and as an income possibility, is an essential element of the regional development plan. Commercial fishing also demands careful regulation and planning. The recommended treaty regulating commercial fisheries between the States bordering on the Great Lakes and the Dominion of Canada should be ratified by all parties at once, in order that every facility for restoring this resource, not only because of its food value, but as a source of employment and income, may be assured and hastened.

Wildlife, as well as commercial fisheries, is one of the renewable resources of the Region. Its re-establishment will provide another source of income and employment in areas where this need exists. Wildlife development is a joint responsibility of the Fish and Wildlife Service of the Department of Interior and the appropriate State agencies, and should be continued.

#### Minerals

Mineral resources in the area under discussion are principally coal, petroleum, fluorspar, sand, gravel, limestone, and clays. Changes in the nature of the coal and energy market have brought about a decline in coal demand, accompanied by depressed conditions in coal mining communities. There is, therefore, a surplus of skilled mine labor that is loath to move out

of the coal community. Investigations as to the possibility of expanding markets, developing new uses for coal in industry, and rehabilitating displaced miners in other work are urgently required.

A specific example of freight rate and market readjustments to be desired can be found in the coal mining districts in western Indiana, southern Illinois, and western Kentucky, where there is a problem of a very slack summer season. Short-time programs for the revival of coal mining activity call for the development of summer markets, mainly through the development of summer river traffic to the markets of St. Paul, Minneapolis, and Chicago, and, over Lake Michigan to Wisconsin and Michigan ports, by way of the port of Chicago. For the latter, a reduction in freight rates from mining district to the port of Chicago for lake destinations.

The development of a fuel product from Illinois coal acceptable as a domestic fuel in Chicago and St. Louis will bring about a more extensive utilization of these nearby coal fields.

A long-time program for the coal districts assumes that coal will become increasingly important as a chemical raw material, and for this, the coal districts must be examined with reference to their suitability as locations for chemical manufacturing plants.

Structural clay products are among the depressed industries, although not necessarily restricted in location to a depressed district or region. Clay resources are abundantly available in the entire area covered in this survey. Moreover, it is a Region where timber resources are scant or original timber stands have been depleted. A substantial portion of annual construction is accomplished with materials shipped from distant production points. The farm, particularly, has been one of the greatest markets for lumber. The depletion of adequate supplies of soft wood in areas east of the Rocky Mountains suggests the use of building materials from mineral products as an alternative. Raw materials and local industries for the manufacture of structural clay products are distributed through the area. This is distinctly a local industry, and new vigor in this industry is conditional upon education in the construction and use of clay products.

In the limestone counties of south central Indiana, a serious social and economic

problem exists because much of the processing of building limestone has been shifted from the location of the limestone itself to the various job sites in the cities. An investigation of the wisdom of relevant railroad freight rates and of the differentials in labor costs and regulations between the two locations might well lead to at least partial solution of the problem.

A problem of chemical research is that involving the fluorspar deposits of southern Illinois and western Kentucky. Certain communities in the fluorspar districts of these two States are dependent upon activity in fluorspar mines for a livelihood. Hitherto, the principal outlet for this material has been in the steel industry, and employment in these communities fluctuated with the rise and fall of steel output. The cyclical nature of demand can be moderated somewhat by creating a diverse market for this product. This is the objective of research now in progress on fluorspar and its compounds.

The problem in the iron and copper mining areas of upper Michigan is even more acute. These mines are unable to compete with open pit mines in other regions. Their operation is further hampered by tax laws, which prevent them from mining during the winter and building stock piles in advance of summer water transportation on the Great Lakes, because stock piles are assessed for taxation in the spring. It is unlikely that many of the miners will find employment in the mines, and they must seek jobs elsewhere. They may fit into the reforestation program, but there will still be need for some form of industry.

#### Industry

The strategic location of Region 4 with respect to population and transportation, coal, raw materials, and water influenced the development of an industrial economy at an early date. The State of Indiana is typical of much of the Region, and there may be found in the area a wide diversity of manufacturing. Some kind of industry exists in every one of the 92 counties of the State.

The industrial areas of the State manufacture a wide variety of articles and products. More than 64 percent of the population of Indiana lives in cities, and most of these people depend upon some form of industry or services to industry for a livelihood. The same is true of Illinois and Ohio and of most of Wisconsin and Michigan.

Agriculturists, geologists, and industrialists agree that research is greatly needed. New developments will aid agriculture and urban and mining interests. Mr. Harry J. Reed, new Dean and Director of the College of Agriculture and the Agricultural Experiment Station at Purdue University, is quoted in the Preliminary Report of the State Planning Board of Indiana, 1934, as follows:

"The fields and woodlots of Indiana can produce enormous amounts of raw materials suitable for industrial purposes as rapidly as the knowledge regarding useful by-products can be developed. A great field of research lies ahead of the Agricultural Experiment Station along these lines. It is essential that a greater knowledge of new uses for farm products and wastes now occurring on Indiana farms be developed. Mr. Reed stated emphatically that in his opinion the future of Indiana agriculture depended upon the utilization of waste products in manufacturing. This would also include the growing of new products which would be valuable for manufacturing. In the light of present understanding the use of soy beans offers great possibilities. This crop grows especially well in Indiana and should therefore be profitable to the farmer and its development should provide employment for many people in industry.

"At Indiana University the State Geologist is being continually called on for advice as to the value of Indiana resources of a mineral nature. The ceramic laboratory there makes analyses and reports for those seeking information in regard to minerals. There are private organizations also which are seeking to perfect industrial processes which will offer new outlets for industry and which would also in turn afford employment for many people.

"The year 1930 witnesses the incorporation of an organization designed to promote industrial research. This is known as the Purdue Research Foundation. It was created under authority of the State with a contractual agreement which is beyond the dangers of political change. The foreword in Bulletin No. 1 of this foundation gives an idea of the high purpose for which it was created. Mr. G. Stanley Meikle, who is the Director of the Foundation, made the following statement, 'The past century has witnessed the evolution of a new epoch in the history of civilization. Science and new technology have begun to lift the bur-

dens of hardship and unnecessary toil from the shoulders of man. He is being released to enjoy the higher values of life which are being created with increasing rapidity as he expands his control over the endless resources and infinite power in nature. The continued development of these new tools of civilization, to be used as the means to an end, is largely dependent, not upon wealth of resources, but upon wealth of human ingenuity and intelligence applied to adjust mankind to his environment. Science and learning are being forced into the sphere of practice. An increasing responsibility in the selection and training of the scientific and technological leaders of the future is being placed upon the institutions of learning. An appreciation of the trends of this new era, and a realization that the success of scientific and technological development is largely dependent upon organized effort, inspired the Founders to make possible the Purdue Research Foundation!

\*Whereas the primary purpose of the foundation is to cooperate with industry in developing new processes and new methods it also has in view a much broader purpose. This purpose is the development of human resources. It will provide opportunity for students and faculty members with research ability to proceed under competent direction and with adequate funds to the development of their ideas. This will tend to uncover ability and originality and will make it possible for a high order of intelligence to be applied to industrial problems. While the foundation is located at Purdue University, it is not intended to limit its opportunities to students of that university alone, but all students are invited to participate, as funds become available.

"The articles of incorporation establish the foundation to promote educational purposes by encouraging, fostering and conducting scientific investigations and research by acquiring, and disseminating knowledge thereto; and further, both in connection with Purdue University and independently thereof, to foster and encourage education and learning in science, agriculture and mechanic arts and to promote the liberal and practical education of the industrial classes of the several pursuits and professions of life. The foundation may also acquire property, may secure patents on processes and articles developed and conduct its business in a prac-

tical manner. Its directors are composed of representatives of industry as well as trustees of the University, alumni research councilors and research members. It is quite evident that this is an organization well equipped to develop new industrial processes which will give employment to a large number of people and which will develop human resources."

Much that has been said in the Indiana report applies with equal appropriateness to Illinois, Ohio, and the southern portions of Wisconsin and Michigan. In West Virginia, the chemical industry has been highly developed along the Kanawha River, where conditions are especially favorable for this type of industry. In the Wheeling and Upper Monongahela areas, in reality adjuncts of the Pittsburgh district, there are steel, glass, and pottery plants and associated heavy industry. Elsewhere, manufacturing in Kentucky and West Virginia is confined largely to the vicinity of the Ohio River, where water transportation is available and rail freight rates are influenced by competitive water shipping rates. Only a few industries are found in the cut-over regions of northern Michigan and Wisconsin. The densities indicate very closely the spread of industry in the Region.

The foregoing sections of the regional development plan conclusively demonstrate the necessity of greater industrial development in all portions of the Region if employment is to be stabilized, not only for the 18,000,000 or more urban dwellers but also for the surplus labor in both the good and the less favored agricultural and mineral areas. The prosperity of industry is directly proportional to the strength of both domestic and foreign markets. The regional plan cannot guarantee such markets, but it must be assumed that they will exist as a part of the structure of the regional industrial economy. Any other assumption would be an admission that natural opportunities are diminishing and would obviate the necessity of planning for regional industrial development. The favorable location of Region 4 for industrial development becomes more apparent in view of the world situation and the necessity of locating vital industries far distant from the sea-boards.

Three basic steps that must be taken as prerequisites for industrial locations are as follows:

1. Research to determine new products and methods of manufacture.

2. Research to determine the types of industry suitable for location in various parts of the Region where different skills are available.

3. Determination of locations for actual industrial plants.

The determination of new products and methods can best be reached in established industrial research laboratories. Among existing establishments of this character in the Region are the aforementioned Purdue Research Foundation, a similar organization at the Ohio State University, the Engineering Experiment Station at the University of Illinois, the Forest Products Laboratory at the University of Wisconsin, the Research Laboratories of General Motors Corporation, Dow Chemical Company at Midland, Michigan, and many others. An essential element of the industrial plan is the establishment of sufficient well equipped industrial laboratories, working in close alliance with private industry, to meet the demands of industrial development in the Region. In such laboratories, not only general research but also research peculiarly applicable to each State and its potential resources may be carried on, and should include social and economic research related to industrial development. The new mineral industries building at West Virginia University, for which a contract has just been awarded, will house such an institution for mineral research.

In each State, there should be vigorous research into the types of industry that may be established successfully in different parts of the State, and the extent to which such industries may use local forest, agricultural, and mineral resources and give work to local people. This necessitates an understanding of the kind of work that people of the area are capable of doing or are being trained to do. It may be determined that, in some localities, handicraft articles are the highest type of manufacture that can be successfully produced. In many other portions of the Region, industry requiring the highest skill will be appropriate. The traditions of good craftsmanship that exist in a large portion of the Region are a valuable factor in developing an industrial program. The objective of this plan is to design a pattern of industry covering the entire Region. The State planning board of each State should be responsible for the industrial pattern for its State, and, in reaching conclusions, it should have the advice of research agencies, State cham-

bers of commerce, State development commissions, city and county planning commissions, and all others who are competent to offer advice. In this Region, where the development of industry is a basic necessity for the welfare of the people, the State planning boards should regard this as a primary objective. The chairmen of the several State planning boards should act as a regional committee to reconcile State industrial patterns into a regional pattern. In this, they would have the assistance of the staff of the Indianapolis Field Office of the National Resources Planning Board.

The location of actual industries is a task for private industry itself. The regional industrial pattern and those of the States would also provide for industry much of the basic investigational data that a well-organized industry secures before locating a new plant, including information as to available buildings and plant facilities, quantity and skills of available labor, transportation facilities, water supply, power facilities and rates, housing facilities, etc. Private industry would, in every instance, make the decision as to where it would locate, but public agencies and promotional organizations should be in a position to provide regional and local facts upon which the decisions of private industry could be based. The development of coordination between the fact-finding public agencies - those that prepare the State industrial pattern -, the semi-public development associations, such as chambers of commerce, and the industries that use the data, is an essential element of the regional plan and should be a major objective of the State planning board and associated local planning agencies.

#### Water

#### Power

The maintenance of a constantly progressive development of the industrial pattern demands a correlated power program. In the interest of conservation and maximum use of transportation facilities, power sources will include all of the feasible hydroelectric possibilities. Except for the mountainous areas in the southern portions of the Region, the topography of the Region is generally unfavorable to water power development when considered in the light of commonly accepted criteria, which delimit economical feasibility of water power to a comparison with the cost of equivalent steam



production. These criteria are invalidated by broader concepts of multiple-use potentialities and by the possibilities of releasing fuel-carrying capacity of transportation systems in congested metropolitan areas. Undeveloped water power sites that are suitable for peak load plants exist near to the industrial load centers in Ohio, Illinois, and Indiana. These should have a proper place in the future pattern of industry.

The creation of new industrial centers in the southern portion of the Region will be possible through the coordination of newly developed water power with fuel plants located close to the mines. A specific example of such hydro-steam associations lies in the southern Illinois section. Here hydro-power from the Gilbertsville, Kentucky, dam of the Tennessee Valley Authority, operating in conjunction with mouth-of-mine fuel power plants, favors future industrial expansion for which transportation facilities are well developed. Similar possibilities exist for the remainder of the Kentucky and West Virginia sectors. The inland position of the Region is favorable for defense objectives.

#### Ground Water

Recognition of the importance of ground-water supplies to the maintenance of industry is of utmost consequence to the future of the Region. Favorable temperatures and the mineral quality of ground water, including brines, have positive and negative values peculiar to the continued operation of certain industries that cannot readily utilize surface supplies in their processes. The indiscriminate use of ground water for purposes that might be served equally well by surface supplies must be curtailed in order to achieve maximum values for industrial progress.

The region of the future, therefore, presents a coordinated picture of proper regulation of water by which the supply and demand are favorably balanced and allocated for the attainment of maximum economic and social benefit. The alarming dissipation of ground water sources at the present time indicates the need for concentration of thought toward the solution of the immediate problem if the forward progress of vital industrial development is to be maintained.

Reference is made here to Bulletin No. 6 of the Wisconsin State Planning Board which outlines a plan for utilization of storage capacity in the Wisconsin River to provide

additional water supply in the Fox River by diversion at Portage, Wisconsin. This plan would insure adequate water supply for the industries in the Green Bay-Fox River district.

#### Industrial Pollution

Industry in this Region, in common with industry all over the Nation, has a definite obligation not only to other industries but to the public, to return water, which has been used for industrial purposes, to the streams in a reasonably pure state. In this region of heavy urban population, this is particularly essential. State sanitary engineering departments and the Public Health Service have found that industrial waste pollution can best be controlled through cooperative efforts with industry. Research is developing ways in which many industrial wastes may be profitably reclaimed and pay all or a large part of the cost of controlling pollution. These efforts should be expanded as rapidly as research points the way to solutions.

#### Flood Control

The ideal future region must necessarily offer complete insurance against flood damage. The attainment of such a goal requires drastic realignment of existing philosophy in matters regarding human occupation of flood plain areas. This is particularly true in regard to existing submarginal agricultural areas. Continued protection of these areas to maintain the *status quo* militates against the best interests of the Region and of the United States as a whole. Large sections of Region 4 are susceptible to excessive flood damage due to an overdevelopment of land that should be utilized for channel storage during high water periods. In the case of urban developments, the restoration of these lands to the river channel is much more difficult and less justifiable than is the restoration of agricultural land similarly affected. However, readjustments should contemplate reasonable readjustment of both urban and agricultural areas wherever possible. The resultant ideal balance, together with economic protective measures, can be made to achieve the desired end of complete protection.

#### Transportation

##### Rail

Railroad facilities in Region 4 are adequate for all purposes from the standpoint

of trackage, yards, terminal facilities, repair shops, motive power, rolling stock, and personnel. It is estimated that the facilities are not utilized to more than one-half capacity. There are a few counties in the Region that have no rail facilities, but only minor physical additions would have to be made in order to meet the exigencies of an expanding industrial program, even the added load of national defense. There will be need for joint rail, water, and highway terminals to supplement those already in use. While these are more problems of transportation management than of physical development, they should be considered as part of the regional and State industrial patterns.

#### Highways

The basic need in highway transport is the development of a system of express and limited access highways between important industrial and population centers. As of today, the highway system is adequate, but it is anticipated that traffic will double in the next twenty years. The present exigencies of national defense are likely to increase traffic 25 percent or more. The Bureau of Public Roads states that rural and urban trunk line roads have only 16 percent of the total mileage and carry 60 percent of the traffic. Local city streets total 6 percent of the mileage and carry 30 percent of the traffic, whereas county and local rural roads account for 78 percent of the mileage and carry but 10 percent of the traffic. Increases in traffic will probably develop in the same proportions. In a recent address by Mr. Murray Van Wagoner, State Highway Commissioner of Michigan, before the meeting of the American Society of Civil Engineers on September 7, 1939, these significant statements were made:

"The principal objective of highway planning should be a determination of primary and secondary roads and streets having the utmost of significance in motor vehicle transportation regardless of whether they be under the jurisdiction of the city, the county or the state. The extent, thereof, must meet the financial support which can be borne by motorists, as special users. Obviously a great many miles of purely local roads and streets, where no traffic problems exist, must be excluded from the system of critical needs."

Unquestionably, proper adjustment of land use in the submarginal land areas of the Re-

gion will bring about the abandonment of many miles of unneeded and costly local roads.

"It is on these heavily traveled rural routes and urban arteries that the essential highway transportation movement takes place. It is there that expenditure of the revenues from motor vehicle taxes will for the most part be made under a just and rational highway plan. It is a mistake to believe that such concentration of effort on a strategically selected system rather than spreading it over total road mileage results in any hardship to traffic. In the one case actual highway benefits are widely and highly utilized; in the other, highway utilization may be just as great, but the benefits are of a much lower order."

The paper points out that more than half of suburban fatal accidents occur within 5 miles of cities and that 28 percent of all such accidents occurred within one mile of cities. It is also evident that the divided lane highway produces the minimum number of accidents.

"Without forgetting the very real needs of much of the trunkline and secondary mileage of the country, it is evident that inadequacy is greatest in the larger urban centers and radiates in diminishing intensity from them. Numerous indices prove it. In these areas where car ownership and heaviest traffic volumes are concentrated, are found the highest fatal accident rates and the gradual deterioration of business activity and property values in certain sections where transportation service is deficient.

"The enormous proportions of the movement of vehicles on the principal urban arteries, the importance of this movement to the life of the city, and the blocking effect which occurs at intersections all indicate that special facilities must be built to handle it. Widening operations give relief but the relief is only temporary and in time the easier access to already crowded districts increases the basic difficulty. Unquestionably the only real solution will be found in the construction of depressed or elevated limited access streets to, through and around the sections of highest commercial and traffic importance.

"These modern arteries will traverse areas which urban growth and lagging transportation service have blighted. Such areas exist in every great metropolitan center, and the development of broad adequate channels for traffic will not only correct the faults

that created them, but will be a powerful influence in restoring them to usefulness and prosperity.

"A recent traffic survey of Detroit disclosed that these blighted areas contain certain districts in which are concentrated the car owners most often involved in accidents. Thus it may be expected that in addition to providing facilities needed for safe driving, the development of these efficient streets will remove some of the conditions which produce bad drivers."

The Bureau of Public Roads report on Toll Roads and Free Roads, dated April 27, 1939, includes a national master plan for highway development. The plan for the Region must include as an essential element decisions as to the principal super-highways needed for inter-regional traffic and movement within the Region. This is a responsibility of the State highway departments. The State planning boards should give close consideration to the pattern of highways as they relate to and serve the industrial pattern of the Region. It is important that the separate State plans be coordinated in this manner for the entire Region.

#### Navigation

Water transport is a vital element in the industrial economy of the Region. The system of locks and dams to maintain a minimum depth of nine feet for navigation on the Ohio and its tributaries is complete and, except for maintenance, requires no development. On the Mississippi, the Corps of Engineers' plan contemplates reconstruction of and combinations of certain locks and dams, additional upper watershed reservoirs to insure minimum depths of pools during low water periods and construction of a new channel at Chain-of-Rocks near St. Louis to relieve the bottle neck at that point. On the Great Lakes, eighteen to twenty-one foot harbor depths have been completed at most important harbors and are contemplated at others. The strategic location of this Region with respect not only to domestic population, but also as a safe place for industry, demands the early completion of the St. Lawrence canal to permit the navigation of ocean commerce to Great Lakes ports. Upon the completion of the St. Lawrence waterway, a large proportion of the ships in foreign trade may enter the lakes harbors. This project should have high priority.

Also high in priority is the plan for completing the Indiana-Illinois waterway

connecting Lake Michigan with the Illinois River, the Mississippi, and the Gulf of Mexico. This canal includes the provision of a channel nine feet deep and one hundred sixty feet wide from Indiana Harbor and Lake Calumet through the Sag Channel to the Illinois waterway, and a deep draft channel from South Chicago to Lake Calumet, where an inter-change ship barge terminal will be built.

#### Air

The national airport plans of the Civil Aeronautics Administration provide a network of first, second, and third priority air routes and necessary airports. Wisconsin and Michigan have prepared State airport plans, and the other States are giving attention to this problem. The State planning boards, in cooperation with State air authorities, should complete State airport plans at once. Aside from the provision of airports as part of a construction program, the primary need in the Region seems to be the establishment of feeder routes so that air traffic facilities may eventually be available to all communities.

The chairmen of the State planning boards, acting as a regional committee, should give continuous attention to the transportation essentials of the Region and thus perceive the means of coordinating transport not only within its own framework but also with industrial development.

#### Coordination of Transport Facilities

In line with national recommendations for the use of transportation facilities of all types, a regional plan of transportation coordination should be considered, particularly in its relation to the industrial pattern.

#### Personnel

The training and equipping of people is the backbone of the industrial economy of the Region. While it is recognized that much needs to be done in developing the skills of people, there has been no coordinated plan directed to this end. During the past summer, 428 young men have been trained in Indiana under direction of the Work Projects Administration in cooperation with the State Department of Education, and at least ten percent of them have already been absorbed in industry. Unquestionably, industrial operators prefer to train their personnel in their own plants, but rapid expan-

sion of industry may require outside training. Certainly, the industrial pattern must include a well worked out program of personnel training agreed upon by planning, industrial, educational, and labor authorities. The schools and facilities for training exist. The coordinated program and organization for carrying it out is yet to be worked out.

#### Housing

There are no recognized State housing plans, and consequently, no regional housing plan in this Region. Housing has been regarded as a local function, and while there are State housing authorities in all of the States of the Region, they have not developed statements of housing needs from State or area viewpoint. There has been increased activity in home construction all over the Region, most of which has been financed by mortgages guaranteed by the Federal Housing Administration. Most of this has not proceeded in accordance with area or municipal plans. The industrial pattern of the Region, based upon State industrial plans, must necessarily include a housing pattern, and should be developed by the associated State planning boards.

#### Municipal Planning and Government

The urbanized character of the Region points to the necessity for continuous urban planning. It would be gratifying if it were possible to say that the municipalities of the Region were seriously endeavoring to plan for their future development in a comprehensive manner. There are, however, only a few instances that may be cited as exemplary. Constantly rising local tax rates, accompanied by increased tax delinquency, are causing a rapidly growing recognition by citizens that cities must control their growth and have better government. This realization, accompanied by participation in civic affairs, will be a large factor in better local government and planning.

The critical areas in cities are the central areas and older residential districts surrounding the central business districts and the suburban fringe in which most new developments are taking place. Serious tax delinquency has developed in the central districts due to deterioration of buildings, crowding of population, congestion of traffic, and consequent movement of residents and business to outlying areas. In the sub-

urban fringes, subdivision of land into building lots has far exceeded demands and needs, and has resulted in critical tax delinquency. The report of the Michigan Planning Commission entitled *A Study of Subdivision Development in the Detroit Metropolitan Area* reveals the serious situation which exists in that area. Similar situations, varying in degree, exist in many other urban centers of the Region. This problem is national in scope, and the development of formulae for the control of development in the suburban fringe areas has been recognized as a subject for study by the National Resources Planning Board, through its Land Committee. Into this effort should be drawn the State planning boards and the county land-use planning committees, as well as city and county planning commissions. Methods of rehabilitating the central districts of cities should be attacked in a similar manner, and here as in the case of the problems of the suburban fringe, the cooperation of local committees of real estate, loan, and civic organizations should be sought.

In this Region, the solution of municipal planning problems and the guidance of future urban expansion are especially important for two reasons. The quality of municipal development now vitally affects the lives of more than 18,000,000 inhabitants of the Region, and the cost of city government has a direct influence upon the income of these people. Good government and good planning of cities go hand in hand. In the second place, it is recognized by industrialists that the best place for the location of industry is in the well-planned and well-governed city. In such locations, industrial operations may be carried on with the fewest handicaps to efficient operation and with the lowest taxes consistent with good government. In this Region, where the main hope of the future rests upon continued industrial development, the good planning and good government of cities become a goal of first magnitude.

#### Conclusions

The development of this Region, toward which adherence to the policies discussed hereinbefore will contribute, is dependent upon thorough cooperation between Federal, State, and local authorities and influential individuals. It is recognized that the threefold attack composed of basic research, education, and extension participated in by local people, has the potential ability to

bring about the essential development of the Region, but it is also evident that the process of development will be one of evolution commensurate with the growth of understanding among the people of the Region of the necessities for development. Federal agencies must recognize one outstanding fact, which is that, regardless of where research is carried on or where educational policies and processes are developed, the facts must be brought to localities and their people by established State official and semi-public educational and extension services. The educational efforts must be unified through the accepted State agencies.

The foregoing policies will provide a

framework to which Federal, State, and local public works projects may be referred. Determinations of the soundness of projects may then be made with assurance that they will be logical elements of a unified plan of development. The State planning boards in each State of the Region, with the aid of competent staffs, should act as the agencies that would bring to bear upon each proposed public works project the intelligent consideration of interested officials and individuals. The success of this method of current attention to details in the light of fundamental development policies has been demonstrated sufficiently to prove its worth.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

REGION 6

SOUTH CENTRAL

DALLAS, TEXAS

1940

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Report of the  
SOUTH CENTRAL REGIONAL PLANNING COMMISSION

Earl O. Mills  
Regional Counselor

Julian W. Terrant  
Planning Technician

## FOREWORD

The Regional Development Plan for the South-Central Region represents the first known attempt to prepare a comprehensive word-picture of the physical characteristics, resources, problems, future needs, and possibilities within the entire area. Obviously, such an undertaking has necessitated the assembling of much data and many proposals from numerous sources, particularly the State and Federal agencies.

It has long been realized, of course, that many individuals and agencies have been making important investigations and plans relating to the development of the Region and that there was need for more effective cooperation in order to facilitate the activities of each agency and insure proper coordination of their respective programs. Accordingly, a permanent unofficial Regional Planning Advisory Committee was established to fulfill this need and to cooperate with the Dallas Regional Office, not only in the immediate task of preparing the first draft of the Regional Development Plan, but more particularly for the purpose of cooperating in the further study and development of the plan that is to follow. It is contemplated that within the full committee, which is comprised of members from both State and Federal agencies, subcommittees will be appointed to facilitate future study and planning operations.

Although a considerable amount of essential information is now available for the planning of the area, it is clearly evident that this represents only a small portion of that required before complete plans and final recommendations can be made for the orderly and economic building of the Region. Consequently, the Regional Development Plan as presented herein must be regarded only as the foundation or framework upon which may be constructed gradually the comprehensive detailed plan so glaringly needed as an intelligent guide for future regional development.

The preparation of such a plan is no mean task, and the degree of success eventually achieved will depend almost wholly upon the

sustained interest and cooperation of such individuals and agencies as those represented in the membership of the Regional Planning Advisory Committee. In the light of the invaluable services already rendered and the splendid spirit of cooperation manifested by the members of the Regional Planning Advisory Committee at its first meeting on September 23-24, 1940, there is every reason to believe that such cooperation in the South-Central Region will not only continue but will grow in its effectiveness. Moreover, it is believed that through this medium, the Regional Development Plan can and will be made a sound and useful instrument for evaluating public works programs and enhancing the social and economic welfare of the Region.

Members of the Regional Planning Advisory Committee who assisted in drafting this report are:

L. A. Henry, Director, Arkansas State Planning Board

George C. Branner, Arkansas State Geologist  
Sam S. Mims, representing DeWitt L. Pyburn, Chairman, Louisiana State Planning Commission

Ernest E. Scholl, Chairman, Oklahoma State Agricultural Land Use Planning Committee  
C. S. Clark, Chairman, Texas Board of Water Engineers

W. E. Morgan, Extension Service, Texas A. and M. College

Print Hudson, In Charge, Flood Control Surveys, Bureau of Agricultural Economics, Region 6

James W. Browning, In Charge, Flood Control Surveys, Bureau of Agricultural Economics, Region 9

Morris Evans, In Charge, Flood Control Surveys, Bureau of Agricultural Economics, Region 2

C. O. Henderson, Area Leader, Division of Land Economics, Bureau of Agricultural Economics, Southeastern Area

Karl A. Shafer, representing F. G. Standing, Leader, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, Area 6

Ralph Rogers, Regional Representative, Division of State and Local Planning, Bureau of Agricultural Economics

L. P. Merrill, Conservator, Soil Conservation Service, Region 4

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H. H. Finnell, Conservator, Soil Conservation Service, Region 6

T. Roy Reid, Director, Farm Security Administration, Region 6

C. M. Evans, Director, Farm Security Administration, Region 8

R. B. Baxter, representing Wilson Cowen, Acting Director, Farm Security Administration, Region 12

I. F. Eldredge, representing E. L. Demmon, Southern Forest Experiment Station

Dwight P. Reardon, representing W. R. Parkhill, Chief, Engineering Section, Farm Credit Administration

Edwin R. Nenson, Coordinator, U. S. Department of Agriculture, Southern Great Plains

P. L. Sharkey, representing A. N. Thompson, Engineer, Bureau of Reclamation

E. C. Sullivan, District Engineer, U. S. Public Health Service

J. L. Lytel, representing Lawrence M. Lawson, Commissioner, International Boundary Commission

L. C. Fuller, representing M. F. Christiansen, Assistant Regional Director, National Park Service

F. R. Oliver, representing J. A. Elliott, District Engineer, Public Roads Administration

L. C. Elliott, Regional Manager, Civil Aeronautics Administration

Col. F. S. Besson, District Engineer, Corps of Engineers, Galveston District

Major W. W. Wanamaker, Assistant Division Engineer, Corps of Engineers, Southwestern Division

Capt. W. H. Hastings, representing Major Samuel D. Sturgis, Acting District Engineer, Corps of Engineers, Vicksburg District

J. L. Saunders, District Engineers, U. S. Geological Survey, Fort Smith, Arkansas

C. E. Ellsworth, District Engineer, U. S. Geological Survey, Austin, Texas

A. C. Monahan, Regional Coordinator, Office of Indian Affairs

George E. Barclay, representing John C. Gatlin, Director, Fish and Wildlife Service, Region 2

Roy Moore, Assistant Regional Director, U. S. Fish and Wildlife Service, Region 4

Gabriel C. Harmon, Land Planning Consultant, Federal Housing Administration

J. R. Cobb, representing C. O. Falkenwald, Director, Division of Cooperative Relations, Rural Electrification Administration



## SUMMARY OF THE REGIONAL PLAN

The Regional Development Plan for the South-Central Region is predicated upon a realization that the population will grow, primarily through natural increase, about 20 percent in the next 20 years. In general, the plan would provide for:

Distribution of the people on the land according to its capacity to support them, where they will have a reasonable chance of success. This will result in:

a. A relatively dense population within the alluvial valleys of the Mississippi, Red, Arkansas, and other rivers and their tributaries, in the irrigated areas within the sub-humid regions, and in the central farm belt through Texas and Oklahoma.

b. A minimum permanent population in the Ozark-Ouachita mountains, western range lands, trans-Pecos country, tidal marshlands, and to a less extent the piney woods region; concentration of this limited population within farming, trading, or manufacturing communities where they can be served conveniently and economically with all modern facilities.

This implies that the lands will be put to their most logical uses, such as cropping, forestry, grazing, and recreation.

Retirement from cultivation of all lands now in farms that are seriously eroded or are submarginal for agriculture, and reclamation of such lands for forest, pasture, wildlife, or recreational use.

Further agricultural development of those lands that can support additional population, based on scientific analysis to determine the proper load for these lands in order to accommodate people now located in submarginal areas. This will include the rehabilitation and extension of drainage systems, clearing of additional areas, and construction of irrigation systems.

Stabilization of farming on a sound basis by readjusting farm sizes, adopting carefully prepared farm plans, and utilizing proper farm management practices.

Elimination of the unwholesome aspects of farm tenancy by assisting those to become owners who desire it, and by improving tenant-owner relationships for the remainder.

Reduction of land-tax delinquency by classifying and retaining submarginal tax-reverted land for public purposes and otherwise controlling it for its proper use.

Elimination of aimless farm migration by providing suitable opportunities for settlement on good land and giving proper guidance to such settlement.

Conservation of soil and water on all erodible land.

Restoration of the maximum carrying capacity and proper management of all permanent pastures and ranges.

Development of the full productive capacity of all permanent forest lands and promotion of an efficient forest products industry that will consume the full sustained yield of the forests.

Protection of life and property from floods by means of coordinated systems of reservoirs, floodways, levees, and other water-retention devices.

Reduction of the effects of drought through the conservation of water in place, development of farm and ranch water facilities, and conservation and wise development of surface and underground waters for irrigation wherever practicable.

Protection of public waters against pollution by municipal and industrial wastes.

Insurance of established irrigation projects along the Rio Grande against loss of an adequate dependable water supply by securing necessary control of such water.

Conservation of energy resources by developing the fullest possible use of wasted natural gas and water power, in lieu of other fuels.

Construction of an adequate system of regional superhighways and freeways serving principal cities, military centers, recreational areas, and other main traffic objectives, with grade separations and other features for traffic speed and safety.

A full system of regional airways and seaplane facilities to serve primary civil, commercial, and military needs, with adequate

terminal airports and intermediate fields, lighting, radio, and weather reporting facilities.

A better organized system of railroad facilities through consolidation of local lines into unified systems, orderly elimination of uneconomical duplications and branches, and full coordination with other types of carriers.

Development of all navigable waterways wherever such development can be justified economically.

Equitable freight rates.

A more logical industrialization predicated upon available raw materials, energy resources, and other important factors.

Modern, accessible public educational facilities for all the people, including libraries, laboratories, and provisions for vocational training in industrial skills.

Good public health through the establishment of adequate hospitals and clinics, the control of mosquitos and rodents, the enforcement of complete rural and urban sanitation, and the provision of balanced diets for all

farm families through an increase in the production of green vegetables, milk, butter, and eggs.

Housing of at least a decent minimum standard for all the people, with good water, proper sanitation, and necessary modern conveniences.

Good local roads, rural electrification, social and welfare institutions, and other utilities and facilities for all areas that are suitable for permanent habitation.

Full utilization of the Region's unusual recreational opportunities, with attractive parkways to connect the more important recreational areas such as the Gulf Coast beaches, mountains, State and national parks, and forests.

Maximum enjoyment of the wildlife resources for commerce and sport, through adequate and properly distributed conservation facilities.

Sufficient incomes to enable all the people to maintain a decent standard of living, made possible through greater industrial employment, increased and stabilized farm incomes, and development of supplemental incomes.

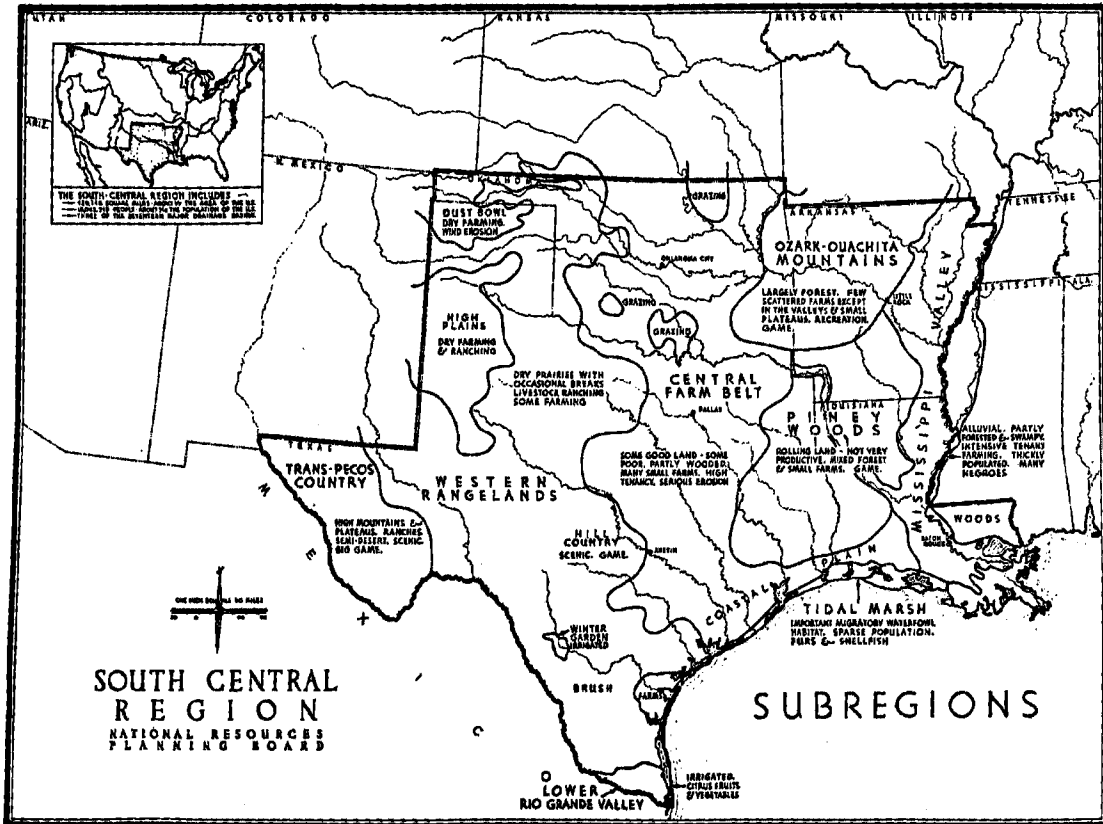


Figure 1.—Subregions of the South Central Region

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PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
S O U T H C E N T R A L

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The Region—its Characteristics  
and Resources

Physical Characteristics

The South-Central Region includes the four States of Arkansas, Louisiana, Oklahoma, and Texas. Within this area, there are nearly 430 thousand square miles, or approximately one seventh of the land area of the United States. It is seven times as large as all of New England, but contains only one and a half times the population. Of the total area, Texas comprises about 61 percent, Oklahoma 16, Arkansas 12, and Louisiana 11.

From the Gulf of Mexico on the south and the Mississippi River on the east, the land rises gradually westward almost to the Continental Divide, where it reaches a mile or more in height. Most of the area is composed of flat to rolling plains with rough outcroppings and hilly areas in certain localities. In the northeast portion, the Ozark-Ouachita uplift has created an extensive area of moderately high mountains, while in the far western part of Texas there are extensions of the Rocky Mountain system reaching 8,000 feet or more in elevation. There are many fertile valleys in the Region, chief among which are the broad Mississippi River Valley along the eastern edge, and the Arkansas and Red river valleys, tributary thereto. Numerous long rivers traverse the Region, generally from northwest to southeast, and empty finally into the Gulf of Mexico. The more important streams are the Mississippi River along the eastern border and its southwestern tributaries such as the White, Arkansas, Canadian, and Red; the Trinity, Brazos, and Colorado of Texas; and the Rio Grande along the southern border between Texas and Mexico.

The Region is subject to a variety of climate, ranging from humid to arid and from freezing to semi-tropical. Almost the entire eastern half is humid, with an average annual rainfall of as much as 50 inches or more in some parts, while average rainfall in the

arid sections is as little as 10 inches or less a year in the western extremity of Texas. One of the chief climatic difficulties of the Region is the lack of uniform rainfall, causing droughts which sometimes recur several years in succession. Deviations up to 30 percent or more from the average annual precipitation are common. Such deviations are serious where the average rainfall is 30 inches or less, and farming habits can be adjusted with difficulty to such conditions. Moreover, serious droughts are not uncommon even in the humid part of the Region.

Influenced by warm winds from the Gulf of Mexico, most of the area enjoys a temperate climate with relatively high summer and moderate winter temperatures. In the high plains of Northwest Texas and Oklahoma, there are often severe and rapid changes in temperature during the winter, at which times blizzards frequently occur that provide moisture for the growing of winter wheat and other crops. High winds constitute an additional problem in this locality, inasmuch as they create severe dust storms by removing the top soil from unprotected lands. The average wind velocity in the northwest corners of Oklahoma and Texas are twice as great as in the eastern parts of these States.

In the southern part of Texas, a semi-tropical climate prevails, which is conducive to the year-round growth of citrus and vegetable crops. Killing frosts are rare in this locality, while in the balance of the Region the average growing season varies from about 280 days per year in Southern Louisiana to 170 days in northern Arkansas and Oklahoma.

Within the Region, there are many types of land, ranging from cypress swamps to salty deserts. Heavily forested areas, agricultural plains, and grazing prairies are the most common.

Early Settlement and Growth

Although the first explorations in the South-Central Region were made about 400

years ago, actual settlement on any important scale has occurred only in the last 150 years. Many present day problems are a direct effect of the time and methods of settlement in various parts of the Region.

The earliest settlements took place quite naturally along the Mississippi and other navigable rivers, where large plantations were established with the aid of slavery. For a hundred years or more, much of the land in Louisiana and Arkansas has been intensively cultivated for cotton and sugar cane, until today a great part of it has been depleted in fertility to the point where considerable abandonment has already taken place. Now, there is a marked prevalence of sub-standard living conditions, a lack of education and sanitation in this area; and numerous other problems are present.

Farther west in Texas, the settlement of land took place gradually, thus affording the settlers an opportunity to adjust themselves fairly well to the land. As a consequence, there are on the whole somewhat fewer problems from settlement in Texas than in the remainder of the Region.

In contrast to Texas, the settlement of Oklahoma was sudden and destructive. Inasmuch as the Oklahoma Territory had been set aside for Indian purposes, no white settlement was permitted until nearly 1890. By that time, nearly all the adjoining States had been fully settled, and the pressure upon the gateways into Oklahoma became so strong that Congress finally began to open the Territory for settlement. In 1889, the first opening took place, and others followed within the next few years. Thousands of people rushed in overnight and seized the first land they could find, with the result that there was no chance whatever for them to distinguish the good land from the bad or to adjust the size of their holdings to the land capabilities. Today, we find that much land is overcrowded, farm incomes are low, housing is poor, and relief loads high. The land resources have been wasted by inexperienced handling and erosion, and distressed victims of this unwise settlement continue to migrate elsewhere in search of new opportunities.

Louisiana became a State in 1812, with Arkansas following in 1836. Texas, originally a part of Mexico, won its independence in 1836, and joined the Union in 1845. Oklahoma, because of its delayed settlement, did not

become a State until 1907 and was the 46th State to be admitted to the Union.

#### Present Population

According to the preliminary figures of the 1940 Census, the Region has approximately one tenth of the Nation's population, or slightly more than 13 million. Nearly two million are in Arkansas, 2½ million each in Louisiana and Oklahoma, and nearly 8½ million in Texas. Spread thinly over a vast area, the population density averages about 30 per square mile.

The great majority of these people live in the eastern part of the Region, where rainfall is adequate for most human needs. In this area, rural population densities of 20 to 90 persons per square mile may generally be found, while on the land farthest west, the density is frequently less than two inhabitants per square mile. Most of the larger urban population centers are also located in the central and eastern sections.

In 1930, nearly two-thirds of the people lived in rural areas and one-third in cities and towns of 2,500 or more. Nearly one-fifth of the people in the Region are negroes, and there are also nearly 700 thousand Mexicans. Most of the negroes live in Texas, Louisiana, and Arkansas. In many counties of the latter two States, the proportion of negroes reaches 50 percent or more. Approximately 37 percent of the population of the State of Louisiana is negro. Most of the Mexicans, on the other hand, are in southern Texas, where they constitute a high percentage of local populations in many places.

The population of the South-Central Region is somewhat "younger" than that of the United States as a whole. In 1930, less than 39 percent of all the people in the United States were under 20 years of age and 6.4 percent were over 65, while in the South-Central Region about 44 percent were under 20, and only 4 percent over 65. There are at least two reasons for this, one being the higher birth rates in the South, which tend to increase the percentage of young people, and the other being the comparatively recent period of settlement in Oklahoma, during which time it appears that great numbers of young people moved into the State leaving the older people behind.

About 37 percent of all the people in the Region are considered gainful workers. Of

these, about 40 percent are normally engaged in agriculture, 17 percent in manufacturing and mechanical industries, 16 percent in professional, personal, and domestic service, 11 percent in wholesale and retail trade, 7 percent in transportation, 5 percent in clerical pursuits, 2 percent in production of minerals, 1 percent in miscellaneous public service, and 1 percent in forestry and fishing.

These figures indicate higher percentages of persons skilled in agriculture and lower percentages skilled in industry than for the Nation as a whole. Lack of skilled workers will be a handicap to further industrialization unless there is a concerted effort to train more people in industrial pursuits. Higher percentages of professionally and technically trained persons would help to promote business enterprise and greater prosperity for the Region by reducing somewhat the emphasis on agriculture.

While the entire Region has steadily grown throughout past decades, there has been a significant difference in the rates and trends of growth as between the several States. Arkansas and Louisiana, for instance, have had a normal steady growth at about the same rate as the United States in general, although the percentage of increase in the decade just completed was somewhat less in both States than in previous decades. In the last ten years, Arkansas increased 5.1 percent and Louisiana 12.1 percent, Texas has grown more rapidly in the past than either Arkansas or Louisiana, but now appears to have settled down to a rate of growth paralleling that in Louisiana. Its increase in the last ten years was 10.2 percent. Oklahoma, which experienced a rapid surge of growth from 1890 to 1910, grew with increasing slowness from 1910 to 1930, and suffered an actual population loss of 2.81 percent in the last decade. Apparently, Oklahoma is now going through a period of readjustment as a natural reaction from the rapid and often unwise initial development, especially in the Great Plains area.

During the 1930-1940 decade, the Region grew at almost the same rate as the United States as a whole, the rate for the United States being 7.0 percent, and that for the Region 7.2 percent; however, the growth is not

uniform throughout the Region, but is occurring mainly in Louisiana and Texas.

The two sources of population growth are natural increase and migration. In the South-Central Region, the vital statistic records show that from 1930 to 1940 there were 2,384,515 births and 1,226,745 deaths, making a net increase of 1,157,770 within the decade. Inasmuch as the 1940 Census reported an increase of only 875,388, it is obvious that the Region must have lost more than 282 thousand people through migration. Practically all this loss occurred in Oklahoma, while the remainder was lost from Arkansas.

Both Louisiana and Texas gained slightly through migration. Louisiana's total gain of 12.1 percent for the decade was made up of 2.8 percent from migration and 9.5 percent from natural increase. In Texas, there was a natural increase of 9 percent and an additional 1.2 percent increase through migration. Oklahoma would have gained 10 percent through natural increase if it had not lost over 300 thousand people through migration to other States in and out of the Region, and similarly, Arkansas would have gained 10.3 percent through natural increase if it had not lost about 98 thousand through migration. All together, there would have been an increase for the entire Region of 9.2 percent if there had been no loss through migration, as against the 7.2 increase that actually occurred.

Migration within the Region has resulted in considerable local variations as to population gains and losses. Only 57 percent of the 470 counties in the four States showed an increase in population during the last decade, whereas the remaining 43 percent lost population. In Oklahoma, gains were recorded in only 38 percent of the counties, but Louisiana gained in 88 percent. These gains and losses reflect the serious problems that exist in many agricultural areas. The instability of population is in itself a serious problem because a large migratory population does not contribute to the building up of healthy social conditions within an area. This problem of population losses has not affected the cities to the extent that it has the rural areas. Only 10 of the 81 cities in the Region having populations of 10 thousand

or over in 1940 suffered population losses. It appears, therefore, that with few exceptions, the cities will continue to grow, even though at a slower rate.

## Natural Resources

### Land

Of the 275 million acres of land within the South-Central Region, approximately 65 million acres or 24 percent were under cultivation in 1934. The principal croplands are in the alluvial valley of the Mississippi River, along the coastal plains, and throughout a great part of the central and western plains of Oklahoma and Texas. The agricultural land is characterized by a wide diversity of soil, topography, and native cover.

There is a great variety of crops grown, including cotton, sugar cane, rice, wheat, sorghum, and numerous others. Through the central part of the Region, there is general farming, and in many localities there are specialty crops, such as yams and roses in East Texas, fruits, berries, and melons in Arkansas, Oklahoma, and Louisiana; and citrus fruits, and vegetables at various points along the Gulf Coast, especially in the lower Rio Grande Valley. Cotton is one of the major crops of the Region, amounting to about 47 percent of the Nation's total production annually.

Originally, most of the eastern half of the Region was covered with forests of various types, and much of this area may still be classified as more suitable for forests than for any other major use. According to the Forest Service, there are some 52 million acres of commercial forest lands in the Region. This forest area comprises about 62 percent of the total area of Arkansas, 56 percent of Louisiana, 10 percent of Oklahoma, and 6 percent of Texas. Lumbering has been an important activity in the Region since 1900 or before, and in 1937 it accounted for about 14 percent of the Nation's total lumber production, with a value of about 150 million dollars.

Large sections of the Region, mostly in South and West Texas and the Oklahoma Panhandle, together with two or three localities in southern Oklahoma, are ranch lands primarily, capable of supporting large herds of

beef cattle and other livestock. This type of land can support only a limited population, inasmuch as efficient operating units require ranches of from 2,000 to 10,000 acres. Some ranches may be found of over 100,000 acres, the largest of which is the world famous King Ranch in South Texas near the Gulf, which contains over a million acres. The land is characterized by level or rolling topography broken by escarpments, canyons, and other rough land, and by mountain ranges in the area west of the Pecos River.

In other parts of the Region, especially in Osage County, Oklahoma, there are natural pasture lands covered with long grasses and particularly adapted to the finishing of beef cattle for marketing. Still other areas in eastern Oklahoma and western Arkansas have a certain amount of pasture value in combination with forestry.

Almost the entire Gulf Coast of Louisiana, extending 20 to 30 miles inland, and a narrower fringe along some portions of the Texas coast are tidal marsh lands. Their major uses are for wildlife and grazing; however, oil, sulphur, and salt are produced in certain of them.

More land is used primarily for livestock pasturage in the South-Central Region than for any other purpose. The area so used is estimated to be 119 million acres or 43 percent of the total land area. The amount of grazing land has been declining gradually through the years with the advance of crop farming, especially the large-scale wheat and grain sorghum farming in the northwest, and cotton farming farther south. In many instances, land has been farmed that was more suitable for grazing and should never have been plowed. Drought and wind erosion have resulted in much land abandonment and attendant problems. Restoration of the pasture grasses on such land is difficult once the original sod has been destroyed. In addition, much of the land that has remained in pasture has been consistently and severely over-grazed. Such practice results in the depreciation of the native pasture grasses due to their lowered resistance to drought and permits the intrusion of weeds, cactus, mesquite, scrub cedar, and other noxious plants.

A survey in 1935 indicated that the short-grass range in western Texas and Oklahoma had

declined 50 to 75 percent from its original forage value. Continued overgrazing will steadily deplete the range resource and endanger the important livestock industry, which was the original industry in both Texas and Oklahoma, and which continues to represent a vital element in the economy of the Region.

Relatively small portions of the land resources are occupied by urban development or used for industrial, mining, and recreational purposes, or for fishing, trapping, wildlife conservation, and similar public and private activities. The coastal marsh lands of Louisiana and southeast Texas are used extensively for commercial trapping and fishing, for recreational hunting, and for game conservation. The Ozark-Ouachita mountains are used extensively for recreation. Areas near the larger cities are occupied by industries and other semi-urban development. Considerable areas are covered by oil and gas fields in various parts of the Region, but this use is frequently intermingled with other uses such as agriculture or grazing. Mining activities also utilize small areas in eastern Oklahoma and parts of Arkansas and southern Louisiana.

#### *Water*

Major streams within the South-Central Region are typical "through rivers" rising in the arid western section and flowing into the humid eastern area. These streams have dissimilar characteristics in their upper, middle, and lower sections, each of which presents distinctive water problems.

In the western half of the Region, generally west of the 96th meridian, the water resources are limited by low rainfall. Surface waters are relatively scarce except immediately after the heavy rains that are likely to occur locally at any time, especially in the summer. Intense storms of 16 to 22 inches precipitation over large areas in short periods of time are not unknown. Following such storms, the otherwise dry water courses become angry torrents, which subside quickly into dry stream beds. Some of the longer rivers, such as the Cimarron, Canadian, Rio Grande, and Pecos, have their headwaters in the mountains of New Mexico and Colorado, where precipitation is heavy, and although

they may carry considerable water where they emerge from the mountains, there is an appreciable loss of volume as the streams flow through the middle reaches. Sections of other rivers such as the Red, Brazos, and Colorado, which originate in the arid high plains, and the Nueces, which originates in the Edwards Plateau, are virtually dry most of the year.

In the western half of the Region, there is also a serious problem of water supply for all purposes, including irrigation, domestic, and municipal uses, stock water, flushing of wastes, and even dry farming and ranching. Moreover, people living in the valleys are subjected to severe losses and handicaps due to flash floods. Many sources of water supply present further problems due to mineralization, especially in portions of western Oklahoma and Texas, where such streams as the Salt Fork of the Arkansas, the North Fork of the Red, the Cimarron, and the Pecos acquire heavy loads of salt or gypsum in traversing natural mineral deposits.

Underground waters are generally adequate for existing local purposes and, in some instances, for limited supplemental irrigation, but these sources, too, are highly mineralized with gypsum salt, or fluorides in some localities. Large quantities of underground potable supplies are known to exist in some areas and have been developed for irrigation to a certain extent, but there is always the danger of misguided overdevelopment through lack of adequate factual data as to the amount and quality of water available and the cost of pumping.

In the eastern half of the Region, the principal problem is an excess of water from floods, backwaters, marshes, and swamps. The construction of levees, which began early in the 18th century, is being carried on to protect the land further. Even in this area there are occasional severe low water flows in the major streams that interfere with water supplies, elimination of wastes, navigation, and fish life. Many local streams dwindle in the summer, resulting in a deficiency of water supplies and serious stream pollution.

In a large portion of the Ozark Mountain area of northern Arkansas, underground water supplies are generally plentiful. Many of



the streams are fed the year around by numerous large springs, some of which are among the largest in the United States. These streams are considered excellent for fishing and recreational use. Underground waters are available also in most parts of the Mississippi Valley, but in some instances, as in the Grande Prairie rice area of Arkansas, a serious problem may soon be created by overdevelopment if proper precaution is not taken. In the Mississippi River Valley country, there are many large and small lakes, lagoons, and bayous, which are valuable for fishing, waterfowl, and recreational uses. On the other hand, however, the presence of these water areas creates serious malaria problems.

In the upland areas of Arkansas, eastern Oklahoma, and central Texas, several of the rivers are so situated as to afford sites for the generation of water power, some of which have already been developed. The chain of power and flood control reservoirs on the Colorado River in Texas is a notable example. Many streams in Arkansas, Louisiana, and Texas are suitable also for development of navigation. For many years, these streams afforded the only avenues of access to the newly opened country. At the present time, Louisiana has, perhaps, one of the most extensive systems of inland waterways in the country. Navigation, however, is not without its problems, which include the shoaling of channels due to severe soil erosion, silting of channels due to floods, and shallow depths due to low water at certain times of the year. Some streams, such as the Arkansas, were once navigated for considerable distances.

Drainage of agriculture lands is a serious problem, especially in the Mississippi Valley. Throughout this area, hundreds of independent drainage and levee districts have been created in the past, a considerable number of which are now in financial difficulties. As a result, many drainage facilities have not been completed, and there is a lack of proper coordination, maintenance, and operation.

While the water problems in the Mississippi Valley relate chiefly to protection against surplus waters and their disposal, in some localities there is a need also for storage against droughts and maintenance of existing

rice-growing areas. Along the Gulf Coast, the intrusion of salt water into the mouths of the rivers and bayous has been interfering seriously with municipal supplies and with the irrigation of rice areas. The city water supply of New Orleans is affected at times by such salt water intrusion.

The central part of the Region represents a blending of the water resources and problems of both arid and humid sections. The major problems here are due to fluctuating stream flows resulting from frequent extremes of flood and drought. Such variations contribute to the problem of pollution of both surface and underground waters by sewage and oil-field wastes. Pollution from mines, pulp mills, sugar mills, and various other forms of industries constitutes a serious problem in Oklahoma, Louisiana, and southeast Texas.

The lower Rio Grande Valley presents a special problem due to the uncontrolled flow of water in the Rio Grande and the total dependence of the area upon this water for its irrigation systems. New irrigation projects are now being developed on the Mexican side of the River that threaten to curtail the American supplies, and so far there has been no success in negotiating a satisfactory treaty with Mexico to overcome this difficulty. Meanwhile, large volumes of flood water flow into the Gulf of Mexico and are wasted, inasmuch as the necessary reservoirs to conserve this resource cannot be built on the main stream without an international agreement. The problem is to find some practical means of insuring an adequate and dependable water supply for the existing irrigated area on the United States' side of the River. Fortunately, steps have already been taken in this direction by the International Boundary Commission.

#### *Minerals*

It is reported by the Bureau of Mines that about one-fourth of the Nation's total mineral production, based on value, comes from the South-Central Region. Texas leads the Nation, with Oklahoma ranking fourth, Louisiana sixth, and Arkansas thirty-first. The total value of mineral production from these States was over one and one third billion dollars in 1937.

Although there are numerous important minerals to be found in the Region in considerable quantities, the greatest wealth by far is in oil and gas resources. Some of the largest oil and gas deposits in the Nation, including such fields as the East Texas, Rodessa, Amarillo, and Midcontinent, occur within the South-Central Region. Texas ranks first among all the States in crude production, with Oklahoma third, Louisiana fourth, and Arkansas tenth. It has been estimated that the known oil reserves in the Region are sufficient at the present rate of production to last about 16 years, and additional reserves are still being discovered. In Texas and Louisiana, at least, new discoveries exceed consumption.

It is estimated that the natural gas reserves in the Midcontinent and Gulf Coast fields range from 47 to 51 trillion cubic feet, or about 50 percent of the total gas reserves of the United States. It is said that millions of dollars worth of natural gas are blown away into the air every day because the producing fields are so far away from the centers of consumption that the cost of transporting this gas places an economic limit upon its utilization. One of the outstanding problems of the Region, therefore, is to develop means of utilizing this resource near its point of production other than for such uses as the production of carbon black. There are also other serious problems, including disposition of brines and oil wastes and the various social and economic difficulties arising from oil "boom towns" and their later deflation.

It is estimated that a little over three percent of the Nation's total coal reserves are in this Region, large deposits being found in Texas and Oklahoma and lesser quantities in Arkansas. In addition, there are about 30 billion tons of lignite in Texas. Neither of these resources, however, is being produced in any great quantity due to the preference for oil and gas as fuels. They are, however, a most valuable resource to the Region and the Nation in that they provide an important fuel reserve. There has been some coal production in previous years, especially in eastern Oklahoma, where the growth of several large com-

munities, such as McAlester, has been based on a coal mining economy. In these localities, serious problems, including stranded population, unemployment, high relief loads, and poor housing, have resulted from the decline in coal production.

Zinc and lead are found in large quantities in the northeast section of Oklahoma and to a smaller extent in Arkansas and Texas. In 1929, the Oklahoma deposits produced nearly 37 percent of the world's supply of zinc, but the output fluctuates widely in accordance with world conditions and market demands.

The only large deposits of bauxite (aluminum ore) in the United States are found in Arkansas, which produces over 95 percent of the bauxite originating in this country. Only 47 percent of the bauxite consumed in the Nation, however, comes from domestic sources. The remainder is imported.

Large quantities of sulphur are found in southern Louisiana and Texas along the Gulf Coast. Texas, alone, produced over 2 million tons valued at 36 million dollars in 1937.

Helium, a rare, non-inflammable gas used in lighter-than-air aircraft, is found in two or three parts of Texas, the principal deposit being near Amarillo. At the present time, this is the major source of supply in the world. The existing reserves and facilities for recovery are under the complete and strict control of the Federal Government.

Various quantities of other important minerals exist also throughout the Region, such as iron, manganese, copper, gold, silver, tin, antimony, titanium, quicksilver, graphite, phosphates, salt, potash, gypsum, fuller's earth, rock asphalt, and many others. Large quantities of common building materials, such as limestone, marl, marble, granite, clay, sand, gravel, mica, and silica, are also found in the Region. Several of these are utilized locally for building purposes. Further development of many of them will depend upon additional explorations, the advancement of technical knowledge necessary for efficient production and utilization, and the development of industries requiring these materials.

As a whole, the South-Central Region contains a tremendous wealth of mineral resources. Their prevalence affords opportunity for

increased industrial development of which there is great need in the Region.

#### *Wildlife*

Wildlife resources are of vast importance to this Region. A recent report of the Forest Service placed the total annual value of such resources in Texas, alone, at more than 94 million dollars. This is more than three times the value of similar resources in any other State. Obviously, such resources have both a commercial and recreational value. The Gulf Coast of Louisiana and Texas constitutes the most important migratory water-fowl winter headquarters in the Nation, and huge reservations have been established for their protection.

Louisiana ranks as the leading fur producing State in the country. Fur-bearing animals of commercial value include muskrat, mink, raccoon, opossum, otter, badger, fox, civet cat, and skunk. There are approximately 12 thousand trappers in Louisiana alone. Their activities give employment to some 30 thousand persons. There has been a decline in the number of fur-bearing animals in recent years, said to be due to drought disease, and storms. Remedial measures are needed to restore this important resource to a sustained-yield basis.

Commercial fishing is an important industry. Many shell-fish are found in quantity, including oysters, shrimp, and crab, as well as a wide variety of other fish. The canning of shrimp and oysters employs many thousands of persons along the Gulf Coast. The conservation of these resources has been undertaken by State agencies with some apparent success, but certain important problems still remain.

The recreational significance of wildlife in the Region is also enormous but difficult to evaluate. Important reserves of small and large game, as well as game birds, are to be found in various parts of the Region. Recreational fishing includes tarpon, swordfish, and shark, as well as a variety of smaller fish.

The Federal Government has established some of the world's largest wildlife sanctuaries in this Region, including the Sabine Lake Migratory Waterfowl Refuge of nearly 140 thousand acres in Louisiana and the White

River Migratory Waterfowl Refuge of over 99 thousand acres in Arkansas. A unique wildlife research station of over 61 thousand acres has been established in Oklahoma, where different varieties of western wildlife are being protected and studied. Altogether, the Federal game preserves in the Region total more than 462 thousand acres. In addition, there are large State preserves, especially in Louisiana, which have been made possible, in part, through private endowments, such as the Rockefeller Wildlife Sanctuary of 86 thousand acres and the Russell-Sage Sanctuary of more than 75 thousand acres. Many other game preserves, wildlife refuges, and fish hatcheries are located throughout the Region.

The entire Region is well adapted to the propagation and preservation of wildlife on a large scale by reason of its favorable climate, vegetation, and topography. The principal needs are more and properly distributed preserves, reasonable regulations, and the inclusion of plans for wildlife in all land-management and resource-development programs.

#### The Regional Development Plan

##### Future Population

Because the development of the Region should be in the interest of its population, it is important first to obtain some idea of the number and character of the population to be served before proceeding to plan. It is impossible, obviously, to predict accurately the population of the future, but a general indication of probable population increases can be gained from a study of past growth and trends, birth and death rates, and migration, together with an appraisal of the opportunities for further settlement within the area.

It appears obvious in the light of the declining birth rate and restrictions upon immigration that the population of the United States will eventually reach a maximum. It is estimated that the peak will be approximately 158 million about 1980, after which the population will remain more or less static or will decline slowly. When this point is reached, the problem will not be one of locating new population, but rather of improving

the general welfare by readjustment of existing population to the land.

The discussion in preceding sections has indicated that this Region has large reserves of undeveloped resources, especially land and minerals, and that it can probably accommodate considerably more people than it now has. Estimates of future population growth indicate that this Region may be expected to have a population of something more than 15 million by 1960, if present trends as to births, deaths, immigration, and migration continue substantially as they have in the past. Should there be any abrupt changes in any of these factors, the estimate for 1960 will vary accordingly. As an illustration, previous estimates for some of the Great Plains States have gone amiss during the last decade due to unanticipated droughts, economic conditions, and consequent migration.

Any long-range program for the Region should anticipate a natural population increase of at least 20 percent by 1960, without regard to immigration. The question arises as to where these people, in the interest of their own welfare, should live and what the desirable population pattern of the Region should be. Obviously, it is important to determine those localities that are most suited to future permanent settlement, and that the regional program provide for the logical development of those areas. It must be determined, for instance, what maximum density of population could and should be accommodated on each type of land, such as crop, forest, and grazing.

Extensive studies have been made to determine the carrying capacity of western range lands in terms of head of cattle that can be permanently sustained on a given area of grazing land, but except for limited areas, there has apparently been no determination, type by type, for the Region as a whole, of the capacity of different types of agricultural land to sustain human habitation.

Until some scientific basis for population distribution is formulated, any predictions relative to such distribution within the Region must necessarily be taken with reserve. In general, however, it appears that a relatively dense population may be expected in

the agricultural portions of the Mississippi alluvial valley; in the coastal plains, where closer settlement may be expected as a result of further drainage improvements; in the central farm belt, excepting such portions as are unsuited to intensive agriculture; and in such areas as the lower Rio Grande Valley, where intensive development may be possible through irrigation, industrialization, mining, or oil-producing activities. A relatively sparse population must be expected in the following areas: the Ozark-Quachita Mountains, where some reduction may be expected from the elimination of impractical hill farms; in the piney woods area, where the population will be limited to that necessary to carry on forestry, forest products manufacturing, oil development, and a certain amount of combination farming in the more fertile areas; in the tidal marshes, which should be retained for large-scale game and fish conservation and management; in the western range lands, where extensive ranching predominates, and where such farms as are recommended will generally be quite large; and in the trans-Pecos country, which will remain primarily a ranching and recreational area.

#### Land Use Adjustments

Throughout many parts of the Region, there is much land in farms that is submarginal for agriculture or has been badly damaged by misuse or neglect. All such land should ultimately be retired from cultivation. In the hill lands of Arkansas and eastern Oklahoma, for example, there are isolated patches of cultivated land in farms which were never suited for that purpose and which have now lost most of their top soil. Prairie lands in the Dust Bowl area have been virtually destroyed through improper cultivation and loss of top soil by wind erosion. Within the central farm belt, many fields have been too intensively or improperly cultivated and have lost their fertility through erosion and gullying.

To correct these problems, the Federal Government has purchased over 650 thousand acres of such land in the Region, which it has withdrawn from agricultural use and

converted to grazing, forestry, recreation, wildlife protection, and other uses. Some of this land, however, is still in the acquisition stage. Through such purchases, it has been possible to make land-use adjustments not only on the land acquired, but also on adjacent farm land through coordinated grazing and forestry. The ultimate goal of the Federal Government is to purchase all lands in the Region that cannot be adjusted to their proper use while remaining in private ownership. No estimate is available as to the total amount of such land to be acquired, inasmuch as acquisitions will depend upon detailed surveys and land-use plans in each locality.

There are certain parts of the Region where the physical and economic factors of land misuse have resulted in a very low standard of living, and in which concentrated purchases are proposed. Among these are parts of northeastern Arkansas within the Ozark Mountains and along Crowley's Ridge; various parts of Oklahoma, such as the eastern portion of the central farm belt, portions of Garvin, Grady, Caddo, McClain and the western tier of counties, and also portions of the Panhandle that are unsuitable for cultivation; parts of Texas west of Fort Worth, from the Red River southerly to Brown and Mills counties, parts of the southern high plains adjacent to New Mexico, a strip of upland adjoining the Rio Grande below El Paso, and several smaller areas. Within these areas, it is estimated that 10 percent or more of the land must be placed under Government ownership as one means of correcting present difficulties.

Other large areas are indicated in which scattered purchases are required, since maladjustments, instead of being concentrated, are dotted throughout the area. Among these are most of the Ouachita Mountain area in Arkansas and Oklahoma, the foothill and plateau areas of northeast Oklahoma and northwest Arkansas, the piney woods sections of Arkansas, Louisiana, and Texas, and the cross-timber areas in Texas. Less than 10 percent, and in many cases only one or two percent, of these areas are recommended for purchase in order to bring about more desirable social and economic conditions.

While it is generally recognized that considerable land in certain areas must eventually be taken out of agriculture and restored to forest cover, no practical method has yet been devised for accomplishing this objective, inasmuch as the resulting problems of population resettlement and effect on local social and economic conditions have not been solved. One of the first questions that arises when land is proposed for purchase is where to relocate the displaced population.

There is immediate need of a survey of the entire Region to determine what lands are available that can support additional population and how many people such lands can support on a reasonable plane of living. Such information is urgently needed and must be obtained before any real progress can be made in readjusting land uses.

At least one study of this kind is now under way in the backwater area of the Yazoo River Delta in Mississippi, which, it is hoped, will be extended ultimately throughout all similar areas in the Mississippi alluvial valley. This study is designed to determine the most practical permanent use of lands now undeveloped because of frequent backwater flooding, but to be protected in the future by the comprehensive Mississippi River levee system now under construction. Such factors are covered as soil types, drainage problems, size and kind of farms, density of population, cost of improvement and maintenance, probable income, and resulting standards of living.

Other studies are needed to devise practicable economic readjustments in the areas to be depopulated.

#### Soil Conservation

It is estimated that of the 275 million acres in the Region, a complete coordinated soil and water conservation program is needed on some 190 million acres, or 69 percent of the total acreage. Of this, 100 million acres need immediate corrective treatment and 90 million acres need preventive measures. The 85 million acres regarded as requiring no conservation measures consist generally of the alluvial valleys, coastal plains, rocky mountains, forests, and other non-erosive lands.

The four States in the South-Central Region are among the leaders in soil conservation activities. With 31 other States, they have recently enacted legislation to permit the creation of local conservation districts in cooperation with the Soil Conservation Service and other Federal agencies. At present, there are about 160 local conservation districts organized, or being organized, in the Region. Their scope embraces more than 117 million acres.

The activities of existing districts should be intensified and additional districts organized for the expansion of the conservation program. Usually, these activities embrace contour plowing, terracing, strip cropping, forestation, and other appropriate measures including the inauguration and enforcement of local regulations pertinent to conservation—all of which are of paramount importance to the vital agricultural economy of the Region.

#### Forests

Nearly 20 percent of the total area of the Region is in commercial forests. If this forest area was brought up to production capacity and forest industries augmented to maintain pace with increased timber production, at least part-time employment could be found for a large portion of the present unemployed and distressed rural people. In East Texas, some persons with foresight are acutely conscious of the fact that within the next quarter century their oil fields, which are now their chief source of wealth and employment, may have gone the way of all non-replaceable resources. They realize that of all their remaining resources only their timber land, properly managed and brought to full production, promises to maintain the prosperity to which they have become accustomed. The same thing may be said of Arkansas and Louisiana. In Oklahoma and Texas, there is a marked shortage of land in commercial forests, and the expense of importing lumber and other essential wood commodities from distant sources may eventually have a serious effect upon the continued settlement and development of the vast acreage of open country. Hence, the economic necessity of developing the present growing stock of timber to the full

capacity of the land it occupies is quite evident.

The "long-range" objectives for the Region should be (a) to retain in forest cover substantially all the area now in commercial and non-commercial forests, and to build up the growing stock of timber in both volume and quality to the full productive capacity of the land, (b) to develop forest products industries to a degree whereby such industries will consume efficiently the full sustained-yield capacity of the forest lands. The achievement of these two objectives will throw the full weight of this important resource into the elevation of the plane of living for millions of people.

The more "immediate" objectives should be (a) to reduce the tremendous economic losses occasioned by forest fires, insects, and blight, (b) to curtail wanton or ignorant exploitation and to substitute thrifty, foresighted, and technically sound forest management, (c) to get down to cases in broadening and extending local cash markets for timber now standing idle, wasted, or left in the woods to rot in tremendous quantities, (d) to increase materially the area of forest land in public ownership, both Federal and State, in order to afford adequate protection and to serve as demonstrations of good forest management, (e) to provide some source of low-rate, long-term credit for forest owners needing financial assistance, and (f) to carry on forest research intensively throughout both the commercial and non-commercial forests, that owners and managers may have a sound technical basis upon which to proceed, confident of success.

Eight important steps are necessary to the gradual accomplishment of these objectives:

1. Increase the Clarke-McNary Federal appropriation for cooperative fire protection for the States of the Region from the present \$178,000 to \$1,200,000, with the continued requirement that the sum be matched by the States and private owners.

2. Enact Federal laws that will aid and encourage each of the four States to pass and put into effect reasonably uniform legislation designed (a) to require compulsory State-wide fire protection by all forest owners, costs

to be matched with public funds, (b) to prevent the clearing of forest lands (except for agricultural use in officially approved agricultural zones) and the exploitation of timber stands in a manner that will result in serious forest depreciation, (c) to require a gradually increasing degree of good forest practice to build up the resource, and (d) to remove such obstacles to stabilized long-time land ownership and industrial development as may exist in present laws, including those relating to taxation.

3. Strengthen and expand the State forest services to the full extent necessary adequately to lead, educate, and, if necessary, regulate forest owners and the forest industries in the protection and sound management of their forest properties, as well as to administer an expanded State forest system.

4. Acquire as State forests, under the Fulmer Act, approximately 600,000 acres of forest land, to be of such character and so located as to serve forest owners as demonstrations of first-class forestry. (The area at present in State forests in 26,000 acres.)

5. Expand the present national forests in the four States and establish new national forests to the extent of an additional 6 million acres. (The present area in national forests is 3,358,000.) As conceived by the regional office of the Forest Service, the cost of acquisition of new State forests under the Fulmer Act would approximate \$2,700,000, and of the additional national forests, about \$46,000,000.

6. Add to the agricultural extension services in the several States a greatly increased corps of forestry specialists, whose function it would be to deal directly as consultants with the general run of small timber owners. The ideal situation would be to have one such forester in each county in which forestry is a major problem or a major industry.

7. Ascertain by careful investigation the kind, number, size, and location of forest industries that the forest resources can and should support. This action might logically be made part of a general industrial program for the Region.

8. Research work in silviculture, forest management, forest economics, protection,

forest influences, and flood control should be greatly increased, intensified, and accelerated. As a part of this work, the Forest Survey of the South should complete its field inventory of Arkansas, Oklahoma, and Texas, in which over 30 million acres are as yet unsurveyed.

#### Farm Tenancy.

The social and economic aspects of farm tenancy, together with recommended action programs, are set forth in a comprehensive study and report on *Farm Tenancy*, published in February 1937, by a special committee appointed by the President. Among other things, the report indicates there had been an annual national increase of about 40 thousand new tenants during the preceding ten years, and that in the spring of 1935, more than a third of the 2,865,000 tenant farmers in the Nation had occupied their present farms only one year.

The problems of farm tenancy are extensive and pronounced in the South-Central Region. Remedial measures must be found if the future welfare of a sizeable portion of the rural population is to be enhanced. There are approximately 620 thousand tenant farmers in the South-Central Region, 200 thousand of whom, with proper financial assistance, could become farm owners within the next ten years. If financial assistance is not made available more liberally than in the recent past, it is estimated that it will require from 20 to 25 years to make farm acquisition loans to even the first 60 or 70 thousand families.

Adequate legislation is recommended as one of the primary needs to promote better relationship between tenants and landlords, to stabilize the rural population, and to reduce and improve farm tenancy conditions. In addition to needed legislation, financial assistance should be extended immediately to from 40 to 60 thousand tenant farmers, and to others as rapidly as possible, to enable them to become farm owners, to the end that such farmers may achieve sound relationship with the land, thereby contributing to the social and economic betterment of the Region.

#### Tax Reverted Rural Lands

It is estimated that there are approximately 5 million acres or more of agriculturally

submarginal tax delinquent rural land in the Region, much of which will revert eventually to public ownership. The States, through their agricultural colleges and State planning boards, have made rather exhaustive studies of such lands, and deficiencies in existing laws, relative thereto, which would provide the necessary basis for intelligent programs to cope with this serious and aggravating problem.

It is agreed quite generally that there is a definite need for perfected State legislation to (a) simplify procedures for adjudicating and administering tax delinquent rural lands and clearing up titles and descriptions, (b) permit the withdrawal of tax abandoned and other publicly owned lands for needed public uses such as forests, reservoir sites, parks, schools, and institutions, and (c) prohibit the sale or donation of any public land until classified and controlled for proper use.

The State of Arkansas recently enacted a land policy law,<sup>1</sup> which attracted national attention, under which no tax-forfeited or other public land may be sold or donated unless so classified and controlled for logical public or private use. Similar legislation is urgently needed and should be enacted by the other States in the Region.

#### Water Resources

Water problems and requirements in the Region vary from those in the drought areas of the Great Plains to the flood areas of the lower Mississippi Valley. Water conservation, therefore, is essential as a prevention against both droughts and floods. Long range objectives for the development of the Region's water resources are contained in the reports of the drainage basin committees. Many detailed recommendations are proposed therein for water control and use in the Region, including farm and ranch water facilities on some 15 million acres generally west of the 98th meridian in Texas and Oklahoma, floodways, channel improvements, irrigation work, levees, wildlife refuges, and recreational lakes—all of which are important elements in a comprehensive

integrated water program. Among the important proposals in the water plan are the following:

*Flood Control.*—In addition to the 8 reservoirs now under construction, 20 or more new reservoirs should be constructed as funds become available. Reservoirs under construction include Great Salt Plains, Altus, and Fort Supply in Oklahoma; Denison in Oklahoma and Texas; Possum Kingdom and Marshall Ford in Texas; and Blue Mountain and Nimrod in Arkansas. New projects proposed for early construction include Greer's Ferry, Lone Rock, Norfolk, Water Valley, Bell Foley, and Blakely Mountain reservoirs in Arkansas; Wallace Lake Reservoir in Louisiana; Optima, Canton, Tenkiller's Ferry, Hulah, Oologah, and Wister reservoirs in Oklahoma; and McGee Bend, Whitney, Hord's Creek, Brownwood (enlargement) reservoirs in Texas, in addition to three dams at and near Rockland. On the lower Mississippi River systems, the Budora, Morganza, and Atchafalaya floodways, and many miles of levees, are recommended projects.

*Irrigation.*—During the past 30 years, there has been a steady increase in irrigated areas in all States of the Region. In 1929, there were some five thousand enterprises, with a total irrigated area of 1,403,000 acres. The principal existing irrigated areas include those in the lower Rio Grande Valley, having over 400 thousand acres; the Rio Grande project near El Paso, with over 68 thousand acres; the Red Bluff project on the Pecos River in West Texas; the Wichita Falls project on the Wichita River in North Texas; extensive rice fields along the lower Colorado River, the coastal plains of Texas and Louisiana, and in eastern Arkansas. Additional major projects under construction include the Marshall Ford Dam on the Colorado River in Texas, which is to irrigate 160 thousand acres of rice land in the coastal plain, and the Altus-Lugert project in southwestern Oklahoma, which is to serve 20 to 70 thousand acres of land now dry farmed.

Existing projects are of two major types, those located in areas of more limited rainfall and those in humid regions. Projects of the former type are designed to stabilize farming by the irrigation of large areas of land where the average annual precipitation

<sup>1</sup> Act No. 321 - Statutes of 1930



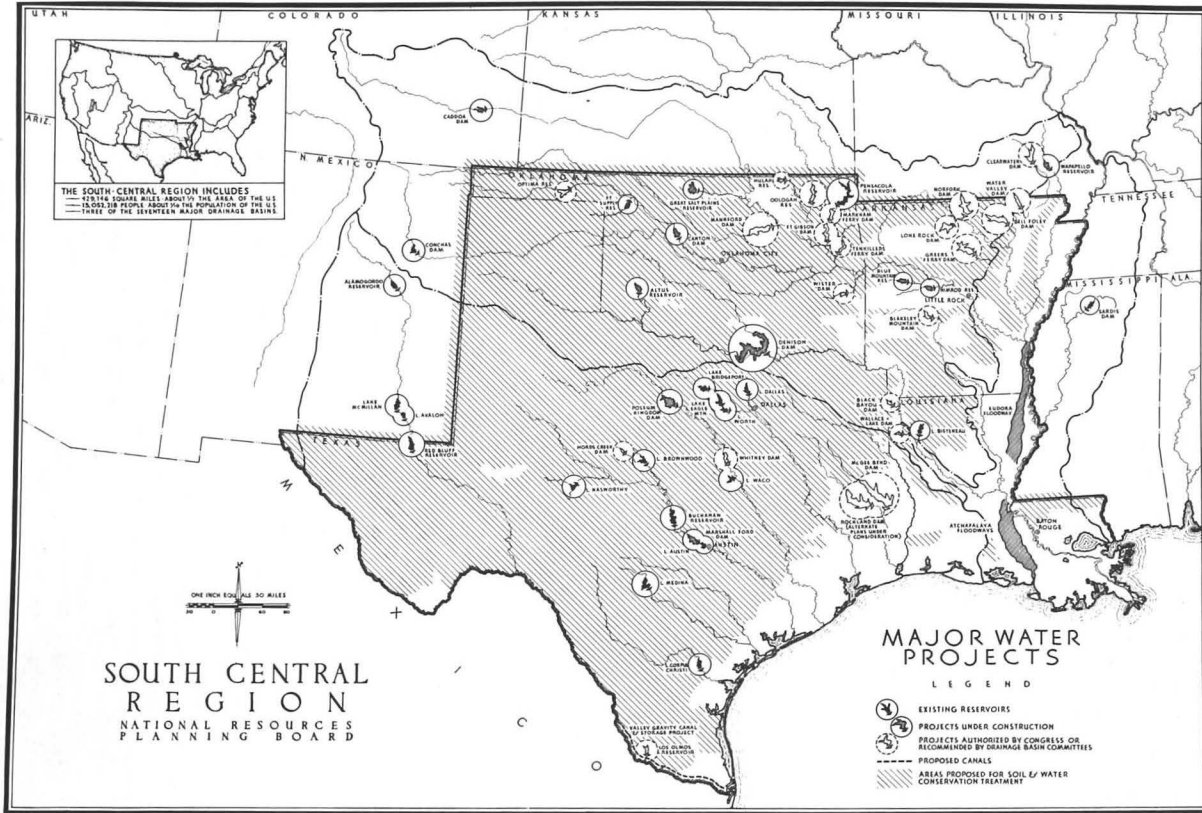


Figure 2.—Major Water Projects

is less than 30 inches, and to form a nucleus for the populace carrying on dry farming and livestock raising in surrounding areas. Those of the latter type are for sporadic irrigation of specialty crops such as rice, citrus fruits, and vegetables.

It may be stated in general that unless some peculiar conditions exist to justify the artificial application of water to the land in areas of adequate rainfall, widespread irrigation developments should be limited to that portion of the Region with an average annual rainfall of not exceeding about 26 inches. Supplemental irrigation facilities, however, are desirable elsewhere as a reserve against occasional droughts. Large irrigation developments should be coordinated with other water needs in the form of multiple-use reservoirs, such as that now under construction at Lugert, Oklahoma, in order to spread the benefits and thus reduce the project cost to the irrigators.

Investigations on proposed projects are now being made by the Bureau of Reclamation on seven rivers in western Oklahoma and Texas to determine the feasibility of their development for irrigation. Among these are the proposed Optima, Fort Supply, and Canton projects. Detailed studies are also being made on the proposed Robert Lee project near San Angelo, Texas, the Balmorhea project in the Pecos River basin, and the Mangum project in southwest Oklahoma. Definite project recommendations will await the outcome of these studies.

Because of conflicts among existing irrigation interests in the Pecos River basin, and the limited amount of water available, a special joint investigation is being made by the National Resources Planning Board with cooperation and financial assistance from the States of Texas and New Mexico, the Geological Survey, Department of Agriculture, and Corps of Engineers, to develop needed factual information with respect to water supplies, water uses and requirements, quality of water, floods and flood damage, erosion, siltation, and other matters. It is anticipated that this fact-finding survey will provide the basis for future compact negotiations between the two States, similar to the activity carried

on in the upper Rio Grande basin about two years ago, to divide satisfactorily the available waters between the various interests. Such allocation of waters will, in turn, determine the future course of improvements in the Pecos basin. The study is being conducted under the auspices of the Denver regional office, National Resources Planning Board.

More adequate State water laws are needed in the Region to protect and conserve underground water supplies for irrigation purposes. The urgent situation in the Grand Prairie rice area of Arkansas is a striking example of this need.

Lower Rio Grande.—Two major projects are proposed by the International Boundary Commission to alleviate present water supply problems in the irrigated areas near El Paso and Brownsville. The first is the Valley Gravity Canal and Storage project to supply permanently the lower Rio Grande Valley of Texas. The total cost, including supplemental storage and hydroelectric installation, is estimated at nearly 60 million dollars. Expenditures are to be made over a 5-year period, and it is estimated 5 million dollars would be needed the first year. The project has received general approval by Congress, but no appropriations have been made for construction.

The project for the El Paso area consists of extending and connecting existing sections of the American Joint Canal to provide a continuous canal from the American Dam to the lower end of the irrigated area, at a cost of 2 million dollars. This work is needed to control the United States' water rights in the Rio Grande in accordance with an existing treaty with Mexico. This project is still under investigation.

Pollution.—Serious stream pollution conditions exist in virtually every stream in the Region. These should be corrected or alleviated by (a) adopting certain minimum standards for stream purity as recommended by the State sanitary engineers in the Region, (b) establishing zones for the different standards, (c) entering into interstate compacts, where necessary, and (d) correcting existing sources of pollution. This will include approximately 534 new or improved sewage treatment plants and correction of such industrial

pollution as is created by oil fields, paper and pulp mills, mines, canneries, either by treatment, dilution, injection into underground sands, or other means. Cooperation between the States and the Federal Government is essential to expand operations in this field in order to protect public health and improve recreational opportunities.

*Drainage and Levee Districts.*—The use of the fertile agricultural lands in distressed levee and drainage districts in the alluvial areas of Arkansas, Louisiana, and Mississippi should be reestablished by coordinating, rehabilitating, extending, and maintaining existing facilities, and clearing up financial difficulties. Altogether, some 3,800,000 acres of land and about 80 thousand rural families would be benefited. The reclamation of these districts would open up about one million acres of idle undeveloped land for resettlement by farm families now located on submarginal lands. State and local cooperation, however, is essential in stimulating the necessary action programs to achieve these objectives.

#### Energy Resources

The Region abounds in fuel resources in the form of oil, gas, and coal, and has some water power. As has been indicated, the known oil reserves are sufficient for about 16 years at the present rate of production, while additional reserves are being discovered annually. Gas reserves are tremendous, but are being wasted in vast quantities because there is no economic market for them. Coal and lignite are available in large quantities.

At the present time, oil and natural gas are the chief sources of electrical energy in the Region, due to their huge quantity, the ease of production, and the cheapness of transportation to generating centers. Small amounts of power are generated by coal, lignite, and water. The total power production in 1937 was 263 million kilowatt hours by hydroelectric plants and over 6 billion kilowatt hours, or 23 times as much, by fuel plants.

The Region is generally lacking in potential water power sites as compared with other parts of the United States. It is estimated that the Region has about 6 billion kilowatt

hours per year of potential dependable water power development, which is less than 2 percent of the total for the Nation. In 1937, there were some 25 hydroelectric generating stations, which produced about 263 million kilowatt hours, or only 4 percent of the total amount of water power available for development. Most water power plants are small units, the largest being on the Ouachita River in Arkansas and on the Colorado in Texas. There are none in Louisiana. The remaining undeveloped water power is fairly well distributed among the four States, with the largest amount in Arkansas. Further development of electrical energy is limited only by the demand. As long as cheap oil and gas are available, it is unlikely that coal and lignite will be utilized to any great extent. Likewise, it is questionable whether water power would be developed further if it were not for the fact that such plants are being considered in connection with large-scale dams for other purposes, such as flood control and irrigation. The construction of dams for other purposes, therefore, may be the determining factor in the development of additional water power in the near future.

Fuels are exhaustible, and water power is not. To conserve fuels, therefore, means to use them sparingly, while to conserve water power means to use it fully. Every day that potential water power remains undeveloped and fuels are used instead means that much waste of natural resources. Hence, it is recommended that water power facilities be developed as rapidly as is economically feasible in coordination with other water needs, such as flood control and irrigation. The major hydroelectric projects now under construction are the Pensacola, Denison, Marshall Ford and Possum Kingdom projects. Others are recommended in connection with proposed dams at Lone Rock, Norfolk, and Blakeley Mountain, in Arkansas; Markham Ferry and Fort Gibson, in Oklahoma; and Whitney, Rockland, and McGee Bend, in Texas.

In the interest of conserving the fuel resources of the Region, unit operation is recommended for oil pools instead of the present competitive system of wasteful development. By unit operation is meant the development as a whole of a geological unit according to a

definite program supervised by the State, royalties to be shared on the basis of acreage, oil in place, or some general equitable arrangement regardless of the location of producing wells. Unit operation has been advocated at different times for this purpose and also for the purpose of more effectively stabilizing the industry.

In the interest of greater public service and the needs of national defense, existing primary transmission lines should be extended and interconnected so that there will eventually be a regional network of main transmission lines connecting all power sources and load centers. In this way, full use can be made of all generating facilities in meeting the requirements of fluctuating loads and of sudden increases in demand, and in the avoidance of interruptions due to accident or war.

#### Transportation

The transportation facilities of the Region include railroads, highways, waterways, airways, and pipelines. Collectively, these facilities form a pattern of infinite complexity with many points of contact, much duplication, some unnecessary links, and numerous missing portions. The need for more effective distribution, location, and coordination of these services is quite apparent if they are to serve the best interests of the public in rendering adequate and economical transportation for all classes of traffic.

*Highways.*—The general framework of principal highways appears at first glance to serve every part of the Region, but upon closer examination, certain important shortcomings are evident. Among these are the lack of diagonal routes, particularly in Oklahoma; the congestion of converging routes in several of the larger cities and the lack of adequate by-pass routes; indirect routes involving wasted mileage of both pavement and operating distance; outmoded road alignment and cross sections; narrow, incomplete, or worn out pavements on many routes and many narrow and unsafe bridges. These criticisms, of course, are not applicable to all highways. Many thousand miles of modern highways are to be found, which have been built in accordance with the latest standards of construction and

safety. Fast and reasonably safe travel is possible throughout most of the Region except in the vicinity of the larger cities and through certain closely developed areas, such as the zinc mining district in northern Oklahoma.

A long-range comprehensive plan of major regional highways is needed to serve as a guide for the construction and improvement of all regional and interregional through routes. Such a plan should be based primarily on certain existing State and national highway routes with extensions, realignments, and other improvements. The system should consist of fast, direct, through routes between all principal traffic centers within and beyond the Region, with separated grades at important intersections and railroad crossings. Some of the routes should have divided lanes where the traffic volume is heavy. With few exceptions, high speed "freeways", with limited access and all grades separated, are not deemed necessary in this Region, because congestion is infrequent in most areas and the majority of existing highways can be traveled on as fast or faster than the law allows. Highways in the major system should consist primarily of normal two-lane pavements 20 to 22 feet in width with eight-foot minimum shoulders, stabilized and dustless. All bridges would have minimum widths of 26 to 30 feet, and rights-of-ways should be 150 feet or more. For traffic volumes of over five thousand vehicles per day, divided roadways are desirable. Many sections of existing highways would be suitable for inclusion in the regional system, but there would have to be considerable straightening, improvement of grades, widening of roadways, shoulders, and bridges, and construction or reconstruction of pavements.

Railroad grade separations should be constructed in accordance with the regional highway plan, together with suggested plans for railroad reorganization. The latter should indicate which of the railroads are to remain as truck lines, which as secondary lines, and which to be abandoned.

Other recommended measures include restriction upon open range practices, the establishment of additional wayside or roadside parks, and the control of roadside development

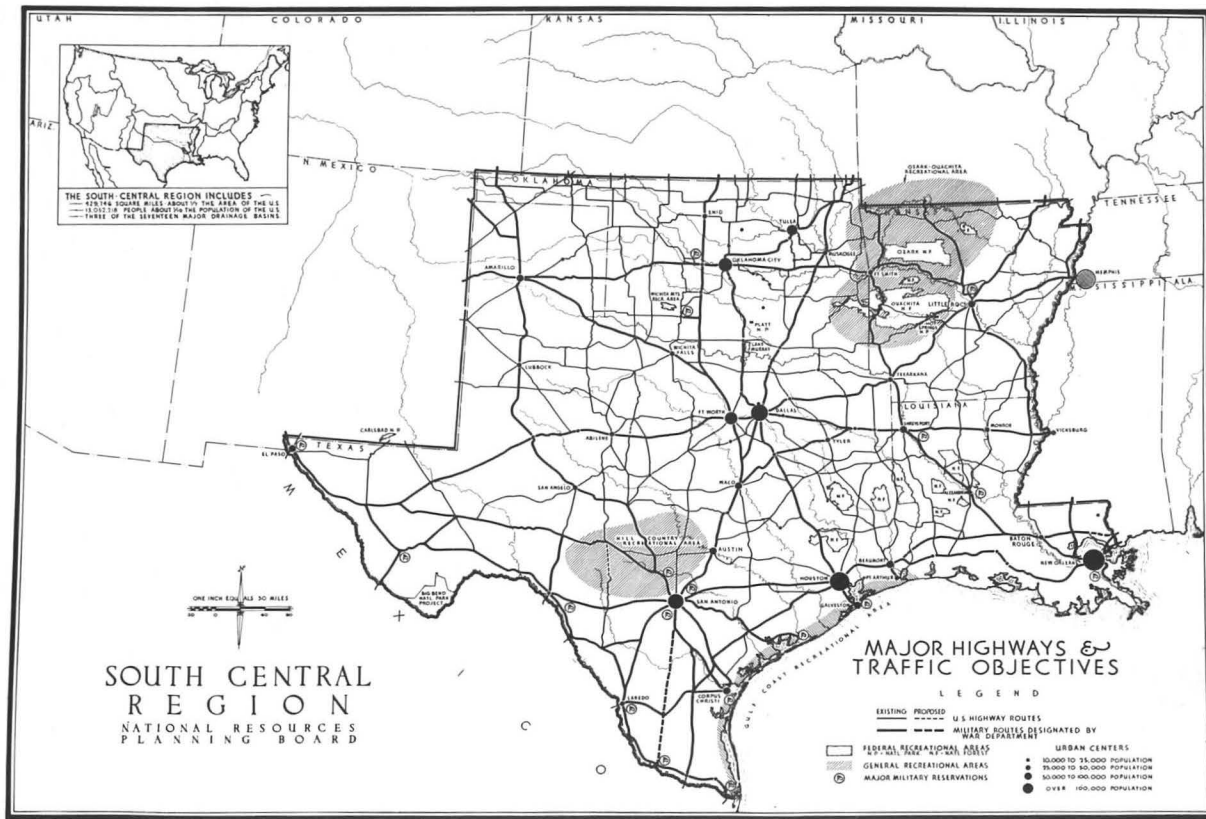


Figure 3.—Major Highways and Traffic Objectives

through zoning, easements, restrictions, or other suitable means.

For the immediate program, it is recommended that construction be carried forward on the system of military highways recently designated by the War Department in cooperation with the Public Roads Administration. Within this Region, the military system would include 6,375 miles of standard highways connecting various military reservations, principal cities, and points along the Mexican border and Gulf of Mexico. This system would also serve certain primary civil traffic requirements. The cost is estimated at 160 million dollars, and necessary improvements, based upon present appropriations, would require about six years if all available Federal aid and matching State funds are used for this purpose. It is felt, however, that before any major construction is undertaken, there should be some additional study of route relocations for the sake of shortening distances and effecting other economies.

*Airways.*—Two transcontinental air routes now pass through the Region, one of which is the New York-Kansas City-Los Angeles route, and the other the New York-Memphis-Los Angeles line. Additional inter-regional routes include those from Richmond, Virginia, through New Orleans to Corpus Christi, Minneapolis to Brownsville, Chicago to New Orleans, Wichita to Galveston, and from Dallas to Atlanta. Other routes for local service within the Region are available, but there still remain many points to be served.

Within the Region are some of the largest and best-known air fields in the Nation, including Randolph, Kelly, and Barksdale fields for military use, and the new naval base now under construction at Corpus Christi.

Public use of the several airways presupposes the availability of adequate landing facilities at necessary intervals along the way, especially for the larger transport planes. The Civil Aeronautics Authority has determined, for various types of flying, certain requirements relating to size of field, length and width of runways, lighting, radio, and weather facilities. According to these classifications, there are relatively few fields within the Region that measure up to

the needs of modern private and public flying. The improvement of existing fields where necessary, and the provision of additional landing areas is an important problem in the Region. One of the chief difficulties in developing individual airport projects is in the determination of what facilities will actually be needed. In most cases, considerable uncertainty exists as to demands that will be made upon a particular airport, that is, whether it will be used by transport planes, military equipment, or merely local private ships.

A long-range plan of regional airways is required to meet the ultimate needs of private, public, and military flying. In addition to the existing 3,500 miles of major routes within the Region, this plan would include about 3,300 miles of new routes, extensions, and connections. The principal new routes would extend from San Antonio to Amarillo and Denver, from Little Rock to Oklahoma City, from San Antonio to El Paso, and from New Orleans to Shreveport and Kansas City. Several short extensions and connections would complete the system. The estimated construction cost would be about 2½ million dollars for the airways alone, excluding airports. These airways should be fully equipped with adequate terminal airports and intermediate fields, with full lighting facilities, as well as intermediate airway beacons, and with radio ranges and weather communication circuits.

There is a need for approximately 200 new airports and the enlargement of 40 or more existing airports, so that every urban community will have a landing field suited to its needs, in accordance with regional and State airport plans. Several new seaplane bases should be established along the Gulf Coast and at appropriate inland points. Uniform State laws pertaining to aeronautics should be adopted in order to correct the present lack of adequate regulations. Cities, towns, and other locations should be marked with standard markings for ready identification from the air.

*Railroads.*—The eastern half of the Region is served by a fairly close network of railroads, while the western portion, where population is more sparse, has but a few through

routes and branches. The principal transcontinental routes passing through the Region are those of the Southern Pacific, Texas and Pacific, Santa Fe, and Rock Island railroads. Several others traverse the Region from north to south leading to the various Gulf ports, including lines of the Burlington, Santa Fe, Rock Island, Missouri-Kansas-Texas, Kansas City Southern, and Missouri Pacific railroads. The principal rail route from the United States to Mexico City passes through the Region, crossing the border at Laredo, Texas.

In the past 20 to 30 years, the pattern of railroad facilities within the Region has changed very little. There has been some new construction of connections, especially in the western portion, and there has also been some abandonment in the eastern portion, where branch lines have outlived their usefulness. In the commercial forest areas of Arkansas, Louisiana, and Texas, numerous logging railroads were built from time to time and abandoned as timber production shifted from one location to another. Due to the highly competitive nature of early railroad construction, there still remains a great amount of duplication of lines between various points and a lack of coordinated operations. Indirect routes are frequently found. The development of bus and truck transportation in recent years has created serious railroad problems due to a failure to coordinate the two services. There is also a lack of general coordination between railroads and barge lines on the principal waterways. Some progress has been made, however, in overcoming these difficulties, as evidenced by the fact that several railroads now operate coordinated bus and truck lines and have extended their services to store-door pickup and delivery.

One of the outstanding problems in the Region is the difference in freight rates established by the Interstate Commerce Commission in comparison with those in the North and East. Such differentials were established originally on the basis of relative density of traffic, but have operated to discourage a natural development of industries in the South-Central Region, which, in turn, would increase the density of traffic. According

to present rates, it costs almost 50 percent more per mile to haul a ton of freight in the South-Central Region than in the northeastern district.

Railroad abandonments have created certain problems wherever they have occurred, including those of providing substitute services, of reduction in local assessed values, elimination of jobs, abandonment of grade separation structures, and others, all of which point to the need for long-range development plans.

In its broadest aspects, any regional plan for adjustment of local railroad problems encroaches upon the national railroad problem, which cannot be solved locally. From both the national and regional viewpoints, however, it is desirable in the public interest and convenience to provide improved service and to effect all possible economies through the consolidation of local lines into unified systems, the elimination of unnecessary duplication and branch lines, unification of terminal facilities, the coordination of railroad services with those of airways and pipelines, and the construction of new routes where they would be effective in shortening distances or opening up new markets.

Many regional projects, such as the separation of grade crossings and the unification of terminals, should be determined in accordance with such a national plan; otherwise, it will be impossible to know which lines are to remain and which are to be abandoned. Where lines are eventually to be abandoned, plans should be developed for providing adequate service by other means, such as coordinated truck and bus service, and all possibilities should be explored for utilizing rights-of-way to be abandoned in the future for highway purposes. The details of most of these developments will depend upon a national plan of major railroad reorganization and consolidation, which should be prepared and adopted as soon as possible.

*Pipelines.*—Because of its extensive oil and gas fields, the South-Central Region contains more miles of pipelines for the transmission of oil, gasoline, and gas than any other similar area in the United States. Oil and gasoline pipelines extend from the various producing fields to refinery centers and the

principal Gulf ports within the Region, and also cross-country to refineries located at St. Louis, Chicago, and other points north and east as far as the eastern seaboard. Natural gas is transmitted from producing fields to all parts of the Region for local consumption, and also to other parts of the United States, principally north, northeast, and east, as far as St. Paul, Chicago, Philadelphia, and New York. Additional pipelines are being built annually at a tremendous rate.

Although most of the pipelines that collect oil or gas from the producing areas and many of the cross-country lines are privately owned, there are a number of common carrier systems, and these services are operated in almost complete independence of other connecting forms of transportation.

It is believed that natural gas pipelines should be extended as rapidly as possible to additional markets in various parts of the United States, in order to provide an outlet for the tremendous volumes of this natural resource that are now being wasted and exhausted into the air. It is also recommended that an investigation be made as to the advisability of utilizing private pipelines as common carriers when they are not in use for private operation. Such a practice would tend to develop the full use of existing facilities and thus avoid unnecessary duplication.

**Waterways.**—The Region contains numerous rivers that have at one time or another been suitable for navigation. Such streams as the Mississippi, Arkansas, Ouachita, White, Red, Trinity, and Brazos served as important arteries for early-day settlement and transportation. Many of these and other streams have been developed into commercial waterways, some of which are among the most important in the Nation. The Mississippi River, for instance, serves as the trunk line of the vast inland waterway system serving the entire central United States, while the Intra-Coastal Canal, extending along the Gulf from New Orleans to Corpus Christi, serves as a feeder for numerous branch waterways extending up the principal streams. Deep draft waterways of 30 foot depth or more for seagoing traffic extend up the Mississippi River to New Orleans and Baton Rouge, up the Sabine

River to Beaumont, up Buffalo Bayou to Houston, and up the Nueces River to Corpus Christi. Other principal waterways are from 9 to 30 feet in depth, and still others are less than 9 feet. Many of the latter waterways are not yet fully developed but are authorized for improvement in accordance with approved depths. Among these are the Arkansas River to Muskogee, Oklahoma, and the Red River to Denison, Texas. Additional projects are being proposed from time to time, often for the purpose of securing lower freight rates. Further extensions of the waterways system that have been studied and are recommended for early construction are (a) the deep water channel to Lake Charles, Louisiana; (b) a nine-foot channel in the Guadalupe River to Victoria, Texas; (c) a navigation canal along the Trinity River to Fort Worth, Texas; (d) straightening and deepening of the intracoastal waterway to a depth of 12 feet and extension to Brownsville, Texas; and (e) widening and deepening of the Mississippi River deep water channel to a depth of 35 feet from Baton Rouge to New Orleans, and 40 feet from New Orleans to the Gulf. In addition, there should be a study of possible cross-connections between the upper ends of the longer navigable rivers, in order to save time in inter-regional movements, and as a national defense measure.

#### Industry

There are several indications of the lack of industrial development in the South-Central Region as compared with the United States. For instance, the Region has nearly 10 percent of the national population, but has only 5 percent of the industrial establishments, 3 percent of all the wage earners in manufacturing establishments, and produces only 4 percent, by value, of all the manufactured products. Moreover, the industries of the South-Central Region were responsible for only 3 percent of the Nation's total wealth created by manufacturing. In other words, manufacturing processes in the South-Central Region add but 30 percent to the finished value of its manufactured products, while for the United States as a whole, the average is over 41 percent.



At present, the ten principal industries in the Region, in the order of the wealth that they create through added values, are petroleum refining, 169 million dollars; lumber and timber products, 65 million; printing and publishing, 56 million; machinery, 47 million; meat packing, 23 million; beverages, 22 million; cottonseed products, 20 million; paper and pulp, 18 million; milling, 15 million; and sugar, 11 million. Sugar refining is the fourth ranking industry in Louisiana, while the refining and smelting of zinc is an important activity in Oklahoma. Other manufacturing activities are also important in certain localities.

It is significant to note that the great majority of raw materials produced within the Region are shipped elsewhere for processing, although plentiful supplies of fuel and other materials and facilities required by industry are available, and nearly 10 percent of the potential consumers in the Nation reside within the Region. Texas produces more cotton than any other State in the Nation, yet there is practically no local processing of this raw material into finished goods. Most cotton goods and garment manufacturing is conducted along the Atlantic seaboard. The Region is one of the chief producers of cattle, yet very little leather is processed or footwear manufactured within its borders. Texas produces 20 percent of the Nation's wool and 80 percent of its mohair, yet there is practically no textile industry in the State. In fact, until recently there was not even one wool scouring plant within the Region.

The State of Arkansas reports that in 1936 the estimated value of all goods brought into the State, including raw materials, exceeded the value of goods exported by nearly 55 million dollars. Texas reports that it imports from other States and countries vastly more manufactured goods than it produces for both home and outside markets.

The opportunity to sell goods, either raw or manufactured, depends upon the availability of markets. One type of market is made up of local consumers, and the other of export business. In the South-Central Region, there is a population of nearly 13 million people, which, in itself, is a sizable con-

sumer market and uses a great diversity of products. The principal consuming centers outside the Region are those in the north-eastern and southeastern sections of the United States, and those in foreign countries, particularly Mexico and South America.

All four States in the Region are conscious of the need of furthering their industrial development in the light of the vast stores of diversified minerals, the agricultural, forestry, and energy resources, the transportation facilities, and other elements present in the Region that would contribute to successful industrialization. Moreover, there can be little doubt that the Region should enjoy a greater portion of the Nation's industrial development. One of the outstanding obstacles militating against the industrialization of the Region is the unreasonable freight rate differential, and once this difficulty is adjusted, the opportunities for industrial development will be greatly enhanced. To overcome discriminatory freight rates, the Region has developed its water transportation facilities to a considerable extent, by which it ships large quantities of oil, cotton, and other raw products to the East Coast and foreign countries, and the further development of inland waterways should prove to have a stimulating effect upon industrial expansion.

It is also encouraging to note that all the States in the Region now have industrial agencies, which are beginning to make strenuous efforts to obtain greater returns on their natural resources through processing and manufacturing. The increased interest in the development of farm chemistry and other chemical research holds considerable promise for this section of the Nation.

In order to develop industries capable of utilizing the Region's resources for manufactured products, such as iron, steel, aluminum, chemicals, plastics, pulp, paper, starch, vegetable oils, leather goods, fabrics, clothing, glass, and building materials, at least the following major activities are necessary: (a) secure equitable freight rates; (b) extend research facilities to develop new products, new uses, and new processes; (c) disseminate authentic information and impartial advice to prospective industries; (d) extend such

facilities as electric power, gas, communication, water, fuel, transportation to areas suitable for industrial expansion; (e) construct modern low-cost housing for industrial workers within easy access of suitable industrial areas; (f) train native workmen in the special skills necessary to new production methods.

As far as possible, there should be a wide diversification of industry within the Region and in each local area. Processing and manufacturing plants should be located as near as possible to the sources of raw materials and in the line of flow to consuming or distributing centers.

#### Rural Electrification

Rural electrification has advanced somewhat more slowly in the South-Central Region than it has in the United States in general. Of the 1,137,571 farms in the Region in 1935, only 23 thousand, or 2 percent, were receiving high-line electric service in 1936. Since that time, the Rural Electrification Administration has stimulated electrification through the medium of loans to farmers' electric cooperatives, public utilities, and municipalities; and largely as a result of this stimulation, the number of electrified farms had increased by 1940 to an estimated 135 thousand, or 12 percent of the total. At the same time, however, the percentage of electrified farms throughout the Nation was increasing from about 10 percent to over 30 percent.

At the present time, there are 120 or more electric cooperatives serving nearly every part of the Region. The principal unserved areas will be found in the more sparsely populated sections, particularly the Ozark-Quachita mountains, the north and south parts of the western rangelands, and the piney woods. The only obstacles in the way of further rural electrification seem to be those of providing service to isolated locations and of increasing farm incomes to the point where the farmers can pay for electric service. In many parts of the Region, the farm families have so little cash income that they are unable even to purchase coal oil or candles for lighting, much less buy electricity. They simply go to bed when it grows dark. In some cases, employment

in the construction of power lines has provided supplementary incomes for the farmers to enable them to pay for house wiring and the purchase of appliances, but there are undoubtedly many areas that still could not support rural electrification in their present state of uneconomic development.

It is recommended that rural electric lines be extended to serve eventually every farm in the Region where electric service is economically possible. This will include virtually all the farms in the Mississippi alluvial Valley, the agricultural portions of the central farm belt, and other designated agricultural areas. In addition, electric lines will probably be feasible in many of the smaller valleys and upland prairies to serve groups of people who now live in the hills. Care should be taken not to develop power lines in areas where an extensive thinning out of population is recommended.

If the continued demand for more rural power lines is met with additional Federal loans to assist farmer-owned cooperatives, private utilities, and municipalities, it is estimated that about 30 percent of the Region's farms can be electrified by 1947.

#### Housing

The housing problem in the South-Central Region has probably never been stated quite so vividly as in the report prepared by an advisory committee of southern citizens on economic conditions of the South.<sup>3</sup> In this report, which relates generally to the 13 southern States, including Arkansas, Louisiana, Oklahoma, and Texas, it is stated among other things, that houses in the rural South are the oldest, have the lowest value, and have the greatest need of repairs of any farm houses in the United States; that only 5.7 percent have water piped to the house and only 3.4 percent have water piped to the bathroom; that more than half the farm houses are unpainted; that more than a third do not have screens to keep out mosquitoes and flies; that half of all the families in the South should be rehoused; that 26 percent of the

<sup>3</sup> Report on Economic Conditions of the South. Prepared for the President by the National Emergency Council, 1938.

city or town households are without indoor flush toilets, as contrasted with 13.1 percent for the city and town households of the country as a whole; that in extensive rural districts there are not only no indoor flush toilets, but no outdoor privies even of the most primitive sort; that nearly a fifth of all southern farm homes have no toilets at all; that in these regions hookworm infection and consequent anemia have flourished as a result of soil pollution; that there is extensive overcrowding in the town areas; that in 19 southern cities over 40 percent of all dwellings rent for less than \$15 a month, or are valued at less than \$1,500; that the average farm house is worth only about \$650 and the average farm renter's house, only \$350. One paragraph from the report is quoted as follows:

"The type of slum most usual in southern towns consists of antiquated, poorly built rental quarters for working people. The rows of wooden houses without any modern improvements, without proper sanitary facilities, and often without running water, are usually in congested areas, and in the least desirable locations. Often they are next to mills or mines where the tenants work, or on low swampy land subject to floods and no good for anything else. They are usually far removed from playgrounds and other recreation areas. The southern slum has often been built to be a slum. It is simply a convenient barracks for a supply of cheap labor. Lack of running water and impure water supplies are common in southern slums. Bathtubs, sinks, and laundry tubs are among the bare necessities that are often lacking in slum dwellings. Sometimes city water is supplied through a yard hydrant shared by several families. Surface wells are often contaminated on the farms and in the villages and small towns. Contaminated milk and contaminated water, frequently found, cause typhoid fever, which is becoming a wide-spread rural disease in the South."

Obviously, the provision of decent housing for all its citizens is one of the Region's greatest needs.

As an ultimate goal, it is recommended that every rural and urban family in the Region be provided with a safe, sanitary, and healthful place in which to live. This will involve the replacement of all existing structures that are beyond repair, and the elimination of all rural and urban slums, makeshift dwellings, and dugouts. New houses, however, should not be constructed where they will

tend to perpetuate uneconomic farm units or ill-advised farmstead locations. There is a realization, too, that housing standards, especially for rural houses, should not be set too high for the lower-income groups. The important thing is to secure good, durable, sanitary houses at a minimum cost, even if some desirable modern conveniences have to be omitted. Studies are now being made to develop practical housing standards for rural areas.

As an immediate goal, it is recommended that all dilapidated dwelling units that are capable of satisfactory repair be repaired, including painting, screening, and rat-proofing.

Constant and concerted efforts should be made toward these ends through private enterprise with or without Federal cooperation. Federal stimulation toward rehousing is afforded by the National Housing Act of 1934, which provides for loan insurance through banks and other financial agencies for new construction and repairs. Loans up to 90 percent of the full value, at favorable terms, and for periods up to 25 years are made possible. Large-scale housing is carried on through loans to local housing authorities for both urban and rural housing projects, and there are now 40 or more city or county housing authorities in the Region. Arkansas has adopted a State law authorizing the creation of both urban and rural housing authorities, while Louisiana and Texas provide only for urban authorities. Oklahoma provides for neither. Additional State laws should be enacted where necessary to provide for both rural and urban housing authorities.

#### Health

While the death rate from all causes is lower in the South-Central Region than in the United States as a whole, due to the average "younger" population, the rates for certain preventable or environmental diseases are much higher than in other sections of the country. Among these are pellagra, tuberculosis, malaria, and typhoid.

Pellagra, which results from diet deficiencies, is serious in Arkansas and Louisiana and also in eastern Oklahoma and Texas. It is more common among negroes than whites, and

although the number of deaths is not particularly great, the number affected by the disease is considerable.

Tuberculosis, like pellagra, is most serious among negroes, who are affected about four times as often as the whites. This disease may be attributed in part to the low economic status and inadequate diets of the rural population.

Malaria, too, is more common among negroes than whites, the number of cases being about double. It is most serious in the low swampy parts of the Region, where drainage work and mosquito control are usually required.

Typhoid, which affects both the whites and negroes alike, is due largely to insanitation and could be reduced by proper sanitary facilities, especially in the rural sections.

Typhus, a contagious fever, has increased appreciably in the Region during the past decade. The most effective control of this disease involves the elimination of rodents in buildings, particularly where food is stored.

Other preventable diseases are prevalent in the Region, such as silicosis in the lead and zinc mining districts of northeast Oklahoma, although tuberculosis is much more prevalent in these mining areas.

Adequate medical and hospital facilities are of first importance in dealing with all diseases. Such facilities, however, are seriously inadequate in the South-Central Region. It is estimated that one-third to one-half of the people in the area, whose incomes are under \$750 a year, are receiving inadequate or no medical services. Some communities and extensive rural areas are without hospital and other institutional facilities. Doctors, too, are often beyond the economic reach of large portions of the population. Among other important factors contributing to the public health problem is that of poor, insanitary housing.

The regional development program, therefore, should be concerned with the improvement and wider distribution of hospital and clinical facilities, the provision of better roads to make these facilities accessible to rural people, removal of people from isolated areas, and the raising of economic levels in order

that people may be able to avail themselves of medical and hospital services.

Numerous projects should be undertaken for the provision of safe and adequate water supplies for both urban and rural people. Sewerage systems and sewage disposal plants should be constructed wherever necessary to protect the public health. Rural sanitation should be effected through the construction of thousands of sanitary privies and other waste disposal facilities. Swampy places in the vicinity of inhabited areas should be drained, and all ponds, lakes, streams, reservoirs, and other water retaining facilities should have proper engineering and treatment for mosquito control. All dwellings should be fully screened, well ventilated, and rat-proofed. Balanced diets are important and should be made possible by the growing of enough green vegetables and the production of enough milk and eggs on each farm to supply adequately the farm family.

#### Education

Despite the fact that the South-Central Region has numerous institutions of higher learning, its educational level is still relatively low as compared with other sections of the United States. Moreover, the Region is high in illiteracy, especially in the eastern half where negroes constitute a high percentage of the population. While the national percentage of illiteracy in 1930 was 4.3 percent, this Region averaged 5.6 percent, which is 30 percent higher than the average for the Nation. The rate of illiteracy for negroes is eleven times as high as that for the whites, and 20 percent of the regional population in 1930 was negro. Excessive illiteracy among these people is due apparently to the lack of schooling in the passing generation, because illiteracy rates are declining in proportion to the education of the present generation. All illiteracy rates declined considerably from 1920 to 1930, and it is anticipated that further declines will be evidenced by the 1940 Census. Even though numerous studies are being made, nevertheless much remains to be done.

The great bulk of the population depends for its education primarily upon the public school system of elementary and high schools.

In the South-Central Region, the district system, consisting of small independent school districts under local support and control, prevails. In Louisiana, however, the school system is based upon the parish unit. According to the best available information, there are at least 16 thousand separate school districts in the Region, each of which is a separate taxing and administrative unit. Thus, it may be seen that the present school pattern in the Region is based upon a framework designed years ago when transportation was slow and school attendance relatively low. Further, the school year in this Region is still somewhat shorter than in the northern States. In 1930, the average number of days each pupil was in school in Texas and Louisiana was from 120 to 130 days, and in Arkansas and Oklahoma, less than 120 days, as compared with the average attendance in the northeastern States (Missouri to Maine) of between 155 and 165 days.

One of the great problems facing school authorities is the declining use of existing schools, resulting from reduced birth rates and consequent gradual reduction in the number of children of school age. This imposes an organization problem. The instability of the rural population in many areas, occasioned by widespread tenancy, farm abandonment, migration, and migratory workers, poses not only the problem of an increasing financial burden for the remaining population, but also makes it difficult for the moving population to secure adequate education.

Housing facilities for schools are woefully inadequate throughout much of the rural area. Modern facilities, such as libraries and laboratories, are in many cases totally unknown. High schools are within the reach of only a part of the rural population. There is a high percentage of negroes in the total population for whose use separate schools are maintained. Indian children, however, of whom there are some 35 thousand in Oklahoma alone, are cared for in Federal Government schools and through payment of tuition for them in approved public schools.

The outstanding problems affecting public educational facilities are generally related to population decreases and fluctuations in many rural areas, declining county income for

school purposes, scattered and isolated settlements, bad roads, inefficiently small administrative units, and the high percentage of negroes for whom separate schools are required. To overcome these difficulties, there is a perennial plea for more and more financial assistance from State and Federal sources, but this alone cannot solve them. A radical readjustment in the pattern of school facilities and administrative units is imperative and must be worked out in accordance with a long-range coordinated plan that will relate school facilities to land use and population distribution. More attention should be given to vocational and adult education in the future.

Public library facilities are necessarily a part of a general educational scheme, and the use of such facilities is a further indicator of the relative educational standards of any given locality. In the South-Central Region, the States of Arkansas, Louisiana, Texas, and Oklahoma rank, respectively, second, fifth, seventh, and eleventh lowest in the United States in the per capita circulation of public library books. Many sections are without library facilities, but traveling public library service "bookmobiles" make a limited number of volumes available to the rural population in each of the four States.

A modern system of public school facilities to serve the Region in the future should be designed along the following lines:

1. Schools should be located only in those areas in which the population will remain or in which new population is to be introduced.
2. Isolated one and two-room schools should be eliminated in favor of larger, centrally located, modern structures having modern equipment, libraries, laboratories, and the like, and adequate teaching staffs.
3. Transportation to the consolidated schools should be furnished for all pupils beyond reasonable walking distance.
4. There should be a high school within reach of every populated locality.
5. The size of school units should be determined carefully in view of the expectation that the scholastic census will continue to decline in accordance with reduced birth rates, other factors being constant.

6. Administrative units should be reorganized into large efficient organizations under expert educational directorship and adequate administrative staff.

7. Each school should be located on an adequate site and provisions made for recreation and community center facilities to serve the community in out-of-school hours.

8. Public libraries should be established through State aid, or otherwise if necessary, within reach of every populous section, or effective traveling library or branch library systems should be set up to operate from a central headquarters. Book distribution through the public schools is one means of accomplishing this objective.

Other improvements, such as full grades, higher teaching standards, a longer school year, and more vocational training, should also be a part of the educational program.

#### Recreation

The South-Central Region possesses a wide variety of recreational resources. Among these are outstanding mountains, rivers, lakes, springs, canyons, beaches, and historic, archaeological, scientific, and scenic areas, as well as many interesting cities. The Ozark-Ouachita mountain area in Arkansas and Oklahoma is the largest natural playground in the Region and for some distance beyond. The hill country in South-Central Texas serves as a resort area for much of that State. The Trans-Pecos Region includes the Big Bend country, a primitive mountainous region in Southwest Texas adjacent to the Rio Grande, which is an area of national importance. The 700 miles of Gulf Coast include some of the finest beaches and fishing waters in the world. Excellent hunting areas for both small and large game are to be found in various parts of the Region, and other recreational opportunities, such as Lake Murray in Oklahoma, abound elsewhere.

There are at present within the Region two national parks (Hot Springs in Arkansas and Platt in Oklahoma), one national monument (Chamlette in Louisiana), and one national park project (Big Bend in Texas), seven national forests, and seventeen other national recreation areas of various kinds. Together, the existing national park areas contain more

than 456 thousand acres exclusive of the national forests, which add another 2,821,000 acres. In addition, there are 75 or more State parks of various sizes and types, and numerous local parks in the various municipalities, but it is surprising to find that county parks are practically unknown. Parks or roads restricted to pleasure or passenger traffic only are also lacking, although roadside improvement has been in general practice throughout the Region, and small roadside parks have been established at many points. Texas boasts of 674 roadside parks, and Oklahoma has at least 21 such areas.

Among the various recreational problems requiring special attention might be mentioned the need for providing suitable recreational facilities for rural people in the more sparsely settled sections; for providing adequate access to park units; for developing recreational parkways; and for developing park areas in conjunction with reservoir projects. The failure to plan, acquire, and develop appropriate shoreline areas in connection with reservoir development has, in several cases resulted in complications, due to the public demand for access to and use of the water areas. In most instances, adjacent property has been bought up by private interests for speculative purposes, and the general public has been deprived of its rightful enjoyment of these valuable recreational opportunities.

The major recommendations in the regional recreation plan are as follows: (1) complete the acquisition and development of the Big Bend National Park and the Palo Duro State Park in Texas; (2) develop the Mississippi River parkway in accordance with detailed studies yet to be made; (3) develop a gulf coast parkway between the Mississippi River and the Lower Rio Grande Valley and Mexico; (4) develop the Texas Gulf Coast beaches and lagoons for comprehensive public recreation; (5) create additional park units in the Ozark-Ouachita mountain region and encourage the full use of this area for public recreation of all kinds; (6) develop the Arbuckle Mountain-Lake Murray-Platt National Park Area for additional public recreation; (7) provide State and local parks and parkways in accordance with State recreational area studies;

(8) establish recreational areas on the shores of reservoirs in accordance with State recreational studies; (9) acquire and preserve scenic, historic, archaeological, and scientific sites having State or national significance.

The acquisition and development of public recreational areas presupposes that there will be adequate administration, operation, and maintenance so that the public may obtain the full use and benefit of the areas.

#### Wildlife

As indicated earlier in this report, the wildlife resources of the Region and their use in hunting, fishing, and other recreational pursuits, as well as for commercial purposes, represent substantial values in this area. A number of important wildlife sanctuaries have been established through the combined efforts of private, State, and Federal agencies and individuals, including such large areas as the Sabine Lake, White River, Rockefeller, Russell-Sage, and Wichita Mountains refuges. Further specific improvements to fill out in part the regional requirements for wildlife conservation are recommended as follows: (1) preservation of the Louisiana tidal marsh as a primary wildlife area, including some development work to correct damage caused by the cutting of canals through the marshes, the prevention of future uneconomic drainage enterprises, and some development of water control structures in selected parts of the marsh for the purpose of wildlife management; (2) one or more migratory waterfowl areas in the lower Rio Grande delta; (3) several wildlife projects on existing or future reservoirs, such as Denison, Inks, Austin, Marshall Ford, Buchanan, or Robert Lee; (4) an area in the northwest part of the Texas Panhandle for migratory waterfowl.

In the interest of commercial and sport fishing, industrial plants should be required to dispose of all poisonous wastes harmlessly instead of dumping them into the streams. Wildlife management plans should be included in all land management and resource development projects. In general, it must be recognized that private and public lands other than refuges, on which wildlife may be con-

sidered only of secondary importance, must be depended upon to provide the bulk of protection to the wildlife resource.

#### Incomes

The South-Central Region, with about one-tenth of the population of the United States, enjoys only about one-sixteenth of the national income. It had only three-fifths as much income per capita in the prosperous year of 1929 as did the whole Nation. The per capita income in Texas was about three-fourths as high as the national average, in Oklahoma two-thirds, in Louisiana less than two-thirds, and in Arkansas less than one-half.

For the Region as a whole, the average per capita income in 1929 was about \$460 as against \$750 for the United States. Texas was highest with \$509 per capita, Oklahoma next with \$493, then Louisiana with \$428, and finally Arkansas with \$308. These figures, of course, do not reveal the many individual incomes in each State that are lower than the average. In Oklahoma, for example, one-third of the farmers make less than \$300 per year, and in Louisiana, out of a total of 64 there were 44 in which the per capita cash income in 1936 was less than \$100. In one parish, it was as low as \$26 for the entire year, and the highest per capita income reported for any parish in the State was only \$260. These figures do not include any relief or other government bonus payments.

In comparison with other parts of the United States, the plane of living in this Region is considerably less than the average. According to Goodrich and others in *Migration and Economic Opportunity*, the plane of living in the South-Central States in 1928-29 was on the average less than 40 percent of that in the North-Central and Northeastern States. In some areas it was as low as 15 percent. This low plane of living is undoubtedly due to the high percentage of rural people and the handicaps they endure because of the many problems affecting agriculture and other rural pursuits.

The principal source of income in the Region is mineral production, which in 1937 was valued at over one and one-third billion dollars. Manufacturing was second with 816

million dollars value and farm products third with 796 million dollars. Comparative figures on other important sources of income, such as trading, transportation, personal services, and the professions, are not available.

It appears from a study of available information that the raising of income levels in the South-Central Region will depend primarily upon an increase in manufacturing, but there is also a need for greatly increasing the levels of farm income. Supplemental incomes should be developed through part-time employment in forestry, forest products manufacturing, mining, recreational services, and other activities, and by realizing the cash value of hunting privileges and similar services. There are many things in the farm situation, however, that are basically wrong, and that cannot be corrected merely by raising price levels, controlling production, and finding supplemental incomes. Some of the more fundamental problems, as discussed elsewhere in this report, are inadequate farm sizes, improper types of farming, depletion in soil fertility, and farming of non-agricultural land. The regional plan should strive to correct such problems as these.

#### Urban Areas

According to preliminary 1940 Census figures, the Region has 81 cities of over 10 thousand population. The principal cities of over 100 thousand population are New Orleans with 482 thousand; Houston with 386 thousand; Dallas with 293 thousand; San Antonio with 253 thousand; Oklahoma City with 204 thousand; Fort Worth with 178 thousand; and Tulsa with 141 thousand. New Orleans and Houston are among the 21 largest cities in the Nation. It will be noted that the State of Arkansas has no city over 100 thousand population, Louisiana has only one, Oklahoma two, and Texas four. All of these cities, with the exception of New Orleans, are located in a belt extending through central Texas and Oklahoma. Other cities of smaller size are located in various parts of the Region.

Most of the larger cities are either general manufacturing, wholesale, and retail centers, such as Dallas, San Antonio, Oklahoma City, Fort Worth, and Tulsa, or important sea-

ports, such as New Orleans, Houston, Beaumont, and Corpus Christi. Tulsa, the headquarters for numerous oil companies and industries, is known as the "oil capital of the world." Austin is primarily a State capital and university city, and there are certain resort cities, such as Galveston, Hot Springs, New Orleans, and San Antonio. Among the smaller cities, there are a number of oil boom towns, but the majority are shipping and marketing centers for the surrounding countryside.

Most of the cities of 50 thousand and over have been increasing steadily in size, the growth from 1930 to 1940 ranging from 107 percent down. Losses were experienced by a number of cities, the maximum being 10 percent. The extent of increases or decreases is usually due to local factors. Most increases are the result of the mass movement of surplus farm population to the cities, where industrial and other opportunities are sought. A number of former oil boom towns and some of those affected by prolonged droughts have quite naturally shown a loss in population.

While individual cities may regard their serious problems as primarily local, a few of these affect the Region in general. Blighted areas and substandard housing, as discussed in other sections of this report, are so common that the net effect upon the welfare of the Region is serious. The premature expansion of city subdivisions into outlying areas creates a blight on rural areas that is most detrimental. Too few of the smaller cities are directing their development according to well considered plans, as city planning is very laggard within the Region. More careful planning is especially important for cities that are built upon oil development or other boom factors, in order to avoid the problems of speculative overdevelopment as against sound conservative growth.

Every growing city and town should have a carefully prepared plan of general development as a guide for all new construction and expansion. The emphasis should be primarily not on growing bigger but on becoming better, in order to improve the standards of living and increase the opportunities for earning more adequate incomes.



### Defense

While the proposed regional plan is not predicated upon wartime emergency needs, it should and does provide a social and economic framework with which the national defense program can be integrated. It provides a means, for example, whereby new emergency developments may be absorbed into the local economy after the emergency has passed, thus avoiding the creation of serious new problems which would otherwise result from later deflation.

Insofar as possible, therefore, all national defense projects should be channeled through the State planning boards and be related to the Regional Development Plan. Only in this way can proper integration be had with a coordinated development plan for the area.

### Economic Opportunities and Social Advantages

Despite the many major problems that have retarded and will continue to retard its progress until corrected or substantially alleviated, the South-Central Region is endowed with a tremendous wealth of natural resources and advantages which, if used wisely, can contribute generously to a more abundant life, not only for its present population, but for the greater population to come.

Its abundant mineral resources, its extensive areas of lands that are still good for crops, forests, and grazing, its climate, and excellent recreational areas both developed and potential, all coupled with its relatively youthful and staunch population capable of assimilating a good education, which the Region can afford to provide, form economic and social assets, which if planned for, developed, and controlled, must inevitably make this Region one of the most wholesome and prosperous areas in the Nation.

The attainment of that objective will be slow, costly, and at times disheartening, but it can be reached. Even yearly, the results of adherence to plans for long-range objectives will be material and encouraging. Nevertheless, the continuous study of new problems,

the refinement of the general plan indicating the direction and extent of desirable future growth and changes, and the advance programming of public works will all be necessary to avoid haphazard development which has proved so costly and inconvenient in the past.

Faced now with recurring droughts, inadequate water control, over grazed pastures, uneconomic farming units, tenancy, substandard housing, low incomes, inadequate medical, sanitary, and educational (in the vocational field particularly) facilities, a substantial portion of the people of the Region merely exist. Their plight constitutes a brake upon the general prosperity.

The solution of these and other problems must be brought about through comprehensive planning for the development of the Region, so conceived and conducted as to restrain immediately those practices that would destroy present sound conditions, and at the same time, permit correction or alleviation of existing evils and promote the gradual elevation of the plane of living.

Through the cooperation of Federal, State, and local governments, and with public understanding and support, many things can be accomplished in the Region to correct permanently existing problems. It is possible to visualize a comparatively prosperous and happy people engaged in a variety of occupations suitable to their talents. Instead of present waste, there will be conservation; instead of isolated farms without conveniences and essential facilities, there will be compact communities in areas free from the ravages of drought or flood, with decent housing, proper sanitation, utilities, accessible schools, and other desirable conveniences.

One can foresee that in the future, industry, recognizing the abundance of skilled labor provided through a comprehensive vocational education system, and desiring to locate near the source of raw materials, will have become blended in the economic life of the Region. It will have afforded supplemental incomes to many whose chief endeavor will still be agriculture. The forests will no longer stand idle. They will produce timber, pulp in vast quantities, and manufactured

products for the Nation, but consumption will never exceed the supply.

Wildlife will be plentiful, and close at hand will be recreation for those who desire it. The urban dweller will be able to obtain the form of physical diversions he needs because of his environment. The farm popula-

tion will find diversions suitable to his desires.

No longer will the population migrate elsewhere in search of a better existence. They will have increased materially in numbers and will enjoy a wholesome and satisfying life.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

MISSOURI VALLEY

REGION 6

OMAHA, NEBRASKA

1940

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Report of the  
MISSOURI VALLEY REGIONAL PLANNING COMMISSION

Philip H. Elwood  
*Regional Chairman*

C. Woody Thompson  
*Planning Technician*

T. Hillard Cox  
*Planning Technician*

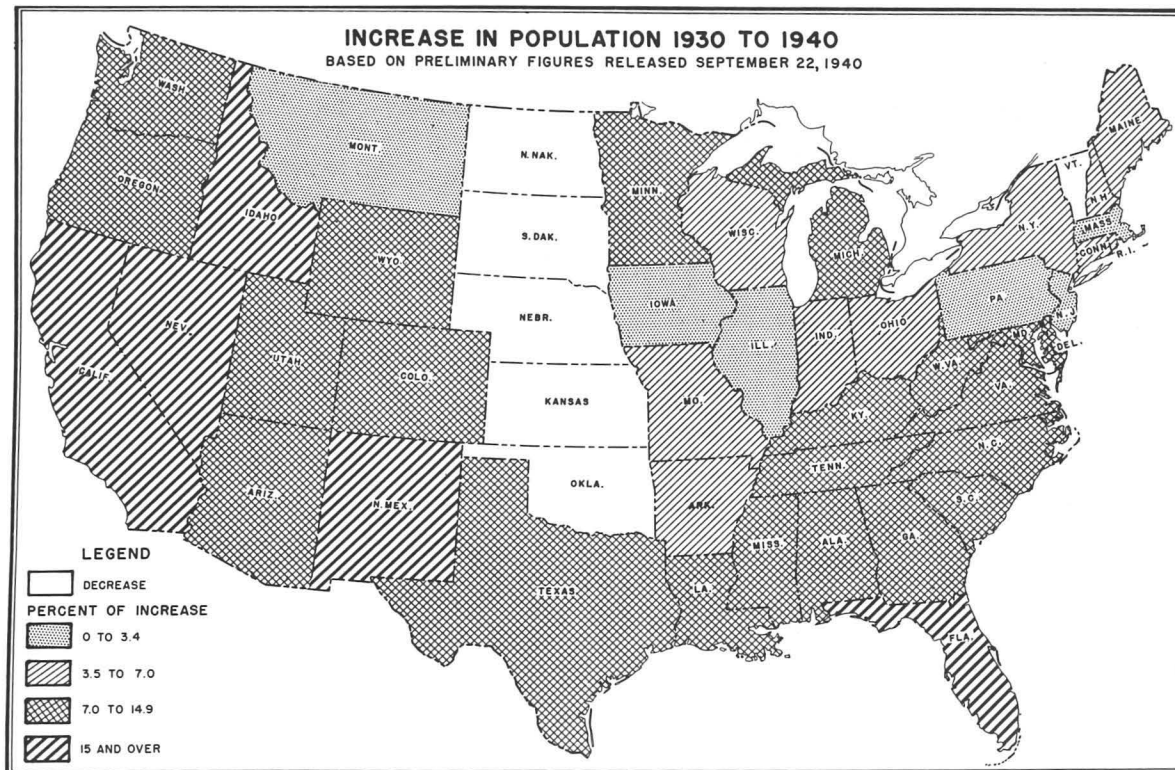


Figure 1. — Increase in Population, 1930 to 1940

NATIONAL RESOURCES PLANNING BOARD  
FIELD OFFICE  
OMAHA, NEBRASKA

October 28, 1940

Mr. Charles W. Eliot, Director  
National Resources Planning Board  
Washington, D. C.

Dear Mr. Eliot:

In submitting this preliminary Development Plan or Program for the Missouri Valley Region which includes the States served by the Omaha Field Office of Region 6 of the National Resources Planning Board, we wish to call your particular attention to the following:

1. This is a compilation of ideas and thoughts from many minds representing a number of agencies both State and Federal, as well as official and private individual opinions and advice. We wish especially to acknowledge the generous help and cooperation of the following: District Corps of Engineers, Soil Conservation Service, National Park Service, Forest Service, Bureau of Reclamation, Farm Security Administration, U. S. Housing Authority, Civil Aeronautics Authority, Fish and Wildlife Service, Bureau of the Census, Extension Services of the Land-Grant Colleges, North Dakota State Advisory Board, South Dakota Resources Advisory Board, Nebraska State Planning Board, Minnesota Resources Commission, Kansas State Planning Board, Missouri State Planning Board, and the recently appointed Iowa Industrial Resources Defense Commission, as well as the water consultants of the National Resources Planning Board. We are especially indebted to the Montana State Planning and Water Board, the Wyoming State Planning Board, and the Colorado State Planning Board for effective collaboration on the drainage basin plans of the Upper Missouri and the Platte River Basins.

2. This is properly and of necessity a very flexible plan or series of suggested programs subject to change from time to time as conditions warrant and additional public and private opinion and advice become available.

3. One definite and immediate need if the plan for the Region is to develop properly is the creation of an official Missouri Valley Planning Commission which could, with the necessary committees concentrating on *special* problems and problem areas, do much toward effectively mobilizing the best minds of the Region toward their solution. The efforts of many agencies working out extensive programs in the various States could be focused through such a Commission insuring better cooperation toward common objectives.

Incomplete as it may be in many phases of a comprehensive plan, it does, we feel, represent an encouraging example of helpful conscientious cooperation on the part of the many Federal and State agencies working with the Omaha staff and consultants of the National Resources Planning Board. It is our hope that it is but the beginning of a much more definite and detailed social and economic plan for this great Region directed toward a stabilized, prosperous and happy people engaged in those pursuits best adapted to the Resources of the Region.

Sincerely yours,

F. H. ELWOOD,  
*Chairman, Region 6.*

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PRELIMINARY STATEMENT REGIONAL DEVELOPMENT PLAN  
MISSOURI VALLEY

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PART I -- INTRODUCTORY STATEMENT

The seven States of Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota comprise the area generally served by the Omaha regional office of the National Resources Planning Board.<sup>1</sup> In terms of location, these States occupy the north central portion of the Nation; in terms of acres in farms, they account for 26 percent of the United States' total. In general, the area is flat to rolling, with significant exceptions along some of the water courses and in the Black Hills and Ozarks. Its soil grades from the best to very poor. It is a land of extreme cold and intense heat; a land with normal annual precipitation averages ranging from 15 inches in the northwest corner to over 45 inches in the southeast. Fortunately for agriculture, approximately 70 percent of it comes during the growing season. In terms of economic organization, agriculture and livestock are its main resources. In addition, it has significant amounts of iron ore, petroleum, natural gas, lead and zinc, gold and silver, and many other minerals including manganese, lignite, and coal. Other resources are to be found, such as gypsum, ceramic clays, limestone, and forests.

*The Missouri Valley Region.* In the creation of a regional development program for the seven States of the Omaha field office, one is met immediately with an important question, namely, what is the common bond of these other States? In other words, do we have here a unified region by any acceptable definition? A study of the economic geography of the United States shows our Region to include parts of five economic regions. Its extreme length extends from cotton in the bootheel of Missouri to grazing, mining, and lumbering at the Canadian line. What, therefore, is the common bond in Region VI?

It is recognized at the outset that this question is neither new nor unique to this

Region. The problem of regionalism has been thoroughly treated in a prior National Resources Board publication.<sup>2</sup> In that publication are set out many types and kinds of regions as well as the limitations to any selected basis, especially one along State lines. Yet for all these difficulties, these seven States are a logical combination for regional development.

In the first place, there is a common bond in the Missouri River basin. Every one of these States has some degree of interest in the maximum use of the waters of that river. In the second place, this group of States has a socio-economic homogeneity--it lies in that trans-Mississippi area bordered on the east by a great river and on the west by the Rocky Mountains. From Davenport, Iowa, to its most westwardly village, one is constantly reminded that he is "out where the West begins!"

In the third place, there are at least two common economic ties. The first of these is the Great Plains stretching north and south across the western half of this Region. From this area comes the livestock that is fattened in the western Corn Belt, i.e., Iowa, Nebraska, and southeastern South Dakota. Thus, there is an economic inter-relationship, which when balanced, unites the Plains to each of the other States of the Region. A second economic tie is the strategic location in the matter of industrial development. These States lie directly in the path of the westward expansion of industry. In these days of hurried defense activities, the industrial possibilities of the Region have become very important. Its combination of interior location, adequate transportation, and abundant resources ought to make for significant defense and peacetime expansion.

In the fourth place, Region VI has the virtue of including not one, but several problem areas. It is a region "based on a composite of problems." Thus, the energies

<sup>1</sup> Since part of the work of the drainage basin committees of the Missouri River is administered by the offices in Omaha and Denver, our office can be said to serve jointly with Region VII (Denver field office).

<sup>2</sup> National Resources Committee, *Regional Factors in National Planning*, 1928.

of its leaders will not be focused excessively on a single situation. Instead, in the consideration of several major problems, there will more likely be created a genuine regional program properly balanced by all relevant economic and social considerations. Finally, for administrative convenience, the States of Region VI are a proper grouping. With minor exceptions, there is scarcely an important city in the Region not quickly accessible from the regional office in Omaha.

*The Need for a Regional Plan.* There are many reasons why there must be regional planning: We are in the process of closing a three-century long epoch of planless exploitation of the human, natural, and physical resources of North America. During these three centuries, it has been assumed that untrammelled individual initiative would somehow yield the greatest long-run social progress. Now we know the error of that assumption. In the haste to satisfy immediate needs, we have cut down our forests, destroyed much of our wildlife, wasted our precious soil and mineral resources. Only today are we reckoning the toll of these past practices. If we are to secure a proper balance in the use of our resources, there must be intelligent planning and action in accordance with those plans. In the area of Region VI, for instance, we must learn to put our scant water supplies to the most beneficial uses, we must execute the best available of land-use patterns, and we must use our dwindling mineral supplies as economically as possible. In short, the practices of the past compel the immediate formulation of regional and national plans. Not to do so now may lead to disaster not many years hence.

We can be specific in this matter. As a result of "planless" exploitation, we are now faced with several serious problems. Looking first to the eastern side of Region VI, there are the exploited mineral and timber areas in Minnesota and Missouri. In Minnesota, there has been a double stage of exploitation. First, the land was quickly stripped of its trees; then it was robbed of its scant fertility by an exploitive agriculture. The results are a denuded and eroded top soil and, at best, a meager existence for its owners. As a result of the recession of these waves of exploitation, we have inherited the social consequences of stranded populations and abandoned lands. A similar problem exists on the Minnesota

iron ranges. There, changes in mining methods have eliminated jobs for many miners, thereby leaving stranded population areas. The same general picture, with minor variations, applies to the Ozark area of Missouri. There, a stabilized subsistence mountain agriculture has twice been invaded by cycles of exploitation. First, it was lumbering; next, it was mining. As a result, there has been the usual aftermath--a disorganized economic and social pattern, abandoned lands, stranded populations.

Even the more level agricultural prairies stretching between the Minnesota forests and the Missouri Ozarks have not been immune from the devastating effect of exploitation. Improper agricultural practices have speeded up water erosion and exhaustion of land. For instance, in some of the more rolling parts of Iowa and Missouri, as much as 75 percent of the top soil is now washed away. As a result, not only has the eventual abandonment of lands been hastened, but the river streams of that area are rapidly becoming "aquatic deserts".

Turning to the western half of Region VI, we find one of the major rural problem areas of the United States. There, beyond the 98 prime meridian and stretching westward to the Rockies, lie the Great Plains, an area of broad expanse broken only occasionally by rivers and gullied lands, a region of high winds, intense sun, and little water. Here, the usual land-water relationship is reversed. Instead of attempting to carry away surface water as rapidly as possible, the problem becomes one of intense water conservation. Over almost all of the area of the Great Plains, normal precipitation approaches (or falls below) the critical point of humid agriculture, and in drought years, the results are disastrous. In 1934, a drought year, 7½ million acres of corn were planted and not harvested, and approximately 20 million acres of wheat were lost. The former was one-eighth of the United States' total of acres planted in that crop; the latter was one-half of the total number of acres planted.

Space does not permit a detailed review of the history of the settlement of the Great Plains.<sup>3</sup> In brief, these areas were settled according to the small homestead pattern of eastern humid agriculture. A

<sup>3</sup> For brief, but excellent statements, see Report of the Great Plains Committee, *The Future of the Great Plains*, 1936; National Resources Planning Board, *Northern Great Plains*, 1940; Bennett, *Soil Conservation*, Chapter 35, especially pp. 722-378, 1939. For a more extensive treatment, see Webb, *The Great Plains*.



combination of better-than-average rainfall in early years and high prices during the first World War caused excessive plowing of these range lands for wheat raising. Even where the plow did not penetrate, overgrazing led to the same consequences. Soon, the Great Plains were exposed to the fury of wind and water.

The consequences are easily (and tragically) recorded. After years of drought, many farm families have given up the fight, moving to a nearby town or migrating to other regions — mainly toward the west coast. This movement can be shown statistically. In the decade 1930 to 1940, the Plains States each lost the following population:

		Percent of 1930 Population
Kansas	91,862	4.9
Nebraska	64,495	4.7
North Dakota	41,155	6.0
South Dakota	52,877	7.6

These figures do not show the real losses because they should be adjusted for increases in urban places and for the general growth trend in the United States. So adjusted, these four States will have relative declines of approximately 10 or more percent. When one examines the data for each State, he finds county losses ranging to a high of 64.2 percent for Buffalo County in central South Dakota.

Another evidence of distress on the Plains is seen in the figures for tax delinquency. In a 1940 study sponsored by the State Advisory Resources Board and the Tax Commission of North Dakota, 18.8 percent of all land in that State was found to be 5 or more years tax delinquent. If to this are added the publicly owned lands, 30 percent of North Dakota pays no taxes. Of course, certain counties show a far worse situation. In an extreme case, one county has over 40 percent of its farm lands with 5 or more years taxes delinquent. Other States show similar results. Carelton County in the Minnesota cut-over area has had 23 percent of its acres revert to the State because of delinquent taxes. To this should be added another 20 percent in some stage of tax delinquency. Our last sample is in South Dakota. In Stanley County, in the center of the State, where rainfall averages are most critical for dry farming, 65.3 percent of all farm land in 1936 was tax delinquent

and 57.8 percent subject to tax deed. The picture is scarcely better in other South Dakota counties. Corson in the northwest corner had 70 percent of its land delinquent and almost half subject to tax deed.

The consequences of such delinquency are generally to demoralize county government and to shrink the tax base, thereby increasing the load on tax paying property. Even here, there are definite limits to tax increases.

A third evidence is the record of relief. We illustrate with data from North Dakota. For the State as a whole, 34 percent of the population was on relief in 1937, 31 percent in 1938, and 21 percent in 1939. Again, when county figures are examined, the percentages run to a high of 68 percent in 1937, 76 percent in 1938, and 41 percent in 1939. Such figures far exceed the national average of approximately 15 percent of the population on relief.

To this point, we have presented the need for regional planning in terms of the larger subdivisions of the Region, viz., the cut-over portion of Minnesota, the Ozark portion of Missouri, the western portion of the Corn Belt, and the Great Plains. There are, in addition, several smaller areas, which within their borders present equally important problems of rehabilitation and reorganization. In South Dakota is a large area of land containing the chemical element "selenium". It is poisonous to man and beast and, unfortunately, is absorbed by all forms of plant life growing on selenium lands. Thus, animals grazing on or fed with forage or grain from such areas often develop a serious disease usually referred to as "alkali disease". In turn, the meat of these animals will infect any who eat it. As a consequence, the agricultural use of selenium lands has become quite hazardous.<sup>4</sup> In Missouri, there is the bootheel section with the problems attending cotton culture, and the stranded population in the tiff section on the eastern side. In southern and central Iowa, there are the stranded coal mine communities. In Kansas, there is the gas and oil section where, at the present time, a goodly portion of the gas is wasted. In Minnesota, there is the problem of unemployment on the iron ranges. In Kansas, there is the salinity problem, one which arises from search for subsurface water and impro-

<sup>4</sup> This problem has been given special attention by the South Dakota State Planning Board in its report *Selenium Problems in South Dakota*, Brookings, 1937.

per irrigation practices. Finally, each of these sections is a problem area, and for each some careful planning is necessary.

*The Resources for Planning.* We have set out the area of Region VI and its problems. To correct these problems, we need extensive plans for the maximization of water use and the conservation of mineral and land resources for the ultimate benefit of the largest number of people. As we show later on, the attainment of these objectives can come only through official local, State, and regional planning organizations. But before we can plan, we must know the economic and social foundation upon which plans must be built.

1. *Land (Agriculture).* Our primary economic resource is land, especially agricultural land. The percentage of total land area in farms ranges from 63 percent in Minnesota to 96.6 percent in Kansas. The four Great Plains States have approximately nine-tenths of their area in farms. This farm land is used generally for the growing of crops and the feeding of meat animals. Thus, it will be no surprise to find that this Region is one of the two primary food producing areas of the United States, raising from 40 to 45 percent of all United States food production. The following table illustrates this point:

	Percent of U. S. Production
Wheat	53
Corn	44
Small grains	54 to 65
Hogs	36
Cattle	28

Only one important natural hazard stands in the way of the proper agricultural utilization of all but the roughest portions of this Region, and that is water. In the western half (past the 98th prime meridian), the average annual precipitation approaches, and falls below, the minimum requirements for humid area agriculture. In drought years, the actual rainfall for all this section may be below that critical point. Thus, for this Great Plains section, the first requirement for agriculture is water. The first step in a balanced economy for this section must be the maximum economical development of water facilities in combination with a land-use program intelligently

related to available water supplies.

Of course, other hazards of natural and man-made varieties exist. Pests, improper farm practice, improper farm size and organization, and unpredictable price oscillations are but a few. But the proper integration of regional and natural plans can meet all these.

2. *Land (Mining).* The second significant resource of the Region lies under its surface - minerals. These range from the most important such as iron ore, lead and zinc, and petroleum and natural gas, to isolated deposits such as tuff and gypsum, to a host of minerals of yet unknown or doubtful commercial value. While mineral production is distinctly second to agricultural production, being but approximately one-eighth of the latter in a normal year, it is nonetheless important to the Region and to the United States. This is shown in the following table:

Mineral	Percent of U.S. Production
Iron ore	63
Gold	22
Lead	35
Zinc	17
Lignite	65*
Bituminous Coal	10*
Petroleum	5
Natural Gas	3

\*Percent original reserve

Since the Region has been one primarily devoted to agriculture, its mineral deposits, worked and potential, may be a basis of future stabilization of economic activity. As Father Ligutti has demonstrated at Granger, Iowa, mining is one occupation that can be integrated with a type of part-time agriculture, especially where productive land is available.

3. *Manufacturing.* Any region that raises foodstuffs and produces minerals is likely to have a certain type of manufacturing. Unless transportation rates are too adverse, at least the early processing stages will be located near the source of raw material. In this respect, except for iron ore, every significant raw material of the Region is processed to some extent in the Region. The leading industries thus include flour milling, cereal milling, meat packing, and oil refining. The importance of some of these is shown below:

Manufacture	Percent of U.S. Production
Flour	39
Butter	45
Meat Packing	31
Poultry	52

In addition, there are many more kinds of manufacturing, ranging from fountain pens in Fort Madison to airplanes in Wichita. In short, while distinctly third in the economic pyramid of Region VI, these industries are essential, especially to a well-balanced economy. Properly planned and developed, they will assist in absorbing some of the Region's unemployed. Considering its natural advantages in the form of labor, markets, and resources, unless freight rates interfere,<sup>5</sup> there ought to be significant future industrial expansion.

4. *The People.* Farm lands, minerals, and to some extent, manufacturing establishments are but the inert raw materials out of which people build themselves a society. Thus a final ingredient is essential — people and particularly, intelligent people. That this Region possesses this element is scarcely open to debate. It was intelligence that made possible the opening and development of the West. And now where ignorance and carelessness have created problems, it will be intelligence that will find their

solution. Thus, we have the essential base for a proper social pyramid. Upon such a foundation can be built a superstructure of many dimensions. Such an edifice built with intelligence upon a balanced economy can include all those things essential to the well-being of the people of the United States. In short, on such a social and economic base as exists in Region VI, real and effective plans can be prepared by which to accomplish what now appear to be but roseate dreams.

*Limits to Regional Planning.* Without wishing to detract in the least from our plans for regional programming, we must be realists enough to admit that there are limits to regional planning. In many instances, a regional program will require inter-regional and national direction. For instance, if the economic balance of the Great Plains should require significant migration of people, such a plan becomes a national one. In other ways, regional planning is limited. A complete solution of the farm problem may demand the stabilization of the prices of farm products, and certainly in its broad objectives and operation, it requires national supervision and organization. This would be a very difficult task for regional planners acting alone. Thus, just as regional plans attempt to integrate and implement local and State plans, so must regional plans be related to each other, and made complete through national planning.

## PART II -- THE REGIONAL PLAN

What combination of specific plans are best adapted to (a) give to these States a balanced economy and (b) create for the United States a balanced interregional economy? Specifically, what can be done to improve the economic and social environment of the people in this Region, stabilize employment, reduce to a minimum the relief load? To this end, the following 9 objectives are presented. They are the result of composite efforts of many authorities and cooperating State and Federal agencies. Action programs along the lines set out below, while they cannot prevent drought nor eliminate other natural disasters, can make such events less destructive, and withal, begin to give a more stabilized population pattern.

<sup>5</sup> The Interterritorial Freight Rate Problem of the United States. A Study of the Tennessee Valley Authority, printed as House Document 264, 75th Congress, 1st Session.

### Water Resources

#### Missouri Drainage Basins

##### Problems and Objectives

An adequate water program must include the profitable use and conservation of all water resources, surface and underground. In this plan all types of use—urban, rural, and recreational—should be considered. The important problem in the Missouri basin is scarcity of water relative to the demands of various types of possible uses.

The principal objectives involved in a comprehensive program of reorganization of water supplies of the Missouri basin are: the adjustment of the Missouri headwaters' supplies above Canyon Ferry; the equitable allocation of the waters of the interstate tributaries of the Yellowstone; the development of the meager water supplies of the

Great Plains tributaries; the early determination of a general policy concerning priority in use of the main stream and tributaries (e.g. navigation versus other uses); the adjustment of controversies and allocation of waters of the Platte; further studies of trans-mountain diversions from the Colorado; the correlation of multiple uses on the Republican and other Kansas River tributaries; major storage for flood control, navigation and other purposes on the Kansas, Osage, Grand, and Gasconade rivers; tributaries to the lower Missouri; and determination of extent of pollution and its abatement on the Missouri from Sioux City to the mouth.

The following recommendations are intended to give the present status of the investigations and the plans being made by the various Federal and State agencies, and to suggest procedure that will lead to a reasonable coordination of the efforts of all concerned.

#### Recommendations

##### 1. *Adjustment of Missouri Headwaters' Supplies above Canyon Ferry, Montana.*

The Montana Power Company has for a number of years operated a series of power plants extending downstream on the Missouri from Canyon Ferry, a few miles due east of Helena, to a point well below Great Falls. These have made complete utilization of the low flow, augmented by pondage in the various reservoirs on this section of the main stream and by storage from the Hebgen Reservoir far upstream.

Proposals for the extension of irrigation and storage for existing irrigation projects in the headwaters above Canyon Ferry have led to threats of litigation, but within the past year a constructive program has been initiated. The Montana Power Company, the State of Montana, and the Bureau of Reclamation have entered into a three-party agreement for investigation and adjustment of conflicting interests.

The plan under investigation contemplates the construction of a storage reservoir of about 1,000,000 acre-feet capacity at Canyon Ferry (the head of the power system) in which will be impounded surplus waters that have hitherto flowed unused past the power stations at certain times of the year. This storage will be released to the power system when required in exchange for upstream storage and freedom to make diversions for consumptive use in the headwaters of the basin

above Canyon Ferry. The project should facilitate the readjustment of water supplies to existing systems and will permit the extension of irrigation to other areas. It is of greatest importance, and it is probable that an equitable adjustment satisfactory to all concerned will be secured.

Interchange of power between plants to be constructed in the future on the Yellowstone and the Missouri river system may later play an important part in the plan for development of Missouri headwaters, and has been suggested as an item in the adjustment of existing rights.

##### 2. *Adjustment of Interstate Controversies on the Yellowstone Tributaries.*

Under recent legislation, there has been re-established the Interstate Compact Commission on the adjustment of controversies on the Yellowstone. The Commission is composed of representatives from the States of Wyoming, Montana, and North Dakota, and a representative of the United States Government (Mr. Clyde Seavey, Commissioner, Federal Power Commission). The Commission will undertake to reach an agreement that will provide for the equitable allotment of waters of the Yellowstone tributaries, namely, Big Horn, Tongue and Powder rivers, among the conflicting interests of the various States.

The large amount of information collected by the Commission under its previous authorization, and the very extensive additional studies that have been made in the basin in the last two years by the Corps of Engineers, the Bureau of Reclamation, the Soil Conservation Service, and the Forest Service jointly, and by some of the State authorities, should make it possible for the new Commission to reach its findings within the next two or possibly three years. Its decision will have a very definite bearing on the storage required for regulation of the principal tributaries and the effect on the Yellowstone and Missouri. On these items, the future development of the Region largely depends.

##### 3. *Coordination of the Plans of the Bureau of Reclamation and the Corps of Engineers for Development of the Yellowstone and Tributaries.*

The Corps of Engineers has recently completed a report on the regulation of the Yellowstone tributaries for flood control, navigation, and other purposes. This document is under review by the Board for Rivers and Harbors and has not yet been released.

The Bureau of Reclamation study of the best plan for development of the Big Horn and other tributaries is now well along toward completion but, as in the case of the preceding report, has not yet been released.

Although neither of these reports has yet been made public, it is understood that the respective plans advocated for storage regulation (particularly on the Big Horn) are not as yet in entire accord. This regulation will play a very important part in the adjustment of the water supplies of both the main stream and its tributaries and will be of vital interest to the Interstate Compact Commission in determining how the supplies are to be utilized and allocated between the divergent interests. Determining the best plan for the river will, in any case, require an adjustment of these two plans, and expediting their correlation will expedite the final report of the Interstate Commission. In the meantime, the final plan for the utilization of the waters of the Yellowstone (and also all of the upper Missouri with which the Yellowstone is intimately connected) cannot be definitely determined.

#### *4. Development of the Great Plains Tributaries.*

An economically justifiable general development of the relatively meager and notably erratic water supplies of the Missouri tributaries from the central part of the Northern Great Plains presents a very difficult problem. These streams, from the little Missouri to the Platte, include the Knife, Heart, Cannonball, Grand, Moreau, and Cheyenne rivers. Progress has been made toward proposed developments on the western border of this area, including the Angostura project, Rapid Valley-Pactola Reservoir, and Mirage Flats project. Other items in the program are the pumping projects along the main Missouri; on the eastern boundary of the area. The possible ultimate development in the Great Plains area lying eastward of the Black Hills still remains to be determined and presents, on account of the erratic flow of the streams and economic limitations, a very difficult problem. The final plan will depend upon the outcome of studies now being made, particularly by the Bureau of Reclamation and the Bureau of Indian Affairs.

Even the more attractive and feasible projects already taken up in the Great Plains program have involved a considerable allocation from Federal funds on a non-reim-

bursable basis. Future projects within the problem area in question will probably require even larger proportionate non-reimbursable allotments. The projects will probably not be justifiable on the basis of return from the lands directly affected, but must depend for justification on their bearing on the general readjustment of use for far larger contiguous areas.

#### *5. Early Determination of a General Policy Concerning Priority in the Use of Waters of the Missouri River.*

Recent studies have further emphasized the potential conflict between navigation and other uses of the Missouri main stem and its principal headwaters' tributaries. That an early determination of policy is imperative is made clear by the studies of the past two years.

The situation on the Missouri is not unique, but parallels that which has led to unending controversy on the Arkansas and on the Platte. On the Missouri, however, the downstream use is navigation instead of irrigation. Briefly, construction of Fort Peck Reservoir was undertaken for the purpose of regulating the discharge of the Missouri for navigation, by providing an estimated discharge of 30,000 c.f.s., during the navigation season at Yankton, South Dakota; training works were also to be constructed on the main stem below that point. Both the reservoir and the training works have been constructed, and it has been found that the training works have produced more beneficial effects than had been anticipated but that the regulated supply at Yankton during a dry cycle such as that of the last ten years will be only about one-half that originally estimated (17,600 c.f.s., as compared to 30,000 c.f.s.).

Further, other potential uses of the river now planned show vastly greater probable depletion of its flow than was anticipated when the Fort Peck project was initiated as an aid for navigation. Among the proposed uses that would further decrease the diminished water supply available for navigation are the possibilities of irrigation of many thousand acres in the headwaters' tributaries above Canyon Ferry, possible irrigation of some 500,000 acres below Canyon Ferry and above Fort Peck Reservoir, and the development through reconnaissance of a potential irrigable area of over 1,700,000 acres below Fort Peck, from part of which the return flow would not discharge back into the Missouri drainage.

While it is not to be anticipated that all of these potential areas will ever be irrigated, it is probable that a substantial percentage thereof may be utilized, providing a firm title to an adequate water supply can be secured. All such developments would be in direct competition with navigation, as would further development on the Yellowstone and tributaries, and many smaller developments throughout the upper basins, already proposed by Montana and Wyoming but not included in the above list.

The Federal and State departments now engaged in the study, construction, or operation of certain types of development are well justified in striving to protect their rights to the use of water, until such time as a general policy covering the limited supply is established by mutual agreement or by court decision. The Corps of Engineers, for example, has been placed, by Act of Congress, in charge of construction operation at Fort Peck Reservoir primarily for navigation and is not in a position to accede to the utilization of Fort Peck water supplies for other purposes detrimental to navigation. The Bureau of Reclamation, in the same manner, cannot be expected to refrain from operating or developing its projects in the upper basin to protect navigation on the lower stream.

Definite action must, therefore, be taken to apportion equitably the water supplies that are available or that may be made available through further storage. The determination of this policy ties in directly with the work of the Yellowstone Compact Commission and with the adjustment of the storage and development programs of all Federal and State agencies.

Navigation on the main stem will be but little affected by any development that can be made in the central Great Plains tributaries east of the Black Hills.

#### 6. Adjustment of Differences in the Platte Basin.

The supplies available in the basins of the North and South Platte have been intensively utilized for many years, both by natural diversion and through the construction of extensive storage, particularly on the North Platte. Conflicting claims have led to many court proceedings and there is now pending the important litigation between the States of Nebraska and Wyoming, involving also the State of Colorado, regarding the uses of waters of the North Platte. Unsuccessful attempts have been made to have this

litigation held in abeyance, pending a thorough investigation of the water supply and the reaching of an agreement by stipulation or compact. These efforts have been unsuccessful, and the case is proceeding in the courts. Unless there is a change of policy, which does not now appear probable, the ultimate adjustment of water supply from the North Platte will depend on the outcome of this case.

Construction of the Kingsley Dam on the North Platte in connection with the Tri-Counties Public Power & Irrigation District should go far, however, to adjust the flow of the North Platte and main Platte below that point and to facilitate adjustment of conflicts that might arise on that part of the stream.

#### 7. Further Studies of Trans-Mountain Diversion from the Colorado.

Large trans-mountain diversions from the Colorado River basin will be made available through the construction of the Colorado-Big Thompson project, and other diversions from the same source have been studied; these include possible trans-mountain diversions into a portion of the basin within Wyoming. The ultimate conclusion of these studies is still to be reached, but it is probable that any additional diversions will be smaller than that through the Colorado-Big Thompson project. All of these diversions, if in compliance with the Colorado River Compact, deserve careful study.

#### 8. Regulation of Multiple Uses on the Republican and Other Kansas River Tributaries.

Multiple-use projects on the upper Republican River have recently become involved with storage long proposed for flood protection of the Kansas Cities--one of the most important flood protection projects in the Mississippi River basin. Studies of the Kansas Cities' problem eventually resulted in the selection of large storage at the Tuttle Creek site on the Big Blue near its mouth, and at the Milford site on the Republican near its junction with the Smoky Hill to form the Kansas, to reduce the Kansas River floods within local levees of moderate height at the Kansas Cities.

Local opposition developed against the use of the Milford site, and the protestants proposed to move the storage upstream to Scandia, Kansas. Later, under studies authorized by Congress, the Scandia site was studied, but the Harlan County Reservoir, still farther upstream, was finally selected as a substitute for Milford.

The decision to locate the main storage on the Republican at the Harlan County site, in its turn, drew fire of local interests still farther upstream. These protestants advocated construction of a system of five or six reservoirs on the principal Republican tributaries above or to the westward of the Harlan County site. At first they advocated the abandonment of the Harlan County project in favor of the system of smaller storage reservoirs; later, they favored construction of a system of small reservoirs in addition to the Harlan County Reservoir.

Correlation of flood protection by the Harlan County Reservoir with irrigation downstream, and possible correlation of proposed upstream flood control storage with irrigation, are still under study. In fact, the entire development of the Republican is still under study and should be carefully analyzed, there being some doubt as to how far eastward irrigation is required, and will actually be utilized, under ordinary climatic conditions.

Further study is also in order to make sure that adding 4,100 square miles to the unregulated drainage area above the Kansas Cities by moving the reservoir upstream from the Milford to the Harlan County site will not unduly reduce the protection to the Kansas Cities. It has been determined that this move can be made, but further review may be in order.

Elsewhere in the Kansas basin--on the upper tributaries of the Smoky Hill, Solomon, and Saline--irrigation possibilities are being studied by the Bureau of Reclamation and by the Corps of Engineers in connection with a review of its original "308" Report. Final plans for utilization of the upper reaches of these streams will depend upon the outcome of the studies.

9. *Flood Control and Multiple-Purpose Projects on the Lower Missouri Tributaries.*

Construction of an extensive system of storage projects on the lower Missouri tributaries has been considered, from time to time, for local flood control and for the regulation of the Missouri and Mississippi for navigation. In addition to the Milford and Tuttle Creek reservoirs already mentioned, the group of reservoirs selected included the Osceola, South Grand, and Pomme de Terre projects in the Osage basin; the Chillicothe in the Grand River basin, and the Richland and Arlington reservoirs in the Gasconade basin. In connection with the Gasconade reservoirs, there is an excellent

opportunity for development of power. Irrigation is not involved on these lower Missouri tributaries.

Local flood regulation is particularly needed on the Grand, and the Chillicothe Reservoir would alleviate a very serious condition that has been brought about by the uncoordinated plans of various drainage districts.

10. *Determination of the Extent of Pollution and its Abatement on the Lower Missouri.*

Serious pollution exists at various points along the Missouri River, resulting chiefly from manufacturing and packing house waste and from sewage. The extent of pollution and its direct effect on health in general, and particularly on the water supplies of various communities, cannot be determined without a study that has been proposed and may be undertaken at an early date. The section of the river to be included in this investigation extends from Sioux City to the mouth. A preliminary reconnaissance would determine definitely what intensive studies are required and the best methods of procedure.

11. All States in the Region should immediately pass laws for the purpose of controlling and regulating the use of artesian water. In those States that already have enacted such laws, proper procedure for execution should be developed.

12. Irrigation development in the Northern Great Plains should be provided primarily to increase the stability of farmers and ranchers already operating within a given area rather than to add new operating units.

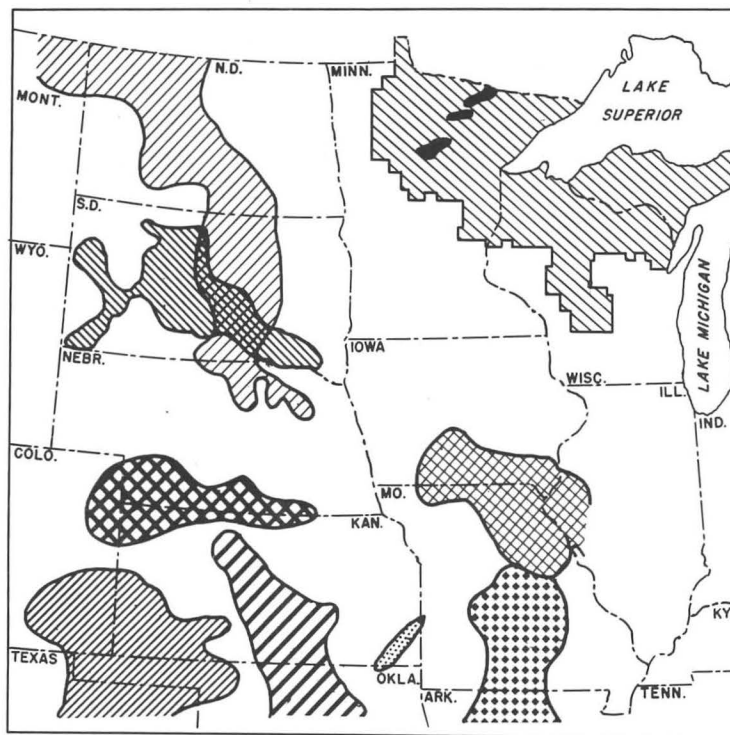
13. Appropriations should be continued to complete the Missouri River navigation project, in order to protect completed works, preserve temporarily stabilized riparian lands, and ensure early commencement of commercial navigation to Sioux City. (See number 5 above.)

Upper Mississippi Drainage Basins  
*Problem and Objective*

The principal problem involved in the upper Mississippi River drainage basins is the development of the most economical plan for the removal of flood flow hazards from the stream valleys of the tributaries of the upper Mississippi. In the sub-humid and semi-arid areas, careful consideration should be given to possibilities of including in the flood control works, facilities for making irrigation water available to areas where agriculture without water is hazardous and

## SPECIAL PROBLEM AREAS

### NATIONAL RESOURCES PLANNING BOARD REGION 6



#### LEGEND

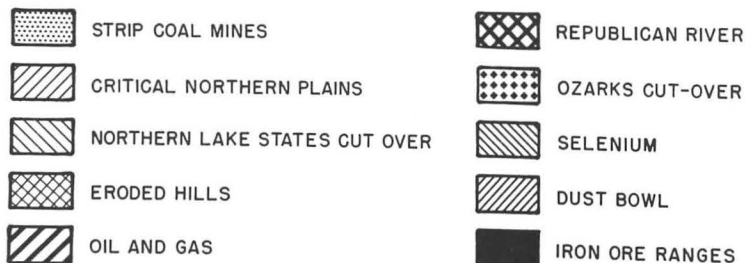


Figure 2. — Special Problem Areas

Figure 2 presents the generalized boundaries of several special problem areas found in Region 6. Such a map must be used with caution, because not every acre within a given problem boundary is necessarily affected. The selenium area, for instance, appears to cover about a quarter of

the State of South Dakota. As a matter of fact, within that boundary are many acres free of selenium. Therefore, the boundary as shown simply means that within its borders is to be found such selenium infected lands as are known to exist.



uncertain. This plan should take fully into account the possibilities of flood flow reduction that may result from the ultimate and most economically desirable plan of land use and management. It should also take into account possibilities of flood flow reduction through the installation of small upstream engineering structures useful for the protection of the upper reaches of each basin. It should also include an analysis and determination of the extent to which large water storage or detention projects located in the lower reaches of the tributaries may be beneficial or objectionable locally as compared to any alternate water plan for these tributaries.

#### Recommendations

1. The important need of the Red River of the North drainage basin is the conservation of the available water supply and the regulated release of the conserved water for beneficial use as domestic water supply for the Red River cities and for the dilution of wastes. In this basin, a reasonably comprehensive water plan was prepared in 1936. Since that time, further investigations have been made, additional information is being collected, and the need for other quantitative data has become apparent. A complete review of the water plan for the Red River of the North should be undertaken in the light of new information and a further understanding of the problems.

2. Treatment of domestic and industrial waste waters to the greatest extent economically justified for the maintenance of water quality in the Red River and its principal tributaries.

3. Reasonable provision for the control of flood waters to reduce flood hazards for both urban and agricultural lands in the Red River basin.

4. In the Rainy River basin, water planning must be focused on the best adjustment of lake levels as between the conflicting uses of water power development in the vicinity of International Falls and the preservation of relatively stable lakes for recreation and wildlife.

5. In the Souris River basin, the problem is similar to that of the Red River of the North, except that the major object of water conservation is related to the interests of wildlife, with, however, due regard for urban requirements. A second consideration involves utilization of conserved water to the extent possible for supplementary ir-

rigation.

6. In the upper Mississippi "D" basin, the general needs are further detailed adjustment of the upper Mississippi navigation project to other land and water needs in the area adjacent to the Mississippi River; reduction of flood hazards with respect to the flood plains of the tributary streams in the region; the best adjustment of other water needs and uses to projects for the conservation of wildlife along the Mississippi itself; and a further study of the problem of the main Mississippi Valley from the public health aspect, to the end that the re-entry of malaria into this region may be avoided to the greatest extent possible.

7. The important needs in the upper Mississippi "E" basin involve a satisfactory completion of the upper Mississippi navigation project through and below the St. Louis industrial region; the completion of adequate flood protection for this region against the maximum expected floods of the Mississippi River; the development of recreational uses for the pools of the Mississippi navigation project; and an adjustment of the operation of this project in the best interests of wildlife.

With respect to the smaller streams in the upper Mississippi "B" basin, the water plan should provide adequate measures of flood flow reduction on the Salt, Fehus, and similar streams of northwest Missouri. For the Meramec River, the ultimate water plan will revolve around the best use of this basin for recreational facilities related to water. As a corollary, this will involve considerations of wildlife conservation, reduction of flood frequency; the reduction in the number of silt laden minor floods; the steps necessary to preserve the quality of the Meramec River water for recreational uses, and to insure a safe supply of satisfactory drinking water for both the recreational population and the smaller communities of the basin.

8. Full consideration should be given to the conservation and protection of wildlife and the development of water for recreational use in all basins of the upper Mississippi River.

#### Land Use

##### The Problem

Region VI is first and foremost an agricultural region; therefore, its primary concern must be with proper land use. Land must be classified by soil type, slopes, etc.,

and its use must then be adjusted to such natural phenomenon as floods, droughts, and winds, and such man-made forces as changing food habits and oscillating prices. When all these factors are thrown into balance, there is some ideal use or uses to which every acre in the Region may be assigned, such as farming, grazing, forestry, recreation, or wildlife.

The dominant land use in Region VI is agriculture and live stock raising. Many Federal and State agencies are now planning with local representatives for the best use of farm land. The leading agencies in this field are the Soil Conservation Service of the Department of Agriculture, the Bureau of Reclamation in the Department of Interior, the Farm Security Administration, and the agricultural colleges, and their experiment stations and extension services.

The program of the Soil Conservation Service will illustrate one important phase of this work. That agency is concerned with the prevention of wastage of soil and moisture resources on farms, grazing, and forest lands, and the restoration of a permanent stabilized agriculture. Its program of action includes: cooperation with soil conservation districts, acquisition and management of submarginal lands, operation of demonstration farms, development of farm forestry, development of water facilities, and studies of flood control (in cooperation with the Corps of Engineers).

Because of its importance in land-use planning, we present a brief summary of its work. It has been found that land planning best begins where plans must eventually be applied--with the farm and farmers. As a result, the soil conservation district, organized under State law, is the primary land-use planning unit. In 1940, there were 3 such districts in operation in Wisconsin, and 10 others organized or contemplated. In Iowa, none was in operation, although 24 were contemplated or had been partially organized. In North Dakota, South Dakota, Nebraska, and Kansas, the record was 49 districts in operation. The following table presents the figures for the States of the Northern Great Plains:

## SOIL CONSERVATION DISTRICTS

State	Districts	Original Acreage	Acres Added	Present Total Acreage
Nebraska	18	1,956,559	191,199	2,147,758
North Dakota	10	4,037,382	391,680	4,429,062
South Dakota	10	1,651,444	491,693	2,143,137
	38	7,645,385	1,074,572	8,719,957

Information by Soil Conservation Service, Lincoln, Nebraska.

As stated above, many new districts are planned within the next two years for Wisconsin and Iowa (Missouri now has no district law). In the Great Plains States of the Dakotas and Nebraska, 15 districts have been organized in the past fiscal year (July 1, 1939 to June 30, 1940). "Based on this rate of increase, it is anticipated that approximately 150 districts will be formed (in these States) during the next six years." This will mean a growth for these States of districts to an average of 600,000 acres each (\$36,761 at present). Eventually, when these States are completely organized, there will become 330 soil conservation districts.

A second activity of the Soil Conservation Service, since it was assigned the task in 1938, is the management of the submarginal land projects of the Department of Agriculture. The figures for the three Northern Great Plains States are:

State	Number Projects	Acres Included	Acres Purchased	Acres transferred from Public Domain
N. Dakota	5	2,985,700	978,373	—
S. Dakota	5	1,998,800	798,718	52,550
Nebraska	1	510,080	131,022	—
	11	5,494,580	1,908,113	52,550

The figures and proposed planned use for purchases in Minnesota, Iowa, and Missouri are:

State	Number Projects	Acres included	PURCHASES		
			Crop-Land	Forest Land	Pasture & Hay Land
Minnesota	2	101,119	16,000	65,000	20,119
Iowa	1	1,902	302	400	1,200
Missouri	3	14,196	3,196	5,000	6,000

State	Crop-Land	PLANNED USE		Total
		Grazing	Forestry, Recreations, Wildlife	
Minnesota	—	—	101,119	101,119
Iowa	840	700	360	1,900
Missouri	—	5,760	8,436	14,196

Additional purchases of both new lands and lands to complete adjustments in existing project areas need be made. In the Great Plains, several millions of acres are now either county owned, or subject to tax deed. The programs of the Soil Conservation Service contemplate, appropriations permitting, the acquisition of several hundred thousand of these acres.

Additional activities of the Soil Conservation Service include operation of demonstration farms, supervision of farm forestry,

and Civilian Conservation Corps work, and the special assignments of programs of water facilities and of flood control by small engineering works on the upper reaches of watersheds. For lack of space, we confine our description to the water facilities and flood control activities. Under a special water facilities act, the Soil Conservation Service constructs water facilities for livestock and farmstead use. The consequent irrigated areas vary in size from a family garden to a group facility serving fifteen farms. Such a program is designed to furnish needy families with supplemental aid so long as the total cost per facility is less than \$50,000. In the Plains States of the Dakotas and Nebraska, 14 projects have been approved for planning, 11 for operation, and 25 demonstration counties have been selected.

More important than the water facilities work, at least in its potentialities, are the flood control activities of the Soil Conservation Service in those watersheds authorized by Congress. As the Lincoln office of the Soil Conservation Service reports, "The ultimate objective of flood control activities in field operations in which a remedial agricultural program for the control of floods is put into practice on farms located in flood source areas of watersheds having substantial flood damages and erosion loss. The program is designed to complement downstream remedial measures put into practice by the War Department." To date, 36,190 square miles have been examined by the Lincoln office, and surveys recommended in nine watersheds. The Milwaukee office reports for Minnesota, Iowa, and Missouri: One detailed survey completed, 4 detailed surveys in progress, 12 preliminary reports completed and 3 preliminary surveys in progress. While this activity (as well as the water facilities program) is a water program, it intimately and primarily affects land use and, in addition, may be of material assistance in reducing "erosion, runoff, and flood damage".

*Urban Land Use.* In addition to rural land-use planning, there is the problem of urban land use. One of the greatest economic wastes in the United States is needless depreciation of urban land values, largely the result of uncontrolled use. These losses occur most often in the "rurban" fringe and at the interior border zone where business and commercial districts join the older residential areas. Fortunately, the more

progressive municipalities are attempting to meet this problem through zoning ordinances and zoning and city planning commissions. A vigorous educational program, however, is needed in every community to bring to the people the full realization of the appalling losses resulting directly from haphazard development and the need and opportunity for avoiding such losses in the future. A new concept of the urban land-use pattern is rapidly emerging.

#### Objective

To attain a stable population and a balanced economy in the Missouri Valley, and as a complement to the water plan, there must be developed an adequate land-use plan. By that combination of plans can the twin goals of a maximum of economic security and a minimum of relief expenditures be approximated. Such a plan must eventually show for every rural acre of the Region its proper use, be it for cropping, grazing, mining, forestry, or recreation. Likewise of nearly equal importance, economically and socially, is the formation in every urban community of an adequate pattern for the most advantageous use of every parcel of land within or near the corporate limits.

#### Recommendations

The objectives of a sustained land-use program can generally be attained through one or more of the following recommended devices or methods:

1. Creation of soil conservation districts. (All the States in the Missouri River region except Missouri have district laws.)
2. Creation of county and community planning committees. (Used effectively in Minnesota and Missouri in cooperation with county land-use committees.)
3. Enactment of county zoning laws along the lines of the Wisconsin law. (This law is especially helpful where land is classified for agricultural, forestry, or recreational use. Thus, in rural problem areas, land use can be stabilized and savings made in expenditures for public services.)
4. Acquisition by counties (or States) of tax deed lands.
  - a. such acquisitions should be classified into agricultural and non-agricultural,
  - b. non-agricultural lands should be withheld from sale and devoted to such use as may be justified by good conser-

vation practice,

c. agricultural land should be offered for sale or lease under restriction as to size of farm unit and type of use.

5. A program of education in proper land use should be extended by agencies of the Department of Agriculture (ex., Soil Conservation Service) and the extension services of the land-grant colleges.

#### *Specific Recommendations*

1. Continued organization of new conservation districts. (See item 1, above.)

2. Continuation of the Civilian Conservation Corps' camps to assist in the work of soil conservation districts and in reforestation and recreational developments.

3. Retirement of all selenium lands from agricultural use until experiments of agricultural agencies discover safe ways of utilizing them.

4. Continuation of water facilities program within the broad limits as now defined.

5. Expansion of flood control work of Soil Conservation Service as an integrated part of the drainage basin work of Federal agencies.

6. Shift in use of the rougher lands of southern Iowa and northeast Missouri from intertilled crops to hay and pasture. This will require a combination of education and State and Federal assistance.

7. Completion of soil maps for every county.

8. Reorganization of local governmental units, especially (a) school districts and (b) counties and townships, in order to reduce the cost of local services without affecting their quality. (Applicable primarily in problem areas in Northern Great Plains, cut-over area and Ozarks.)

9. Organization of official county planning boards to cooperate with the county agricultural land-use planning committees.

10. Relocation and rehabilitation by the Federal Government of populations deprived of their homes and livelihood by land-use adjustments. This can be done in several ways. One is to move people to new agricultural sites. Another is to create for them new occupations in local industries and handicrafts.

11. State and Federal aid to assist tenant farmers to acquire farms, providing the purchase program appears to be feasible and consistent with a proper land-use plan.

12. Protection of agriculture by the Federal Government from possible disarrang-

ing effects of war and preparations for war. This will require the determination of the use capability of land. With such an inventory, we will know where "expansion of the Nation's agriculture (for special war demands) can be made with the least hazard".

This information set to an action program can assist in avoiding a repetition of the irreparable damages done to soil resources during the first World War.

13. Strengthening by adequate State appropriations of the coordinating functions of State planning and resources boards.

14. To meet the urban land-use problem, we recommend:

a) Control of land use by all municipalities within and beyond city limits,

b) Extension of land ownership by municipal corporations to areas beyond city limits,

c) Adjustment of corporate limits to include those fringe communities that are actually a part of the city as an economic and social unit.

d) Creation of active planning and zoning commissions in every urban community. One function of these bodies should be the planning of their communities in accordance with present world happenings and conditions.

#### *Specific Recommendations for the Great Plains*

Implementation of the recommendations<sup>6</sup> of the Northern Great Plains Committee, which include proposals for:

1. Readjustment of the land-use pattern through

a) irrigation, where economical  
b) adjustment of dry-land farming practices

2. Changes in farm pattern  
a) increased size of operating unit

b) return of land to grass  
c) increased livestock farming to replace cash grain

d) development of drought and pest resistant crops

e) integration of town and farm economy

3. Coordination of all interested State and Federal agencies.

<sup>6</sup> These are found in:

The Future of the Great Plains, a report of the Great Plains Committee, 1938, and

Northern Great Plains, a Report of the Northern Great Plains Committee, 1940.

## Minerals and Energy Resources

### The Problem

Mineral production is an important source of income in at least five of the States of Region VI. Important commercial minerals include iron ore, oil and gas, lead, zinc, and coal. Other minerals, some of minor value and some of potential value only, are lignite, manganese, tiff, and tin.

Two problems exist in mining areas. The first is that of conserving the supply. The most notorious wastages have occurred in the natural gas field. That product has been blown into the air, or stripped of its natural gasoline, or burned for illumination of the fields, or burned to make caron black. None of these is an economical use. Thus, there is an imperative need for enforced conservation of all precious natural resources, particularly gas and oil.

The second problem arises when a new labor saving device in mining antiquates old processes, or when other developments reduce significantly and permanently mineral production in established fields. The first of these is found on the iron ranges, the second in the coal fields of this Region. In either case, the result is the same, namely, stranded populations. The problem becomes doubly serious because about the only alternate activity for these stranded people is on adjacent inadequate and often unfertile farm lands. In other words, the farm lands surrounding most of the mining areas are not capable of furnishing an adequate living. Therefore, the second problem becomes one that can be met in only one of two ways: creation of new industrial activities or migration of unemployed people.

### Objective

The objectives in a program of use of mineral and energy resources must include: (a) elimination of waste in mining and processing, (b) research in new methods and processes for further use of minerals and their by-products and (c) long-range plans for rehabilitation of unemployed mine workers and supplemental part-time farming or other employment. Thus, not only will employment be increased or stabilized, but the time of exhaustion of these resources will be greatly postponed.

### Recommendations

1. Reservation of certain minerals for

exclusive war use:

2. Development of pilot plants to explore war uses of manganese, tin, and tungsten.

3. National and State legislation to prohibit waste in mining of all minerals, especially oil and natural gas.

4. A Federal program of relocation and rehabilitation of stranded populations of the southern Iowa coal areas, Mimesota iron ranges, and tiff mining area of Missouri.

### Industry

#### The Problem

Fundamentally, the States of Region VI are food, fiber, and mineral producers. Yet, they have some important manufacturing industries. With the exception of iron ore, every raw material receives some processing before it finds its way as a finished product into outside markets. These are the kinds of industries that logically develop in a raw material producing area. In addition to those already in operation, Region VI has reason to anticipate the growth of other manufacturing, such as processing of raw materials, wastes, and by-products now undeveloped; defense industries and national or "footloose" concerns seeking new locations. The advantages of the mid-continent area for defense and peacetime industrial location are many. It has a large market and is near large markets. It has labor supplies, free capital, rae materials, and adequate transportation facilities.<sup>7</sup> For defense industries, Region VI is a most strategic choice because of its interior location. In short, b, industrial development along economic lines, a great stride forward will be taken in the reiteration of a balanced economy.

### Objective

The industrial objective of the Missouri Valley Region comprehends the economical development of its resources and stimulation of private initiative and investment in industrial enterprises in order to create a balanced economy in the Valley. Agriculture is this Region's basic industry, and it is reasonable to assume that the Region's major industrial activity, apart from certain defense industries, must generally be based on the processing of farm and mineral products and by-products. Continued research to un-

<sup>7</sup> This is not to say, however, that the relative level of freight rates into and out of Region VI is equitable. See item V, below.

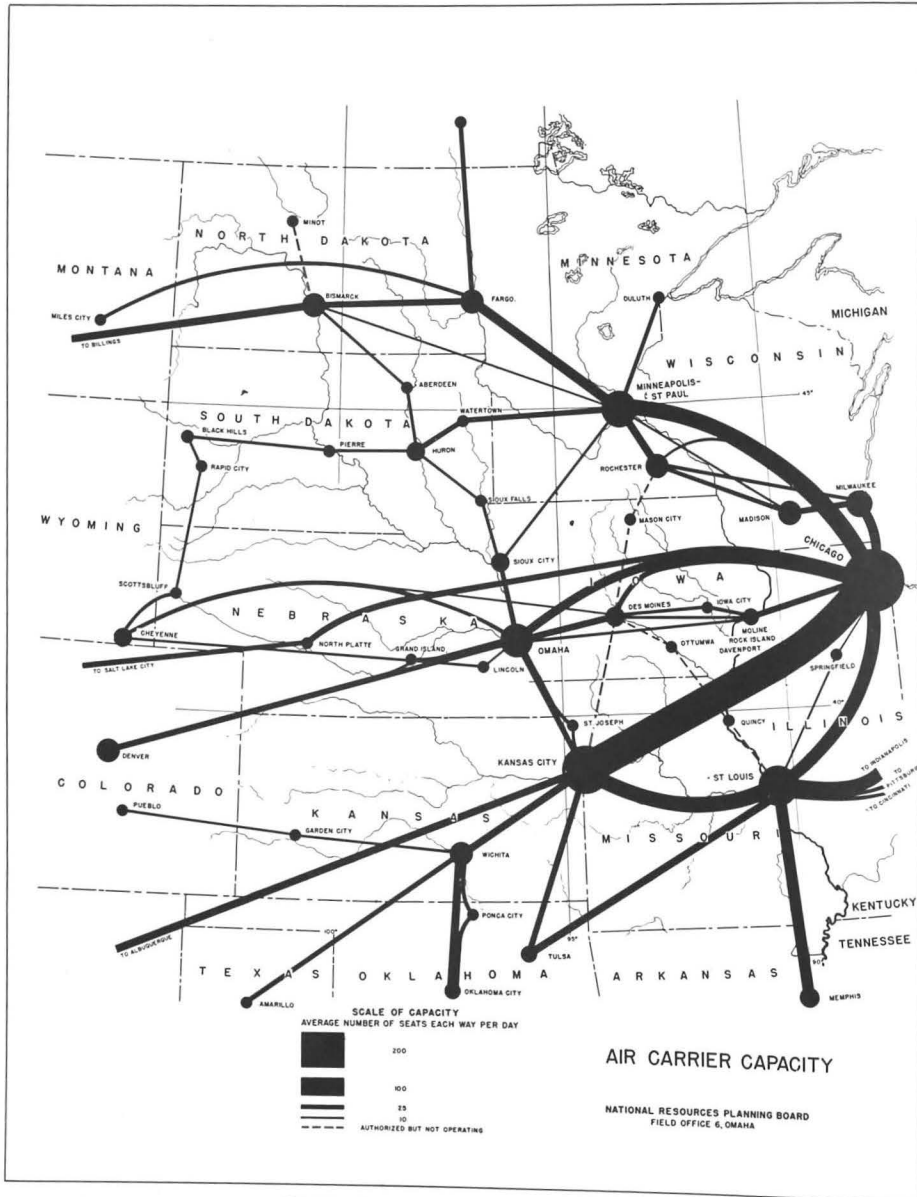


Figure 3. — Air Carrier Capacity

This Figure shows the average carrying capacity of transport planes operating in and through Region 6. The width of band on the map shows the average daily one-way

seating space available. Altogether, nine licensed companies furnish this service.

cover most economical methods of processing and new uses for farm products is desirable.

#### Recommendations

1. Industrial surveys in every State of the Region.
2. A State agency, similar to the Minnesota Research Institute, to investigate industrial opportunities, to encourage prospective industries by careful investigations of technological processes, costs, markets, etc. (The Minnesota Research Institute is located at the University of Minnesota, and operates closely with the Minnesota Resources Commission.)
3. A State supported agency to conduct research in new uses of industrial minerals, new processes, etc.
4. Analysis by State and regional offices of the industrial advantages of this Region for the location of defense industries.
5. Encouragement of industrial location in those areas of unbalanced economy.
6. Establishment of technical schools to train technicians needed by existing and probable new manufacturing establishments. (This program could be materially assisted by the Office of Education, and aided by both the National Youth Administration and interested industries.)
7. Establishment of a system of apprenticeship in industries using skilled employees. Such a system should be developed through the joint efforts of labor, management, and the public schools.

#### Transportation

##### The Problem

In the history of the United States, the agencies of transportation have played an important part. Wherever there were good seaports, or intersecting rail and water, or railway junctions, there were established our cities and towns, and around them developed the countryside. Thus, the sea and canal made New York City and opened the Lakes country to development. Later, the railroads made Chicago and other midwestern cities and opened the prairies and plains to settlement. In truth, because of the dominant position of the railroad, the internal history of the United States from 1850 to 1920 can be labeled the "railway age".

Since 1920, the picture has changed; the internal monopoly of the rails has been broken. The waterways have again become common

carriers, and two new carriers have arisen—the motor bus and the airplane. One consequence has been to free cities and regions from domination of the railroad. A competitive carrier system cannot "make or break" towns and industries. On the other hand, the years since 1920 have produced their problems in the form of cut-throat competition, wasteful duplication of services, confusion as to the ultimate role of each type of carrier, and debilitation of the railroad. Truly, the transportation future of the Region (and of the United States) needs to be planned.

At present, many agencies are planning for our future transportation needs, as in the highway planning surveys of the State highway commissions. The Public Roads Administration is assisting in this work. Plans also have been prepared to deepen the channel of the Missouri River from Sioux City to St. Louis from 6 to 9 feet. The future of the airways is the mutual concern of State officers and the Civil Aeronautics Authority. These agencies have plans and programs for airport expansion and development. These are equally concerned with the proper training of civilian pilots.

##### Objectives

The shipments out of the Region of bulky agricultural and heavy mineral products, existing and potential, require careful planning in order to provide the most effective and economical transportation facilities. At present, the unfavorable transportation rates that penalize this Region are the major transportation problem the Region faces. The question of joint rates among rail, highway, and inland waterways transportation is also vital. Insofar as capacity to handle the agricultural products of this Region is concerned, present facilities are generally quite adequate. A well planned highway program of low-cost hard surfaced road construction will make the local markets available on a year round basis at a minimum cost to the users. Low-cost surfaced roads are essential to the farming and range areas of this Region. Lower cost transportation in all forms would be a factor in the development of potential mineral resources, in the encouragement of industrial expansion, and in lower marketing costs to the farmers. Furthermore, broad, channelized, divided, super transcontinental highways and parkways, with frequent turnouts, lookouts, and rest and recreation areas, will provide for easy,

fast, and safe transport for troop supplies and all sorts of equipment for defense both in war and during times of peace for maneuvers and training purposes. Especially is the Region well situated for development of airports and airplanes; that is, favorable weather and terrain and great distance encourage private as well as commercial flying.

#### Recommendations

1. Increased use of new articulated passenger equipment for rail transportation.
2. Readjustment by the United States (Interstate Commerce Commission) of rail freight rates to eliminate unjust discrimination against goods produced in the midcontinent area and marketed outside the Region.
3. Construction of four lane divided highways, (a) as approaches to cities of 50,000 and over, and (b) for cross country traffic.
4. Construction of by-pass roads around all towns of 50,000 and over.
5. Complete an economical program of farm-to-market roads and elimination of unnecessary country roads.
6. Continued use of master plans for airport development, including restrictions and long-term option on surrounding territory.
7. Public assistance in construction of airports, provided their probable future use will make them self-sustaining.
8. Integration of airport plans with city and county plans.
9. Development of airplane industry so long as that development is consistent with existing industries and labor supply.
10. Continued studies of the Region to determine its facilities for airplane and airport development.

#### Education

##### The Problem

As settlement moved westward, the eastern pattern of public schools was successively duplicated, and under the stimulus of the Morrill Act, after the Civil War, the States of Region VI established many institutions of higher learning--universities, land grant agricultural colleges, and specialized schools of teacher training and mining.

Since the return of drought conditions in the 1930's, the Great Plains States have been obliged to re-examine from top to bottom

their entire educational structures. The question became: Could drought-stricken areas continue the traditional educational pattern? Was the program for higher education too ambitious, based as it was on an ever increasing and prosperous population? In all of the Plains States, these questions have been studied, and answers attempted. In the Dakotas, proposals have been advanced to reorganize and consolidate the public schools. In Nebraska, the State planning board has made several recommendations for reorganization of its institutional program. These include proposals to restrict the educational programs of the several teachers' colleges, to eliminate duplication in the teacher training program, to convert one of the teachers' colleges into a "State Technical School", to strengthen the high school curriculum, and to enlarge the rural school district.

##### Objective

An essential to the preservation of democracy and intelligent planning is an adequate system of public education. The objective in an educational program is to develop adequate facilities available to all regardless of economic status. To accomplish this objective, unnecessary duplication of facilities and curricula should be minimized or eliminated in the existing set-up and avoided in future development. Frequent self-appraisals are necessary to insure that the current offerings of the secondary schools and schools of higher education are designed to prepare young people for the opportunities that will be available. Each State should develop an integrated educational program in which each unit from the one-room school house to the individual institution of higher education has a vital part to perform.

##### Recommendations

1. State-organized system of education, especially vocational training, for all citizens, young or old. Such a program is essential to the rehabilitation of persons caught in problem areas.
2. A State-wide survey by each State of all levels of the education program to eliminate unnecessary duplications in facilities and curricula and to secure greater efficiency per dollar spent. (See the Nebraska Institutional Survey).
3. Reorganization of the school structure in the special problem areas.



4. Development of extension instruction for continued adult education.

5. State and Federal aid to schools in problem areas too poor to finance an adequate program. (The principles contained in the New York Plan of Equalization should be considered for the Northern Great Plains States.)

## Recreation

### The Problem

Recreation, formerly the prerogative of kings and nobles, is now an essential part of every man's life. In earlier days, recreational areas existed naturally and usually close at hand. One could fish, hunt, boat, or roam in some nearby wooded stream or lake area. Today, recreational areas are few and too often inaccessible to large population centers. In the more level sections (and generally in these areas are to be found the population centers), almost all of the land is in farms. The percentages of agricultural lands in the Great Plains range from 95 to 75 percent of the total area; the extremes in the Region range from 97 to 63 percent. Thus, in large portions of this Region, practically every acre is privately owned and devoted to some form of agriculture. In the meantime, an ever larger portion of the people in Region VI are to be found in urban centers. The net result has been to deprive many of them of every form of natural outdoor recreation, unless facilities are provided by local, State, and Federal agencies.

For some years, State park commissions and the National Park Service have been cooperatively planning and developing recreational facilities, largely with Civil Conservation Corps' labor. As the 1940 *Yearbook of the National Park Service* says "This program is one of real conservation of both human and natural resources".

### Objective

Land planning for recreation, in addition to the preservation of outstanding scenic, historic, and wildlife primitive areas, should consider the recreation aspects of water courses and water projects. Reservoirs for navigation, flood control, power, and irrigation have varying potentialities for recreation; these possibilities should be evaluated during project planning. To realize the maximum of recreational values in the Region, there must be close coopera-

tion among the several park and planning agencies, namely, the National Park Service, the State park and conservation commissions and the city and county park boards. Among the more recent recreational facilities are the scenic overlooks, wayside rest areas, and parkways established on important highways by the State highway commissions and the Public Roads Administration. This new recreational resource should be expanded and carefully planned in order to serve further the recreational needs of the Region. Working in close harmony, all these agencies can accomplish the objective of a happier and healthier citizens living in a finer land.

### Recommendations

1. Acquisition by counties, States or Federal Government of all outstanding scenic areas, scientific, wildlife, and historic sites.

2. Establishment by counties and States of vacation areas within 200 miles of population centers as camps for children and family groups.

3. Construction by States and Federal Government of parkways and trailways.

4. Provision of public beaches and water front developments.

5. Establishment of day-use facilities including a playground within one-quarter of a mile, playfield and recreation center within half a mile to one mile, and a sizable park within two miles of each resident of a metropolitan or urban region. Informed opinion recommends a minimum recreational acreage of not less than 10 acres for each 1000 persons living within a municipality.

6. Protection of highways used extensively for pleasure travel by one or more of the following methods: Acquisition of wide right-of-way; control or use of adjoining lands by zoning, elimination of roadside advertising; grading for safety and for erosion control and planting in harmony with adjoining countryside; provision of wayside rest areas, safety turnouts, and parking overlooks.

## Housing

### The Problem

The type and kind of places in which people live have been left entirely to the chance combination of taste and economic circumstances. In fact, because housing relates to land, its development has been particularly guarded against public interference and guidance. Until the first World

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4. Provision of public beaches and water front developments.

5. Establishment of day-use facilities including a playground within one-quarter of a mile, playfield and recreation center within half a mile to one mile, and a sizable park within two miles of each resident of a metropolitan or urban region. Informed opinion recommends a minimum recreational acreage of not less than 10 acres for each 1000 persons living within a municipality.

6. Protection of highways used extensively for pleasure travel by one or more of the following methods: Acquisition of wide right-of-way; control or use of adjoining lands by zoning, elimination of roadside advertising; grading for safety and for erosion control and planting in harmony with adjoining countryside; provision of wayside rest areas, safety turnouts, and parking overlooks.

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### The Problem

The type and kind of places in which people live have been left entirely to the chance combination of taste and economic circumstances. In fact, because housing relates to land, its development has been particularly guarded against public interference and guidance. Until the first World

War, housing in the United States was seldom the concern of public officials. As a consequence, there have arisen many problems and serious deficiencies in urban and rural housing. Many dwellings are inadequate, more are unsightly, and seldom are they planned with a view to a harmonious group. Unless restrained by zoning ordinances, one builds a single unit, a duplex, or an apartment--without regard to surroundings or the economic needs of the occupants.

Nationwide attention was given to the problem of housing when President Hoover told his White House Conference on Housing that 25 percent of the people of this country were improperly or inadequately housed. In recent years, several Federal and State agencies have tackled this problem from one angle or another. First the Resettlement Administration, later the Farm Security Administration, has concerned itself with rural housing. At present, the urban problem is the province of the Federal Housing Administration and the United States Housing Authority. The former is concerned with the certification of funds loaned for individual home construction, the latter with low-cost housing projects for the low-income groups, heretofore condemned to slum quarters.

According to present statistics, there is widespread evidence of underhousing in nearly all the cities of this Region. Assuming as the United States Housing Authority does, that 17.5 percent of all families are in need of housing, for the States of this Region 227,000 new structures should be built immediately. In the detailed work of housing planning, the work of the State planning boards should not be overlooked. For instance, the Iowa State Planning Board has made detailed housing surveys of several Iowa cities, setting out the areas for demolition and housing construction. In addition, it has produced an illustrative booklet, "The Forgotten House", that has attracted Nationwide attention. Further, much basic information already assembled on vacancies, disease, vice, crime, fires, and tax delinquency should be most valuable in many instances where there is immediate need of housing for defense industrial workers.

#### Objective

The objective of a housing program is to make available adequate housing facilities to all under-housed families, rural and urban. The accomplishment of this objective will require a combination of plans of both

public and private agencies to restore the economic balance of the Region and to assist in developing a complete housing construction program. Furthermore, the housing of the future may look altogether different. As the United States Housing Authority has already shown, the single housing unit is less economical than group housing. In fact, the housing needs of the future may only be realized by the creation of a new pattern of community life for both rural and urban areas.

#### Recommendations

1. Continuation and extension of the activity of the Federal Housing Administration, the United States Housing Authority, and the Farm Security Administration.
2. Studies by these and other research and planning agencies of ways and means of lowering housing costs.<sup>8</sup>
3. Studies by these and other research and planning agencies of new types of housing and housing materials designed to further new community patterns.
4. Further studies in the substitution of group housing for the present isolated farm family so typical of American rural communities.
5. Establishment of adequate city and county zoning laws to protect residential property values.
6. Correction, where needed, of zone areas to conform to present economic and industrial needs.
7. Enactment of laws by the States of Iowa, Kansas, and South Dakota whereby the United States Housing Authority may operate in these States.
8. Construction by Federal agencies of adequate housing for civilian employees moving to new defense industrial locations. This construction should be in conformity with local planning and zoning requirements and in accordance with the best principle of architectural city planning and engineering design.

#### Public Works and Public Works Programming

##### Public Works

##### *The Problem and Objectives*

There should exist at all times a reser-

<sup>8</sup> As a sample of the work done on housing, we attach the following bibliography of studies by the Iowa State Planning Board:

*The Forgotten House*

A Report of Progress, pp. 310-324, September, 1934.  
The Second Report, pp. 111-120, April, 1935.

voir of needed public facilities, the construction of which will not only preserve and develop our resources and raise civic standards, but which can be used to meet the distress of unemployment whenever significant numbers of persons find themselves thrown out of work. If planning in Region VI and the Nation accomplishes its objective of a stabilized economy, the only significant relief load will be that created by cyclical movements in business activity. Pending the realization of that objective, it will, of course, be necessary to plan public works operations to meet the larger problem of relief of needy persons, be that need created by drought, industrial decadence or change, or depressions. Of necessity, then, intelligent administration of such a program requires careful planning. In this respect, there have been developed plans and planning machinery on the part of public construction agencies.

*Recommendations*

1. Continued Federal assistance in public construction. Note that the following 545 applications were received in 1938 by PWA, but not approved because of lack of funds:

118 Schools	\$10,067,000
37 College and University Buildings	10,545,000
18 State Institutions	3,496,000
17 Hospitals	2,331,000
60 Municipal Buildings	8,876,000
20 Court Houses	5,466,000
56 Waterworks	3,805,000
32 Sewers and Sewage Plants	3,736,000
92 Highways - Streets - Bridges	40,604,000
76 Power Plants	6,640,000
3 Airports	254,000
3 Drainage	238,000
11 Irrigation	5,913,000
	\$101,971,000

2. Financing by revenue bonds of projects such as waterworks, sewage treatment plants, street improvements, school dormitories, power, irrigation, and drainage districts. For those States not now possessing revenue bond laws, we recommend the enactment of such legislation.

3. Legislatures in the drouth-affected Northern Great Plains area should be encouraged to enact laws similar to the act creating the Montana State Water Conservation Board, which act, among other things, provides for the issuance of revenue bonds pay-

able from revenue from sale of water. The construction of irrigation projects, supplying supplemental water, will probably be found the most helpful in the final rehabilitation and stabilization of entire communities in such areas.

*Public Works Programming*

*The Problem*

The traditional policy of local, State, and national governments has been to embark on public construction with but passing study of actual public need, scant consideration of the recurring expenditures that will thereby be incurred, and practically no thought as to the timing of such work. Thus, at times of high interest rates and construction costs we have built public structures not especially needed. About all that was certain was that the taxpayer had taken on a lifetime obligation of capital repayments and annual maintenance charges.

Such "planless" public construction cannot be countenanced longer. Every level of government from top to bottom must now study and outline its needs (planning), analyze its financial resources (budgeting), and consider the proper timing of public works (programming). Significant strides are now being made in public works programming. The Federal Government is committed to this policy. Several States, including Nebraska and North Dakota in Region VI, are now beginning a demonstration of public works programming on the State level. Certain cities (ex., Fargo, North Dakota) have already made careful studies. In short, planning seems to be coming to the area of public construction expenditures.

*Objective*

Concisely stated, the objective of public works programming is to require every public agency spending construction funds to program its operations in accordance with an accepted plan of development. This will mean that public needs and financial resources will have been interrelated into a rational public works program.

*Recommendations*

1. Mandatory State laws requiring the establishment of State machinery for public works programming.

2. Continued assistance to State and local public works demonstrations.

3. Continued Federal consultant service to States and local governments desiring to

undertake demonstrations.

4. Development by the Washington Office of the National Resources Planning Board of well considered and tested procedures for

programming on the State and local level.

5. Studies by the Washington Office of techniques by which proper timing of public works programs can be determined.

## PART III -- LOOKING FORWARD

### Regional Planning

Regional planning properly conceived is an intermediate step in over-all planning and, to be effective, is never completed. It is intermediate in that it has interrelations with State and local plans on the one hand, and national planning on the other. In its relation to State and local planning, a regional plan should integrate and correlate those of the smaller political units, should harmonize conflicts among them, lend strength to their ultimate operation. In its relation to national plans, a regional plan is similar to a State plan, it must be fitted and adjusted to conform to a harmonized national pattern. Many of the regional planning proposals must be nationally implemented.

Even more important, the planning function is never complete. Many persons think of national and State planning as a process of preparation of blue prints, which when finished, must be followed to the most minute detail. Aside from the fallacy of assuming perfection in architectural blue prints, such is far from the truth. The planning function is never finished. Our plans of today must be adjusted tomorrow in order to meet new conditions not known today. Thus, planning is a continuing and continuous task. Yet it is in no sense a meaningless sequence of change and hodge-podge adjustment. Planning objectives will change but slowly, if at all. The change will occur in the techniques for realization of planning objectives.

### Regional Planning Commission

If regional planning is to be continuous and effective, it needs to be implemented by a regional planning commission. Therefore, as a final recommendation, we urge upon the National Resources Planning Board, the State Planning boards, and related State and Federal agencies in Region VI the immediate creation of a Missouri Valley Planning Commission. It could be organized similarly to the drainage basin committees with representatives from participating State and Federal

agencies, or be composed of eminent lay persons, with a limited number of ex-officio members. Such an agency could assume and execute the formation of plan coordination to the end that this Region would attain the optimum economic and social stability.

### Future Possibilities

By coordination of all planning agencies --local, State, Federal--we shall solve the problems now confronting the people of Region VI. On the Great Plains will be wrought a new land-use pattern, one in which land and water are brought into proper balance, and by which the best of farming methods will be practiced. In this adjustment, new social and political institutions suitable to semi-arid agriculture will arise to replace present defective ones. Thus will the combined intelligence of our people bring a stabilized economic pattern to the Plains.

Similar changes will be brought about in other problem areas. We are learning, and we shall continue to learn, how best to utilize our timber and mineral resources on a conservative basis. Instead of stranded populations now subsisting on public aid, new pursuits will be developed for them. For example, at least a part of the unemployed in the Minnesota cut-over and iron range areas will be working in the new alpha-cellulose plants along Lake Superior. Some of the people of the Dakotas will be busy converting Dakota lignite into char, a material that has several important uses. No less important economic transformations will have been made in other areas.

In the more humid parts of the Region, especially in Minnesota, Iowa, and Missouri, significant changes will have occurred. The senseless soil exploitation of the past, evidenced by the amount of erosion that has occurred on the steeper slopes, will have given way to a conservative agriculture. Less intertilled crops and more pasture will characterize the landscape. Less tenancy and more home ownership will likewise be the rule. A new principle of farming will be

rule. A new principle of farming will be evolved, namely, to hand down a land of improved productivity to each oncoming generation.

The cities and towns of the future will also be changed. In addition to their present function of servicing the surrounding countryside, they will come to possess a second function. As industry migrates west, many urban places will see the rise of factories, thereby acquiring the prime facility for greater regional economic balance. With its great advantages of interior location, adequate transport facilities, and abundant raw materials, the possibilities for extensive development both of peace-time and of defense industries are excellent.

While the cities and towns are acquiring this new function, they will likewise be undergoing an outward transformation. Group housing available to all who cannot afford

single-unit facilities will rise on the site of the present slums. Cities will have their parks and boulevards; the "rurban" fringes will have been cleaned up and beautified.

Finally, for all there will be adequate educational and recreational facilities. Educational opportunities for young and old will exist. The educational pattern will have been accommodated to the needs of our people. Recreation will have assumed its rightful place in the social organization. Within economical distance of every urban center will be found attractive parks and playgrounds. Wherever nature has built an unusual beauty spot, it will be set aside for all time for the use of everyone.

Thus will planning assist in the realization of a land of stability, security, health, and happiness.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

MOUNTAIN STATES

REGION 7

DENVER, COLORADO

1940

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Report of the  
MOUNTAIN STATES REGIONAL PLANNING COMMISSION

Judge Clifford H. Stone,  
*Regional Chairman*

Harlowe M. Stafford,  
*Regional Counselor*

Paul L. Harley,  
*Assistant Planning Technician*



## F O R E W O R D

The National Resources Planning Board has requested that each of the nine regional offices of the Board submit reports for their respective regions, delineating the essential framework of a plan for the development and conservation of the resources of the region.

Pursuant to that request, this report presents the results of the efforts of the Region 7 Office, in cooperation with Federal, State, and local interests, to prepare such a plan for the Mountain States Region.

Conservation of resources does not mean abstinence from use or hoarding; rather, it means the wise and efficient use of our resources in the interest of the regional and national welfare, the avoidance of unnecessary waste in their development and utilization, and the safeguarding in economic health of the industries and population on which we rely for the development of those resources. It is the purpose herein to set forth for the Mountain States Region a plan for the development and conservation of its resources, keeping in mind this definition of conservation.

This plan, or rather, framework of a plan, does not presume to be a complete plan for the Region. A complete plan is a concept not yet attainable in the Mountain States Region. It does, however, endeavor to present the major objectives of regional development and to outline the patterns of action for the attainment of those objectives.

In the preparation of the material for this report, the regional office has had the advice and assistance of many agencies and individuals throughout the Region. At a regional meeting held in Denver on September 17, 1940, attended by representatives of State agencies of Colorado, New Mexico, and Wyoming, and by representatives of the many Federal agencies concerned in the Region, a preliminary draft of the regional plan was presented and discussed. Many valuable additions, revisions, and criticisms resulted from this meeting, and subsequently, many of those in attendance contributed material for and participated in the preparation of certain sections of the report.

Because of its regional nature, the plan presented cannot be of the specific or "blueprint" form that might be possible for a small area or individual project. It must be over-all, and emphasize the larger aims above those of a more minor and transitory character. Moreover, it must be flexible - an adjustable framework susceptible of modification from time to time as required to meet changing conditions and needs. Above all, it should be subject to wide review and criticism to the end that its progressive development may represent a harmonious blending of the considered judgments of all regional, State, and local interests concerned.

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PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
M O U N T A I N   S T A T E S

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**Summary of Objectives  
in the Regional Plan**

The framework of a regional plan, designed to meet the particular requirements for an integrated and balanced development of the resources of the Mountain States Region, is set forth in this report by (1) discussion resources and problems; (2) statements of objectives; and (3) recommendations of patterns of action. The general objectives that are treated as to detail and specific application in this report are as follows:

**I. Conservation and Development  
of Natural Resources**

Stabilize and develop water resources under comprehensive basin plans.

Conserve land resources and improve land usage.

Accomplish greater development and use of mineral resources.

Improve and expand recreational development.

**II. Expansion of Commerce,  
Industry, and Employment**

Investigate present and potential power markets.

Conduct surveys to determine present and potential manufacturing plants, outlets for finished goods, and analyses of the failure of manufacturing plants.

Promote Federal and State participation in institutes of research in the fields of business, engineering, and labor.

Encourage local manufacturing and industrial development that will provide off-season employment.

Complete timber surveys and initiate economic studies looking to greater use of native timber.

Encourage the establishment of marketing cooperatives.

Supply more manufactured articles for local consumption.

**III. Improvement of Facilities  
and Services**

Study and analyze transportation problems; develop and improve transportation systems and facilities.

Improve character of small town and sub-urban development.

Improve conditions of sanitation and health; abate stream pollution; and insure safe water supplies for towns and cities.

Improve living conditions by providing better housing for low income groups.

**IV. Development and Protection  
of Human Resources**

Establish State-wide and county-wide library systems.

Introduce more effective systems of vocational guidance and training.

Promote adult educational programs and extension courses.

Provide a more adequate program of outdoor and indoor recreation.

Establish rural and urban forums or planning groups.

Widen the sphere of influence of Boys' and Girls' organizations.

Continue and expand educational work in the Civilian Conservation Corps and the National Youth Administration.

Initiate studies looking to the further consolidation of rural schools.

**The Region—Its Characteristics,  
Resources, and Problems**

For the purposes of this report, the Mountain States Region may be defined as including Colorado, New Mexico, Wyoming, and portions of adjacent States. Statistical data, where given, represent the summation of figures for the three States only.

The Mountain States Region, lying on both sides of the Continental Divide, occupies a strip of land having a maximum width of about 480 miles and an extreme length of 960 miles.

Within it are included nearly 324,000 square miles or 11 percent of the total area of the United States. It contains many lakes, rivers, and small streams; gently rolling plains, valleys, and plateaus; forests, perennial snowfields; and numerous mountain ranges accentuated by towering peaks, many of which rise to altitudes in excess of 14,000 feet.

Prominent physiographical features are the long backbone of mountains and spurs running from the northwest corner of Wyoming diagonally southeast across that State and south through the central part of Colorado and New Mexico; the confused mass of ragged mountains and high plateaus covering much of the Western half of the Region; the great number of headwater streams and tributaries; and the great expanse of plains extending eastward from the foot of the mountains. It is significant that the Region contains possibly 90 percent of all area in the United States above an altitude of 10,000 feet, and that between the highest point in Colorado and the lowest points in New Mexico and Wyoming there is a difference of approximately 11,000 feet.

In the high areas, the snowfall is heavy, and even during the drier summer months, there is considerable precipitation on the mountain slopes. It is this mountainous area that largely provides the water for the irrigation of the land not only within the Region but far beyond its borders, since heading in these mountains are the Yellowstone, Platte, Arkansas, Rio Grande, Colorado, Bear, and Snake rivers.

The Mountain States Region is one of the great natural resources. It has 1/5 of the national forest acreage, and 1/7 of all land in the national parks and monuments. Average annual water production from run-off originating within its borders amounts to more than 31 million acre-feet. Its crop production is valued at 1/40 and its production of livestock and livestock products at 1/25 of the national totals. In 1937, it produced nearly 90 percent of the Nation's supply of molybdenum, 10 percent of its silver, 9 percent of its gold, 5 percent of the copper, 4 percent of the coal and 3 percent of the petroleum and natural gas. The largest reserves in the United States of bituminous and sub-bituminous coals,

molybdenum, vanadium, and possibly zinc, are within its boundaries. Its mountains, lakes, streams, scenic, and historical attractions provide recreation for visitors from all parts of the Nation.

Of paramount importance to the Mountain States Region are its water resources. It is the proper coordination, development, and use of these resources for irrigation, power, recreational, and domestic purposes that constitute the major problem of the Region. Because of the aridity of the Region's arable lands, irrigation is essential to successful crop production. At present, much of the irrigated land is in need of supplemental water supplies. The provision of such supplies on the eastern slope requires importations from the western slope, and these must be made with due regard to the present and potential development of the western part of the Region.

Most of the important streams are interstate in character, and their extensive use for irrigation has given rise to many interstate controversies. There are also many intrastate difficulties. The adjustment of these differences by interstate compacts and agreements between water users, as well as through coordinated plans of comprehensive development, must be consummated if maximum beneficial use of the Region's water supplies is to be realized.

At times, the streams of the Region carry destructive floods, in most part the result of torrential storms that are particularly characteristic of the eastern sections. There are, therefore, problems of flood control and an urgent need for the construction of flood control works fully coordinated with water conservation development.

It is an outstanding characteristic of the Region that its agricultural development is based largely on a livestock economy. In the plains, there are large areas of grasslands interspersed with the cultivated lands. In the mountains, vast areas of public and private lands are used as summer range for livestock herds that are maintained in the irrigated valleys. The farm lands and the grazing lands are intimately related and exceedingly important one to the other. Except for specialty crops, the farms and ranches are

largely devoted to the production of feed for livestock. The income from agriculture is in a major way expressed in the financial returns from livestock. Problems of land use and land-use adjustments to bring about greater conservation of land and water resources are concerned in large measure with this interrelation of crop and grazing lands.

The scenic attractions of this rugged mountainous Region, the abundance of wildlife, and the extensive area devoted to national parks and monuments represent a recreational resource of outstanding importance to the Region. One of the problems of the Region

is to preserve this resource in coordination with proper and necessary development of irrigation, power, mining, and grazing.

There are nearly 2 million people living in the Region. During the last decade, the increase in population was 9 percent, or 2 percent more than the national increase. Slightly more than 50 percent of the Region's population is rural, but this percentage reflects largely the ratio between rural and urban populations in Colorado, the State of greatest population and largest cities. In New Mexico 75 percent of the population is rural, and in Wyoming, 69 percent.

#### OUTLINE OF THE REGIONAL PLAN

##### I. Conservation and Development of Natural Resources

###### A. Stabilize and Develop Water Resources Under Comprehensive Basin Plans

Because of the distribution of its arable lands, fully three-fourths of the Region's five million acres of irrigated land lies on the eastern slope of the Continental Divide. However, the streams draining the eastern slope produce less than two-fifths of the Region's surface water supply. Conversely, the western slope has one-fourth of the irrigated land and three-fifths of the water supply.

The accompanying outline map of the Region shows the various drainage basins within and bordering it and indicates some of the major features concerned with water development.

Before the limitations of the available water supplies of the eastern slope were known and as a result of a cycle of favorable rainfall, irrigated agriculture was expanded to a point where the average annual production of the streams could not supply the demand, and since 1920, little new development has taken place. The limited arable lands susceptible of easy development on the western slope caused a similar retardation, although water supplies there were abundant, or could have been made so by storage development.

Water supplies on the eastern slope may be stabilized by additional storage of unused flood flows, by development of ground water sources, and by transmountain diversions from

the Colorado River or other basins. Major storage structures in the Yellowstone and North Platte basins are indicated, but in the South Platte, Arkansas, Pecos, and Rio Grande basins, present or authorized developments will largely regulate all unused flood flows. Need is indicated for several small storage projects for irrigation and incidental power in the Tongue, Powder, and Cheyenne river basins.

Potential ground water supplies may not contribute materially to the Region as a whole, but because of their indicated importance to certain areas, studies to determine their potentialities should be undertaken immediately. These should then be followed by the enactment of legislation in Colorado and Wyoming to control use and prevent overdevelopment.

Stabilization to any great extent in the Bear, Platte, Arkansas, and Rio Grande basins requires major transmountain diversions. One such diversion, the Colorado-Big Thompson, is under construction. Others given serious consideration are the Green-Bear, the Blue-South Platte, the Gunnison-Arkansas, and the San Juan-Rio Chama.

On the western slope, with the exception of the Uncompahgre and Grand Valley Reclamation projects, the present irrigated lands are mostly small tracts in the tributary valleys. These lands are now in need of supplemental water, and storage developments are required to furnish this, as well as to provide for the complete development of extensive areas



of irrigable lands. New lands will be limited by their suitability for irrigation, available water, and cost of facilities. Since the cheaper direct diversion facilities and storage sites have been utilized, future construction will involve extensive financing, probably through government sources.

In addition to nearly 143 million dollars invested in the Region's irrigation enterprises up to 1930, 13 million dollars had been expended for drainage works. Nearly 800,000 acres are included in drainage enterprises, of which 54 percent are in the Upper Rio Grande and Pecos river basins, 17 percent in the Yellowstone, 14 percent in the Arkansas, 9 percent in the Colorado, and 6 percent in the Platte. For the successful continuation of irrigation, drainage will become more and more essential in removing harmful salt accumulations and in providing maximum return to the streams of waste waters for re-use below.

The urgent need for settlement of interstate and intrastate water controversies, and requirements for the construction of flood control works on streams throughout the Region have previously been mentioned.

Existing power development in the three States amounts to slightly more than 510,000 kilowatts, 70 percent being steam, 26 percent hydroelectric, and 4 percent internal combustion. Undeveloped hydroelectric capacity has been estimated to be 926,000 kilowatts. In connection with transmountain diversion projects and proposed projects on the Colorado River system, large blocks of power will become available for use in this and adjacent regions. Power will also become available as a feature of multiple-purpose projects such as the Kendrick and San Luis Valley projects.

Integrated basin plans are gradually taking form through the cooperative efforts of Federal, State, and local agencies and their representatives on drainage basin committees. Through such efforts, it is contemplated that these plans will take into account and properly coordinate all phases of irrigation, flood control, power, domestic and municipal and industrial water supply, recreation, wildlife, and related developments.

Although comprehensive plans have not been completed, certain general objectives and

programs of action for the conservation and development of the Region's water resources can be set forth, as follows:

1. Stabilize and supplement water supplies for irrigation, relieving severe annual shortages and frequent basin-wide shortages, and achieving thereby substantial increases in gross production per irrigated acre, the care of idle farm labor, and opportunities for resettlement and rehabilitation of farm families. To accomplish this, initiate and complete the requisite surveys and investigations and, based thereon, construct reservoirs, transmountain diversions, canal systems, and the pertinent works needed.

2. Proceed with the development of the water resources of the Colorado River basin to accomplish the most beneficial and efficient utilization of those resources; development to include use of water for irrigation, range livestock and wild game, hydroelectric power, manufacturing, municipal and domestic supply, and to be properly correlated with transportation, industry, mining, recreation, and urban development.

Through the appropriate Federal agencies and State representatives, complete within a five-year period the Comprehensive Plan of Development for the Colorado River basin, as provided for in Section 15, of the Boulder Canyon Project Act, using funds made available by the Boulder Canyon Project Adjustment Act, effective May 31, 1941.

3. Accomplish a more rational disposition and better utilization of available water supplies.

- a. Accomplish the storage and effective seasonal use of water now diverted unseasonably under direct-flow rights, by mutual agreements among water users. This pertains, among others, to the Greybull and Bear river basins in Wyoming, and to the Upper Rio Grande, La Plata, and Arkansas river basins in Colorado.

- b. Likewise, where storage is not possible, accomplish more effective seasonal use of water diverted under direct-flow rights, by mutual agreements among water users. This pertains, among others, to the Laramie River basin in Colorado.

- c. Promote better economy in the application and use of irrigation waters. This includes the re-use of water, the salvage of water not beneficially used, and the maximum return to the streams of water not required for crop production.

d. By means of interstate agreements or compacts, urgently seek the settlement of interstate water controversies on the Platte, Laramie, Arkansas, Pecos, and Little Snake rivers. Similarly, seek adjustment of interstate problems on the Bear, Snake, Yellowstone and tributaries, Gila, San Juan, and other interstate streams of the Region. To this end, expedite the initiation of investigations and the collection of the basic factual data needed.

e. Conduct cooperative State-Federal surveys to determine the quantity and quality of ground water supplies in areas where proposals for or initial developments have been made. This applies particularly to areas in the vicinity of Pine Bluffs, Wyoming; to the South Platte, Republican, Arkansas, and Upper Rio Grande basins in Colorado; and to areas in Lea, Roosevelt, Luna, and Hidalgo counties in New Mexico. Coincident with above cooperative surveys, secure the enactment of effective ground water legislation in Colorado and Wyoming to prevent threatened litigation and overdevelopment of ground water resources. Ground water development in New Mexico has been effectively controlled by State law for many years.

4. Proceed with necessary studies and construct small dams for water conservation and utilization on headwater streams, where such developments are consistent with the preservation and maintenance of present and prospective requirements of downstream water users.

5. Complete the investigations and surveys for flood control and proceed with the construction of works for adequate flood control throughout the Region as an integral part of the conservation and development of its water resources. Evaluation of benefits and costs of flood control projects should be on a basin-wide basis. This constitutes a part of the multiple-use project development and watershed protection in the stream basins of the Region and contemplates continuance and completion of investigations now under way and the initiation of other necessary investigations, in the Yellowstone, Platte, Republican, Arkansas, Cimarron, Upper Rio Grande, Pecos, and Colorado river basins.

6. Accomplish fullest economic development and use of power resources. As a prerequisite, make detailed investigations of present and potential power markets for hydroelectric and other power that can be developed throughout the Region, such studies to include:

a. An analysis of the economic foundation for power markets in each State and probable future trends of development.

b. A complete compilation and analysis of existing power production and transmission facilities.

c. An analysis of past trends and forecast of probable future trends of sales and energy requirements of electric utility systems.

d. Estimates of the probable future deficiencies in power supply as a part of the market for the total possible output.

#### *Upper Yellowstone River Basin*

Considered as within the Mountain States Region is that portion of the Upper Yellowstone basin comprising the drainage area of the Yellowstone and Big Horn rivers above their confluence, and the drainage areas of the Tongue and Powder rivers in Wyoming.

Future growth in the Upper Yellowstone River basin will depend largely on the development of new irrigated lands. Water supplies, generally, are more abundant in relation to the demand than on most eastern slope streams of the Region, and the Yellowstone, Big Horn, and Powder rivers offer many opportunities for further irrigation development. On the main river, separate pumping units may prove more economical than long gravity canals. On the Big Horn and Powder rivers, storage development is of importance.

Major projects on the Big Horn River and tributaries comprise the Shoshone Indian project and the initial developments of the Riverton, and Shoshone Reclamation projects. In addition to completion of development on these projects, many other developments have been proposed, including a major reservoir in Big Horn Canyon to provide supplemental water for lands in Montana. Several small storage developments are planned on the Tongue and Powder rivers for irrigation and incidental power. Possibilities for ground water development are indicated in the Owl Creek watershed west of Thermopolis, and provision should be made for surveys to determine the quantity and quality of this source.

The Bureau of Reclamation has been authorized to conduct investigations to determine irrigation and storage possibilities in the Upper Yellowstone basin, exclusive of Yellowstone Park, and these have been initiated in the Big Horn and Powder river basins.

Most streams of the basin are subject to flash floods causing destructive channel

overflows. Below Billings, Montana, bottom areas are subject to inundation and silt deposition. The predominant agricultural use of the watershed is for grazing, and in recent years, drought and over grazing have brought an increase in areas approaching badlands in character. Major erosion problems exist on the interstream uplands along the minor tributaries of the Yellowstone River below Columbus, Montana, and on extensive areas in the Big Horn and Powder river basins.

Minor protective works and a well directed program of range and crop land management are indicated as necessary to alleviate flood damage and control erosion and silting.

For unified and maximum beneficial utilization of the water resources of the Yellowstone basin, it is essential that interstate controversies be settled before potential developments in the separate States reach an advanced stage. Congressional authorization has been given to the States of Montana, North Dakota, and Wyoming to negotiate a compact that will provide for the equitable division of Yellowstone waters between the three States. It is important, therefore, that the States take action to consummate such a compact at an early date.

#### *Upper Platte River Basin*

That portion of the Platte River basin in the Mountain States Region comprises the drainage of the North and South Platte rivers west of the 100th meridian. In this area, the predominant demand upon the water supply is for irrigation, and because the demand is large compared to the supply, conflicts between Colorado, Wyoming, and Nebraska have developed, as have also controversies between intrastate interests.

Irrigation must be the foundation of any plan for the development of the Platte River basin. Much more fertile land is available than can be watered, and there are sufficient reservoir sites to provide practically complete regulation. Water power development will aid in financing irrigation but must always remain secondary and incidental to it.

Consideration should be given to the initiation of an appropriate procedure for a joint study of present and potential develop-

ment and interstate problems on the North Platte River, for the purpose of adjusting on a more constructive and beneficial basis, as by compact, the controversy now evidenced by litigation between the States of Colorado, Nebraska, and Wyoming.

On the South Platte River, the essential requirement is for supplemental irrigation supplies, which must largely come through transmountain diversions from the western slope. Early completion of the Colorado-Big Thompson project is needed to supply the northern Colorado district. Other transmountain diversions, such as the proposed Blue-South Platte to supply the area in the upper portion of the river valley, require prompt study and serious consideration.

To provide needed flood control in the Platte River basin, surveys of the War Department and Department of Agriculture should be completed promptly and the flood control works and measures indicated as needed, carried out. Reports on the Cherry Creek flood control project for protection of the City of Denver have been completed by the U. S. Corps of Engineers and the Bureau of Reclamation. Preliminary examination flood control surveys on the South Platte River and tributaries and a special survey on Bear Creek have been authorized and made, but reports have not been released.

#### *Upper Arkansas River Basin*

As within the Mountain States Region, the Upper Arkansas River basin is that portion of the drainage area above Garden City, Kansas.

The major element of a water plan for the Upper Arkansas River basin is the development of a more reliable water supply for present agricultural lands, which have long suffered from lack of an adequate supply. This can be achieved, in small measure, by the additional storage of unused flood flows and by transmountain diversions from the western slope. The Martin (Caddoa) Reservoir near Lamar, Colorado, now under construction by the U. S. Corps of Engineers, will largely regulate and make available the unused flood flows.

There are at present several small transmountain diversions that bring water into



the basin, but studies looking to the feasibility of larger diversions, such as the proposed Gunnison-Arkansas, should be completed.

Some irrigation water is derived from underground sources. Cooperative investigations to determine the quality and quantity of the underground sources should be initiated and subsequent control exercised to protect this resource from over-development.

Floods on the main Arkansas above Garden City and below to Larned, Kansas, will be largely controlled by Martin Dam and Reservoir, but flood problems, especially on Fountain Creek near Colorado Springs and Pueblo, and on the Purgatoire River near Trinidad, have not been solved. Surveys have been authorized and made by the Departments of War, and Agriculture on the Fountain River near Colorado Springs and on the Purgatoire River near Trinidad, but the reports have not been released.

With the assurance of the construction of Martin Reservoir, efforts are being made to consummate a settlement of the long-standing controversy between Colorado and Kansas over the allocation of Arkansas River waters. Early action to consummate a compact or agreement providing for the equitable apportionment of the waters between the two States is desirable.

Abatement of industrial pollution at Pueblo and other cities along the river is a problem demanding attention, and adequate sewage treatment should be extended to all cities and towns using the streams as wasteways.

#### *Pecos River Basin*

The Pecos River basin, comprising a drainage area of some 39,000 square miles, occupies much of the eastern part of New Mexico and a portion of southwestern Texas. From its source in the mountains northeast of Santa Fe to its confluence with the Rio Grande in Texas, the river has a length of nearly 800 miles.

As in the Upper Rio Grande basin, irrigation in the Pecos River basin has developed to the extent that practically all water supplies available to the irrigated lands are consumed. Storage reservoirs on the main river provide practically complete regulation of the stream

except in the lower 150 mile section, which is below all irrigated lands.

The major problem in this basin is that of providing adequately for the existing irrigation development in the river valleys of New Mexico and Texas and at the same time, accomplishing an equitable division of the river's waters between the two States. Controversies between the States over Pecos River waters have existed for many years, and this, together with other pressing problems concerned with salinity, erosion, silting of reservoirs and channels, and floods, led to the initiation of the Pecos River Joint Investigation, which is now underway. The purpose of this investigation, a cooperative endeavor of State and Federal agencies under the leadership of the National Resources Planning Board, is to develop the needed factual information with respect to water supply, water uses and requirements, salinity, siltation, and floods, to serve primarily as the basis for a compact between the States providing for an equitable division of Pecos River waters, and secondly as the foundation for remedial measures to control salinity, erosion, silting, and floods.

Essential objectives in a plan of development for the Pecos River basin are therefore:

Complete the Pecos River Joint Investigation.

Consummate a compact between the States of New Mexico and Texas under which Pecos River waters will be equitably divided.

Construct such works and make effective such measures as are indicated by the investigations as necessary to accomplish effective control of salinity, erosion, silting, and floods.

#### *Upper Rio Grande Basin*

The Upper Rio Grande basin, comprising an area of 34,000 square miles, occupies a portion of southern Colorado, a strip through central New Mexico from north to south, and a small portion of western Texas and northern Mexico.

Irrigation development in the valleys of this basin is such that practically all of the available water supply is now consumed on the more than 900,000 acres of irrigated land and an equal area of non-irrigated but water consuming land that supports native vegetation. Future irrigation development

is, therefore, largely limited to what may be accomplished by (1) salvage of waters now lost through non-beneficial consumption by native vegetation; (2) stabilization of the water supply by storage regulation and control of flood flows, particularly in the San Luis Valley of Colorado; and (3) importations by transmountain diversions from the Colorado River basin.

Adequate drainage in the Sump Area of the "Closed Basin" in Colorado and in the area of the Middle Rio Grande Conservancy District in New Mexico offers the major opportunity for salvage of waters now lost, and action looking to its accomplishment is needed.

Storage in the San Luis Valley to regulate the supply in keeping with the demand has long been sought but was prevented by interstate controversies. These difficulties have now been overcome by the ratification of the Rio Grande Compact, under which the waters of the Upper Rio Grande are equitably apportioned among the three States of Colorado, New Mexico, and Texas.

The San Luis Valley Project, including Wagon Wheel Gap Reservoir, storage on the Conejos River, and the Weminuche Transmountain diversion, has now been authorized and should be carried through to completion as expeditiously as possible.

The possibilities of importations from the Colorado River basin were studied in connection with the Rio Grande Joint Investigation, and reports were presented on four transmountain diversion projects: San Juan-Rio Chama, Animas-Rio Grande, Weminuche Pass, and San Juan-South Fork Rio Grande. The San Juan-Rio Chama diversion offers the possibility of an importation of 350,000 acre-feet annually for use in the Middle Valley in New Mexico and, by exchange, in the San Luis Valley. Further studies looking to the early construction of this diversion project, with adequate protection for present and potential uses in the San Juan basin, should be made.

Silt and salinity problems are aggravated in the middle and lower sections of the upper basin. The silting of Elephant Butte Reservoir and much of the river channel above it and through the middle section is serious. Chief sources of silt are the western tributaries,

Rio Puerco and Rio Salado. Erosion is taking a heavy toll of these watersheds. Flood control surveys and investigations of the Departments of Agriculture and War should be completed and a plan of flood protection works, well directed erosion control measures, and effective watershed management, carried out.

Below Elephant Butte Reservoir and particularly in the El Paso Valley, continued irrigation is threatened by an ever increasing concentration of salt carried in the river's waters. A systematic program of water sampling and analysis and comprehensive investigations looking to the solution of this problem are urgently needed.

The possibility of ground water supplies for irrigation in the San Luis Valley is such that a comprehensive survey to determine the quantity and quality of this source should be undertaken.

In the area of the Middle Rio Grande Conservancy District, aggradation of the river channel causing impairment of drainage works is only one of many problems besetting the District. Provision should be made for completion of adequate irrigation, drainage, and flood protection works in the District.

The development of areas suited for wildlife refuges and the designation and control of areas best suited to recreational purposes should be accomplished as essentials in a well balanced program of development.

#### *Upper Colorado River Basin*

The Colorado River system, third largest drainage basin in the Nation, supplies water and electric power for domestic use, crop agriculture, mining, and manufacturing in Wyoming, Colorado, Utah, Arizona, New Mexico, Nevada, and California. Progress of the Colorado basin States depends to a large extent on greater development and use of their water resources. To date, irrigation projects have been constructed on approximately two million acres. More than two million additional acres may ultimately be irrigated; four million kilowatts of potential water power could be developed.

In this basin, problems of water control are varied and complex. Silting of reservoirs is the major long-range difficulty.

About 500,000 tons of silt are deposited in Lake Mead behind Boulder Dam every day. Floods occur on many tributary streams. Dissolved salt content limits re-use of water drained from irrigated land and creates problems of salinity control. Numerous communities and irrigated lands require supplemental water supplies.

The problem of formulating a comprehensive plan for the development and use of the waters of the Colorado River is complicated because the aridity of the land through which the river flows lends to its waters special significance and value, and because the river is both an interstate and an international stream. In the negotiations of the Colorado River Compact, approved by six of the seven States involved, a start was made toward settlement of conflicting water claims and contests between States, and between smaller subdivisions. A treaty with Mexico and additional interstate agreements, however, must precede final settlement of controversies and full utilization of the river.

With respect to the Upper Colorado River basin, which includes the portion within the Mountain States Region, the U. S. Bureau of Reclamation, cooperating with the States, is preparing a master plan of water development, using all information that is at hand and such additional information as can be gained through current surveys. It is essential that this plan of development be brought as near to perfection as possible within the next few years and that the States come to an agreement on it. The plan of comprehensive development will be greatly expedited by the Boulder Canyon Project Adjustment Act, passed by the present 73rd Congress, which makes available to the Bureau of Reclamation funds for surveys and studies.

In the States of Colorado, New Mexico, and Wyoming are the upper basins of most of the streams that make up the Colorado River system, namely: the Green, Yampa, White, Colorado and tributaries, San Juan, Little Colorado, and Gila rivers. These streams furnish water and electric power for crop and livestock agriculture, domestic uses, mining, and manufacturing. In 1930, the Census reported that there were 1,140,000

acres of land irrigated from the Colorado River system in the three States.

Of all streams in the Mountain States Region, the Colorado River and its tributaries offer the greatest opportunity for future water development because of the existing water surplus on that stream. Not only the future development in the Upper Colorado River basin but that in other basins, such as the Bear, Platte, Arkansas, and Rio Grande, must, therefore, look to the Colorado River basin surplus for much needed supplemental water supplies. The most important future uses of Colorado River waters will be the irrigation of lands within the basin, including the utilization of interbasin diversions; exportations by transmountain diversion to irrigate lands in adjoining basins; the generation of power within and without the basin; and uses for industrial purposes. Other uses and needs such as for mining, recreation, domestic use, and grazing must be fully recognized and taken into account.

With respect to use of pasture lands for grazing, it should be emphasized that the livestock industry is now, and always will be, of great importance to the Upper Colorado River basin and to the entire Mountain States Region. Even at present there is not sufficient summer feed to take care of the livestock population of the area. Therefore, in the development of any general plan for the Upper Colorado River basin, adequate consideration should be given to the provision of irrigation works to cover the maximum amount of pasture land that it appears practicable and feasible to irrigate.

#### B. Conserve Land Resources and Improve Land Usage

The prevailing use of land in the Mountain States Region fits into a pattern peculiarly adapted to semi-arid mountains and plains. In the valley lowlands, where temperature and soil are ideal for intensive farming, irrigated agriculture has developed. Adjacent to the irrigated districts, particularly in Colorado and Wyoming, is a large area of land that has been broken where dry farming is practiced extensively. On both the irrigated and non-irrigated farms, a livestock economy

is generally indicated to be the safe type of farming from the standpoint of conserving the Region's land resources.

Especially in the eastern part of the Region, there is a large area of grassland interspersed with the cultivated land. In the mountainous sections, vast areas of public and private lands are used as summer range for livestock herds that are maintained in the irrigated valleys. Both the farmlands and these grazing lands, whether in public or private ownership, are intimately related and exceedingly important one to the other. Crops produced on the farms are essential to the efficient use of these grasslands.

These same forest and grassland resources are in turn, an absolute requisite to intensive agriculture because they provide a valuable watershed. Moreover, the timber products from the forest lands and the recreational opportunities that they provide aid greatly in making farming in the Region both profitable and attractive. Without the one type of land use, the other would be extremely ineffective. With the two supplementing each other, however, a civilization has developed in the Mountain States Region that is vitally important in the economy of the Nation.

The evolution of the present use of land in the Region has not been as simple as a brief statement describing it. No definite plan was followed, no single code of laws governed, and no single well-conceived philosophy of development prevailed. Both public and private policies and procedures have at various times failed to recognize the limitations of the resources. As a consequence, the use of land has been more or less unguided, and obviously, many mistakes have been made. From the standpoint of the ultimate use and conservation of the land resources, past mistakes must be corrected, present policies directed, and future actions coordinated by a well-designed program.

To conserve the land resources and improve their usage, it is necessary to:

1. Expedite the completion of topographic maps, by the appropriate Federal and State agencies, for inadequately mapped areas in the three States. Such maps are an essential prerequisite to water and land planning, and

to date, the maps for only a small portion of the Region have been completed.

2. Expand research in watershed management, including study of the influence of vegetation on water yields and stream flow regulation. Extensive research has been started in the Platte and Colorado river basins, and such studies should be extended into other basins to determine methods and effects of upstream engineering practices in flood and erosion control.

3. Protect watersheds, stabilize run-off, and reduce erosion and silting of reservoirs by maintaining forest and other vegetative cover, and by range management and other soil conservation practices consistent with the preservation and maintenance of present and prospective water requirements of downstream water users.

Manage the forest and range cover on wild lands and perfect farming practices on agricultural lands so that accelerated run-off and erosion will be controlled and siltation of stream and river improvements reduced to a minimum. Management of the land to be directed to the realization of greatest beneficial multiple use of all resources.

Included in the stream basins where such protective and remedial measures are needed are: the Yellowstone, Big Horn, and Powder rivers, and lower tributaries of the Green River, in Wyoming; the Arkansas River and tributaries below Canon City, the Plains tributaries of the South Platte River, and the lower tributaries of the Colorado River, in Colorado; and the tributaries of the Rio Grande, and the Pecos River and tributaries, in New Mexico.

4. Obtain better balance between capacity of summer pasture lands and forage crops available for winter feed operations in the intermountain grazing areas. Improve the summer pasture lands by irrigation and soil conservation practices in such areas as the Little Laramie River basin in Wyoming; North Park on the North Platte River, Middle Park on the Colorado River, the Gunnison River basin, and San Luis Valley on the Upper Rio Grande, in Colorado.

5. Set up procedures for and carry out a uniform classification of lands and soils.

Classify lands of the Region according to the most desirable uses from conservation, economic, and social standpoints, e.g., as for non-irrigated or irrigated crop production, timber production, grazing (domestic and wild-life), park and recreational areas, and convert the lands to those uses through gradual readjustments. Readjustments in land use, as between dry farming and grazing, are current problems in parts of Wyoming, eastern Colorado, and New Mexico.

6. Assist public and private land owners in realizing the most efficient use of their land. This includes reseeding, rodent and noxious weed control on range lands, restoration of fertility, improvement of cropping systems, and the efficient use of irrigation water.

7. Assist public and private land owners in making adjustments in land use, size of holding and ownership status to obtain more effective operation of the units involved.

**C. Accomplish Greater Development and Use of Mineral Resources Thereby Expanding Industries and Creating New Ones**

The Mountain States Region occupies a unique position in the great variety and extent of its mineral resources, both metallic and non-metallic. It is credited with having the largest reserves of bituminous and sub-bituminous coals, molybdenum, vanadium, and possibly zinc, in the United States. Large deposits of gypsum are known to exist in New Mexico and Colorado. Individually one or more of its States ranks among the four leaders in the production of feldspar, fluorspar, gold, manganiferous iron ore, sheet mica, lead, copper, potassium salts, sodium salts, sulphur ore, tantalum ore, tungsten, uranium and vanadium, and vermiculite. The cement industry is of importance, both in Colorado and Wyoming, and a relatively small area in southwestern Colorado extending into southeastern Utah has produced almost half of the world's radium supply.

While the Region does not approach the leaders in petroleum production, nevertheless its petroleum industry is of great value to the Region itself, and especially to New Mexico and Wyoming. In 1937, the gross returns from

natural gas and petroleum alone were nearly 74 million dollars. Of the total proven oil reserves in the United States estimated as of January 1, 1940, 5.5 percent of one billion barrels are in the Mountain States Region.

In 1937, the gross output from mining in the three States was more than 180 million dollars, so that this industry ranked next to agriculture in total production value. The potentialities for electric power and the Region's abundant supplies of the fluxes and fuels needed in the reduction or refining of its raw ores present a most favorable combination for the future of the mining industry. A substantial part of future development may be expected to come with the exhaustion of mineral deposits in other areas and with an increasing demand for minerals that are now submarginal.

To accomplish greater development and use of the Region's mineral resources:

1. Complete comprehensive inventory and appraisal of the significant mineral resources of the Region through appropriate State and Federal agencies.

2. Improve mineral reduction processes to render new and increased production economically feasible. Expand research in both metallic and non-metallic fields, with particular emphasis in the latter field toward development and use of the Region's great deposits of low-grade coal in competition with other fuels. Research directed toward the utilization of vast reserves of lignite and sub-bituminous coals, such as are found in Colorado, Wyoming, North Dakota, and South Dakota, is under way in a plant at Golden, Colorado, and this should be continued.

Studies looking to the further utilization of the Region's huge clay deposits may also be justified. Recent discoveries permit the economical processing of clays for the production of aluminum.

3. In the development of certain projects for supplementary irrigation supplies, large blocks of hydroelectric power will become available. Research should be started looking to the use of this and other power in electro-chemical and electro-metallurgical processes so that some of the Region's minerals may be refined locally.

4. Develop deposits of (1) deficiency minerals now imported from foreign countries and (2) strategic, critical, and essential minerals with respect to the national defense. Included in both classes of minerals occurring in the Region are: bismuth, cadmium, chromium, fluorspar, helium, manganese and iron manganese, mica, molybdenum, potash, titanium, tungsten, uranium and vanadium. Other developments would result with improvement in the extraction of gasoline from oil shale and heavy sulphur oils.

In Colorado, the production of manganese, mica, and tungsten presents fields for important development. The State now produces over 70 percent of the world's molybdenum supply. Here, the development of manganese is dependent in large part upon the drainage of known combined deposits of zinc, lead, and manganese.

In Wyoming, the Casper and other regions offer some possibilities for the mining and milling of chromium and the Green River basin, for the production of potash and phosphate. This State has large iron and bentonite deposits that are already being used, and uses may be found for the large titanium iron deposits found there.

Potential sources of carbon dioxide exist in Colorado and New Mexico for the production of "dry ice," and in New Mexico, the continued development of extensive potash, copper, natural gas, and oil deposits is of first importance; likewise, there are promising manganese and iron manganese deposits.

5. Through cooperation and regulation determine practicable methods and bring about more effective conservation and utilization of the Region's petroleum and natural gas.

6. Continue research looking to the development of economical processes for the utilization of the Region's oil shales and its huge deposits of low-grade coal in the production of petroleum substitutes. Much work has been done along these lines, and such utilization may become largely a problem of economics.

D. Improve and Expand Recreational Development Thereby Increasing Income and Other Local and Region-wide Benefits

The Mountain States Region has in its climate and scenery a natural resource of

incalculable value; one that provides recreation for thousands of visitors and gives rise to the Region's third largest industry—an industry that does not cause a depletion in the resource itself. It is estimated that nearly 6,600,000 out-of-State motorists visited the three States of the Region in 1939 and that they spent over 162 million dollars while there.

Principal attractions are the mountains, lakes, streams, wildlife, forests, and flora. Camping, hunting, fishing, mountain climbing, skiing, and other outdoor sports may be enjoyed in areas remote from or close to the cities and towns. Within the Region are included, in whole or in part, 33 national forests, 19 national monuments, and 5 national parks. Figures for 1939 show that Shenandoah National Park and the Great Smokies in the heavily populated eastern district led all others in total number of visitors, but Rocky Mountain National Park in Colorado and Yellowstone National Park in Wyoming ranked third and fourth.

Particularly in Wyoming and to a lesser extent in Colorado and New Mexico, "dude ranching" has proven to be a very profitable endeavor, and the Indian lore found throughout New Mexico, in Mesa Verde and other parts of Colorado, and in Wyoming is especially attractive to tourists.

Notwithstanding its wide popularity, the Mountain States Region has much more to offer than is common knowledge, and one of the most important factors in immediate recreational development is the wider dissemination of reliable information on the opportunities that are offered.

Excellent railway and airway service makes the recreational advantages of the Region more readily available to people living in the East and on the Pacific coast; it opens possibilities for the flow of winter sports traffic to ever more popular sports areas in the high Rocky Mountains.

The National Park Service, the Forest Service, State, and local agencies have done and are doing much to develop the recreational attractions of the Region; however, recreational development has only begun. There is need, therefore, for long-range planning of

this development. Objectives and action programs, as essential elements in such planning, are:

1. Through cooperative Federal-State surveys, expand the inventory of existing non-urban recreational facilities to include all potential recreational features of the Region. This should include a determination of possibilities for the development of local week-end and day-use areas that would provide recreational opportunities for people living in the eastern plains and other rural districts.

2. Expand facilities for outdoor recreation in State and local, as well as national areas; improve parks and recreation areas, preserve scenic attractions, unique geological formations, primitive or wilderness areas, and historic sites, all with due regard to multiple use of the Region's resources. This implies proper coordination of the use of land and water resources for recreation with other uses, and a careful consideration of proposed park and national monument expansion to the end that a distinction be made between areas where water conservation, grazing, and mineral development may be paramount and those areas where the recreational features and preservation of scenic attractions are dominant.

3. Provide additional recreation facilities to satisfy the increasing demand for winter sports.

4. Establish parkway connections, where practicable, between major recreational areas, and as approach routes between population centers and outlying recreational areas.

5. Provide ample shore areas above high water in planning water storage sites potentially valuable from a recreational standpoint, to permit sound recreational or wildlife development and to insure controlled public use rather than restricted private use.

6. Preserve fishing grounds and fish life: by specifying minimum storage contents, discharge from the upper water levels, minimum discharge, and headgate screening, in so far as this is possible on irrigation developments; by urging cooperation of State and Federal agencies in working out project plans for structures on potential fishing streams; by eliminating where possible pollution of waters inhabited by game fish; by conducting

surveys to determine the economic fish life propagation value of waters in high areas and what lakes and streams should or should not be made accessible by trail or highway.

Secure rights of way along suitable fishing streams for public use and discourage the present trend of closing and posting fishing waters.

7. Continue provisions for proper studies to determine the history, habitat and environment, population, ecological relationships, and other factors that are necessary for the proper management and conservation of wild game; likewise continue acquisition of lands that are proven to be necessary for winter grazing of wildlife.

8. Distribute more widely reliable information that will acquaint prospective visitors with the recreational opportunities, facilities, and expense involved in visiting areas throughout the Region.

#### 11. Expansion of Commerce, Industry, and Employment

In the Mountain States Region, the value of foreign and domestic exports exceeds that of the imports. Commerce here is largely concerned with the movement out of the area of the products of agriculture, mining, and lesser industries, and movements into the Region of manufactured products.

As compared to a national average "value added by manufacturing" of \$192 per capita in 1937, the average for the Region was only \$62 per capita, and less than \$20 per capita in New Mexico. It is important that studies be initiated to determine the Region's potentialities in industrial development and marketing; that in so far as possible the Region should process more of its raw products for local use; and that it should expand industries for the refining and reduction of more of its ores and agricultural products before shipment out of the Region, all directed toward the development of a better economy, with less dependence on the basic industries of crop agriculture, stock raising, and mining.

Employment in the Region's agricultural, mining, and manufacturing industries fluctuates widely. In agriculture, it varies with

the crop seasons and with production; in mining, the demand for metals causes changes in production and employment, and especially in the coal mines, seasonal variations apply; in the limited field of manufacturing, labor needs vary particularly in the sugar-beet refining, steel production and manufacturing, and meat packing industries.

To expand commerce, industry, and employment action is needed to:

1. Make detailed investigations of present and potential power markets for hydroelectric and other power that can be developed throughout the Region. (See also Section I., A, 6.)

2. Conduct surveys to determine: existing manufacturing plants in the Region, including the source of raw materials used and markets for their products; possibilities for new manufacturing plants that might be developed to use existing raw materials; possible outlets for finished products; and a historical analysis of attempts to establish manufacturing plants which have failed in the Region and the reason for their failure.

3. Promote participation of the Federal Government and the States in institutes of business, engineering, and labor research at appointed State universities or colleges, in the interest of small enterprises that cannot organize and maintain their own research. Provision should be made for central coordination of such institutes.

4. Encourage the establishment of local manufacturing and industrial development that will provide off-season employment for mining, agricultural, and part-time manufacturing communities. Many possibilities in this field will be opened when larger quantities of hydroelectric power are made available.

5. Complete aerial timber surveys and initiate economic studies to determine present use, source and volume of imports, and possible future production of native timber. Based on these studies and under sustained-yield management, expand lumber production to supply a larger percentage of local requirements.

6. Encourage the establishment of marketing cooperatives and improve methods and practices of distributing and marketing the Region's goods.

7. Expand local industrial development to supply more manufactured articles for local

consumption, using raw materials produced in the Region, thereby expanding employment and creating a better integrated economy.

### III. Improvement of Facilities and Service

#### A. Study and Analyze Transportation— Develop and Improve Transportation Systems and Facilities

In the Mountain States Region, as in most areas, there has been a lack of proper coordination of transportation by air, rail, and road. Before such coordination can come about, it will be necessary to determine the role of each mode of transport and the adequacy or the over-development of facilities for each. It is desirable from the public's viewpoint that duplication of services be overcome in so far as possible and that terminals, warehouses, railroad yards, and facilities for the collecting and distributing of goods be coordinated to furnish better services at lower cost.

In many areas, rail lines have been abandoned, and adequate highway facilities could not or have not been supplied. In others, railroad branch lines are operating at a loss and could very well be replaced with a cheaper form of transportation. The distribution of highway funds is becoming a problem with respect to maintenance, and active cooperation upon the part of Federal, State, and local agencies will be needed to work this problem out satisfactorily. Added emphasis must continue to be placed on the secondary system of highways.

Every effort should be made to bring about a plan for the development of air transportation and facilities through the cooperative efforts of the various interests concerned, especially the municipalities and the State governments.

The following objectives and action programs are indicated:

1. Participate in Nation-wide survey and analysis of the problems of transportation in all fields and appraise factors peculiar to the Mountain States Region.

2. With respect to highway transportation, complete master plans through the cooperative efforts of local, county, State, and Federal



agencies, utilizing highway planning surveys; proceed thereunder with the construction of grade separation structures, the re-alignment and surfacing of unsatisfactory segments, and the construction of new sections, especially on the main feeder systems to the major routes.

Similarly, improve access to mountain recreation areas and provide better transportation facilities for mining and agricultural districts, particularly where abandoned rail lines have not been followed by adequate highway construction.

Expand equipment to maintain open roads in the mountainous regions where the volume of through traffic and winter sports travel will justify the cost.

3. Effect needed control of highway corridor to regulate undesirable commercial development and roadside advertising. Accomplish this objective through zoning or other roadside regulation such as scenic easements. A recent enabling act permits district and county zoning in Colorado; similar enactments are desirable in New Mexico and Wyoming.

4. Continue participation with the Federal Government in planning and constructing a system of major highways and connecting routes in the interest of national defense. Reconstruct major routes to meet adequate standards for heavy military equipment.

5. Through the cooperative efforts of Federal, State, and municipal governments, provide a plan and develop thereunder a well integrated system of airports, landing fields, airways, and aids to aerial navigation, which will serve as a means of national defense and take care of ever increasing scheduled air carrier operation and non-scheduled private flying.

Provide quick access to airports from downtown business districts.

Secure the enactment of zoning laws through cooperative efforts of States, counties, and cities, to provide protection to airports from encroachment of obstructions to flight and to establish the proper use of areas adjacent to the airports.

Through cooperation and regulation, prevent traffic hazards that would result if auxiliary or training fields were constructed in close proximity to terminal airports.

6. Encourage the establishment of new industries locally for the production of aircraft and aircraft equipment, if in accord with the best interests of national defense and other major considerations.

#### B. Improve Character of Small Town and Suburban Development

1. Prevent unsightly, uneconomic, and insanitary urban fringe development and preserve open-type suburban development by extension of planning and development control into unincorporated areas. To this end, secure adoption of master plans and zoning ordinances for counties, and control of subdivisions in the vicinity of urban centers.

2. Stimulate and aid small towns and communities in the better planning and development of their public facilities and utilities, and in harmonizing local and regional development, through assistance from State, county, and regional planning agencies.

#### C. Improve Conditions of Sanitation and Health; Abate Stream Pollution; and Insure Safe Water Supplies for Towns and Cities.

Although the Mountain States Region is noted for its healthful climate and much has been accomplished to improve standards of health, the development of the public health program is still in an early stage. Progress in this regard in the Rocky Mountain States has probably not kept pace with many other areas because of lack of facilities, the wide distribution of the population, and the inadequacy of local health organizations. No endeavor is more worthwhile than that of protecting and improving our human resources, and every encouragement should be given to the development of a well organized public health program in the counties and local areas.

In the past several years, the percentage of total urban population served by approved sewage disposal systems in Colorado has increased from 4 percent to 84 percent; over 90 percent is served in New Mexico; and a much lesser percent in Wyoming. Continued cooperation in this field is necessary on the part of State departments of public health

and municipalities in order that a sound program may be established and maintained.

Similar progress has been made in the field of municipal water supplies, although many of the towns and a few cities still do not have adequate water treatment plants; others are in need of supplemental supplies; and some need new supplies altogether. Special emphasis should be placed upon the education of rural families with respect to the dangers of unimproved domestic water supplies, as the death rate from water-borne diseases is far above the national average in many counties.

The need for an improvement in the health and working conditions of industrial workers has been emphasized by recent national defense activities, but even under peace time activities, more thought and energy should be devoted to industrial hygiene.

To improve public and personal health:

1. Create a genuine interest in health problems through education of the individual, family, and community.

2. Enact State legislation to permit the establishment of county or district health units where local sponsorship is not possible.

3. Increase hospital facilities in rural areas particularly through cooperatives or by other means; encourage the organization of additional maternal and child health clinics; and meet the increasing demand for public health nursing. This will include services to the indigent and migrants, for whom provision should be made.

4. Reduce the incidence and mortality from tuberculosis through a continuing program of public health departments, by education, by dissemination of information, by research and clinical diagnosis, and by increasing facilities for hospitalization of the tubercular indigent and transients.

5. Expand mental health service to meet increasing needs and attempt to combat this serious problem by establishing and maintaining child guidance and mental hygiene clinics, and by providing for continuing contacts with patients, under competent supervision.

6. Through legislation, modernized health regulations, and education of the public, secure more effective means of enforcing milk sanitation. Promote the adoption of

the U. S. Public Health Service milk ordinance by the cities and counties.

In the field of sanitation and domestic water supply:

1. Proceed with the construction of sewage treatment plants to alleviate pollution conditions and to remedy the present contamination of irrigation waters, especially those that are used for truck gardening. Investigate methods of treating sewage for conserving its fertilizer value and determine methods for its use.

2. Prevent the pollution of stream waters by mine tailings and industrial wastes.

3. Follow an aggressive campaign for the establishment and maintenance of adequate and safe water supplies for all towns and cities; likewise promote the education of rural people concerning the hazards of using untreated surface waters for drinking and culinary purposes.

4. Bring about a mutual understanding between health departments, industry, and labor with respect to the importance of eliminating or controlling certain industrial health hazards.

D. Improve Living Conditions by Providing Better Housing for Low Income Groups

The needs of the Region with respect to sanitation and health are of no more importance perhaps than its need for better housing—actually, it is difficult to segregate the problems of health from those of housing. Better housing is needed in the rural as well as in the urban districts. Until recently, very little attention had been given to this field, and before much can be done, additional studies are required to determine more exactly what the housing needs are and the people must be given a better understanding of housing as it relates to their general health and welfare.

Due to the past several years of depression, many urban families have moved to outlying districts where rent was more reasonable or where they could build a small home. Their number has been added to by rural families who had to give up their farms due to economic conditions and drought. Some of this development has been creditable, but on the whole,

there has grown up adjacent to many of our cities and towns an uncontrolled type of development that is causing many of the municipalities much concern, since there is no way of controlling sanitation and health in these areas. The solution does not lie in the removal of "shacks," or altogether in the passage and enforcement of zoning restrictions, building codes, etc.—rather, low-cost housing that will meet minimum standards must be made available for these people and those within the cities, through individual effort, and private or public enterprise. Recent surveys in one city in the Region indicate that over 25 percent of the dwellings there are substandard with respect to construction and health facilities.

Much can be done to control future urban and urban fringe housing developments through county zoning laws, building codes, health laws, but sight must not be lost of the fact that many of the people cannot afford anything but minimum standard homes.

With respect to rural housing, the greatest needs in Colorado and Wyoming are probably for migratory camps for transient labor, and homes for resident farm laborers in sugar beet, potato, fruit, and truck crop districts.

In New Mexico, the migratory laborers working in the cotton, broom corn, and truck crop harvest need better housing facilities. With respect to permanent rural families, however, the problem of providing adequate housing is complicated by the fact that many of these families have such small units of land that they cannot produce a living from them. Rehabilitation or resettlement of these people should probably be considered before very much is done toward improvement of their housing.

Construction activities in providing better housing will furnish employment, stimulate industry, remove or improve slum districts, provide opportunities for private investment, and improve the health and happiness of the urban and rural populace.

The following objectives and action programs are indicated:

1. By education in planning and construction and in the use of local building materials, by adequately secured loans, and by

grants where necessary, assist the industrious rural family to rehabilitate itself and improve its housing and sanitation conditions.

2. Construct migratory labor camps to improve bad sanitation and health conditions in the heavy fruit, melon, potato, and sugar beet raising districts. The death rate from filth-borne diseases in these areas is far above the national average.

3. Initiate studies to determine the need for low-income housing in cities and towns and, where necessary, provide new modest residential properties to fill the most urgent needs of these groups.

4. Reconstruct or rehabilitate the poorest residential areas in the larger cities to improve the general living and health conditions of the people living in these areas. Likewise, in blighted commercial districts, many of which include residential properties, bring about the rehabilitation of these districts with a consequent increase in public revenues and a lessening of the decentralization trend in the city.

#### IV. Development and Protection of Human Resources

The protection and promotion of the welfare of the people comprising a nation or region are the sole ends of organized national life. Natural resources, industrial institutions, and all forms of social endeavor are valuable only in so far as they contribute to the well-being of the people. The development and protection of human resources is, therefore, a matter of primary importance.

The population of the Mountain States Region in 1940, is 1,894,270, distributed by States as follows:

Colorado	1,118,820
New Mexico	528,687
Wyoming	246,763

This represents a density of only 5.8 persons per square mile as compared to a national average of over 44. More than 87 percent of the total population is of the white race, 7 percent being of Spanish-American descent.

Dominating the metropolitan areas is the city of Denver with a population in 1940 of over 318,000; other cities in order of size

are Pueblo, and Colorado Springs, Colorado; Albuquerque, New Mexico; and Cheyenne, Wyoming.

In 1930, the Region included nearly 640,000 workers of age 10 and over, distributed by occupational types as follows:

*Occupation of Workers, Age 10 and Over Colorado, New Mexico, and Wyoming—U. S. Census, 1930*

Type	Number workers	Percent
Agriculture	195,763	30.7
Manufacturing	115,211	18.1
Trade	74,275	11.7
Domestic and personal	80,867	9.5
Transportation	57,814	9.1
Professional service	49,065	7.7
Clerical	38,860	6.1
Extractive-minerals	30,809	4.7
Public service	12,048	1.9
Forestry and fishing	3,210	0.5
Total	637,922	100.0

Particularly with respect to agriculture, the Region is faced with problems of caring for transient labor. Unemployment is a problem in many agricultural and mining communities. Stock feeding helps to round out the employment of farmers and farm laborers, and coal mining in the winter helps to counteract somewhat the fluctuations in metal mining employment.

An unemployment census taken in 1937 showed the following distribution of those who registered at that time:

	Number	Percent
Totally unemployed	65,458	49
Emergency workers	31,630	24
Partially unemployed	36,668	27
Total	133,756	100
Total in percent of 1940 population		7.1

More and more attention is being and must be given to the interrelations and interdependence of natural resources, the people, and the institutions. For the people, it is important to give more thought to the significance of: (1) personal characteristics—age distribution, sex, nationality, birth rates, death rates, attitudes, and values; (2) education, skills, religion, and cultural attributes, such as music, arts, crafts, literature, etc.; and (3) the family health, food, clothing, shelter, comfort, convenience, taxes, and income.

For the institutions, the long-range plan of the Region should include: schools, churches, health facilities, libraries, communication facilities, government at all of its levels, recreational facilities, credit institutions, and marketing and trading facilities.

Much additional information is needed to define more clearly the nature of the problems involved before long-range plans for these may be formulated. Recreation, sanitation and health, housing, and marketing and trading facilities have been treated elsewhere in this plan. In this section, discussion of problems and statements of objectives are confined to the interrelated fields of education, youth, and personal welfare.

Much of the problem of conservation of human resources is related to the situation in which urban and rural boys and girls now find themselves. During the past ten years, there has been an increase in the competition for positions in productive industries in the Region. The succession of youth to places of responsibility in industry has been retarded by the fact that persons in the older age brackets have not been able to accumulate a competence that would permit them to retire. Urban boys and girls are reaching their majority without having established themselves in productive industry. In the betterment of these conditions, there is need to:

1. Establish State-wide and county-wide library systems through use of facilities offered by the Work Projects Administration and National Youth Administration.
2. Introduce a better testing technique into the school systems for the purpose of getting information concerning aptitudes and attitudes of boys and girls for use in vocational guidance.
3. Increase present facilities for vocational training with special emphasis on the needs of industry and the national defense program.
4. Provide a more adequate program of outdoor and indoor recreation with proper supervision. This includes the creation of more youth camps and the introduction of keener interests, through competition, in games which can be conducted with little money or equipment, particularly in rural areas.

5. Establish both rural and urban forums or planning groups, which will permit boys and girls to take a more active part in planning the long-range programs which affect them, including conservation and development of natural resources.

6. Widen, in so far as possible, the sphere of influence of such organizations as the 4-H Clubs, Boy Scouts, glee clubs, symphonies, and bands.

7. Continue and expand educational work in the Civilian Conservation Corps and the National Youth Administration.

8. Initiate studies looking to the further consolidation of rural schools, including the

*National Resources Planning Board*

cost of maintaining the individual schools, cost of providing transportation, and logical consolidation areas.

In the field of adult education:

1. Promote adult education programs and extension courses utilizing the universities, the extension services, National Youth Administration, Work Projects Administration, and health organizations.

2. Establish rural and urban forums for the discussion of public, farm, health, and other related questions.

3. Expand vocational opportunities to adults in need of rehabilitation and assist them in finding employment.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

PACIFIC SOUTHWEST

REGION 8

BERKELEY, CALIFORNIA

1940

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Report of the  
PACIFIC SOUTHWEST REGIONAL PLANNING COMMISSION

Baldwin M. Woods  
Chairman

Van Beuren Stanberry  
Regional Counselor

Donald F. Griffin  
Associate Planning Technician

## FOREWORD

Since the days of early settlement, countless individuals and groups have been planning more or less independently for the development of the Nation and its regions. Farmers surveyed the land, laid out their farms, and planned their crops. Prospectors discovered minerals and planned their extraction. Industrial managers planned their factories and output. Although cities, farms, industries, institutions, and physical improvements were not charted in advance, nevertheless they are the resultant of the aspirations and plans of all the people, acting individually or in independent groups.

While these myriad plans were aimed primarily to provide individual incomes, they were also directed more or less consciously toward building prosperous and enduring communities and States. To further these common interests, public agencies and private groups were organized to study the natural resources of land, forests, water, and minerals and to aid in conserving and developing them for the use and benefit of the people. For many years Federal, State, and local agencies and private organizations have been continuously engaged in making and carrying out plans for better use of our natural assets.

In order to present an over-all picture of the possibilities for further development in each region of the Nation, the National Resources Planning Board asked its nine regional field offices to submit a summary report setting forth desirable objectives and lines of action for future progress. This is the report for the Pacific Southwest.

Such an over-all summary has been made possible by the studies and work of the numerous agencies and organizations that have for years been investigating resources, problems, and possibilities of the Pacific Southwest. The Geological Survey and State departments dealing with water and minerals have long been engaged in investigating the Region's water and mineral resources and assembling the data needed for their development.

The Corps of Engineers, in cooperation with State and local agencies, are studying harbors and rivers, and recommending programs and projects to regulate stream-flow, prevent floods, and improve navigation. The Bureau of Reclamation has built many of the large irrigation projects in the Pacific Southwest, and, together with State engineers and local organizations, is making investigations and preparing construction plans for future irrigation projects.

The Forest Service, working with State forestry departments, local officials, and private timber operators, has prepared programs for multiple uses of forest lands and sustained-yield management. The Soil Conservation Service, Farm Security Administration, Agricultural Adjustment Administration, Bureau of Agricultural Economics, and other divisions of the Department of Agriculture are cooperating with State agricultural services and local groups throughout the Region to reduce erosion, conserve soil, and aid farmers to hold their land. Through the work of State and county agricultural and land-use planning committees, detailed programs for improving land use are evolving. The Grazing Service, Fish and Wildlife Service, and National Park Service are cooperating with the Southwest States in planning for development of range lands, fish, wildlife, and recreation areas.

The agencies mentioned above are only a few of the numerous organizations and groups that have been actively engaged in planning for development of the Pacific Southwest.

The statement of objectives and recommendations for action given below is an attempt to present a consensus, incorporating the judgment and opinion of representative agencies, organizations, and individuals in the Pacific Southwest States, that would outline a broad plan for future development. The statement is not presented as a comprehensive plan but as a summary of the kinds of action that would lead to integrated and balanced growth. The purpose of this outline

is not to lay down hard and fast lines that must be rigorously followed, but to provide a broad framework that will be filled out by detailed programs and projects designed to meet local conditions and needs.

This "plan in outline" is a composite product assembled from information, published reports, advice and suggestions obtained from numerous agencies, organizations, and individuals in different parts of the Region. Informal conferences, reports of State planning boards, and meetings of the five Pacific Southwest drainage basin committees held

during the last five years supplied the basic data for many recommendations. A preliminary draft of this report was prepared by the staff of the field office of the National Resources Planning Board in Berkeley, California, and submitted for criticism to representatives of more than 75 agencies and organizations in the Pacific Southwest, most of whom reviewed the draft, forwarded valuable comments, and suggested many revisions. The comments and suggestions have been carefully considered and incorporated, as far as practicable, in the statement that follows.



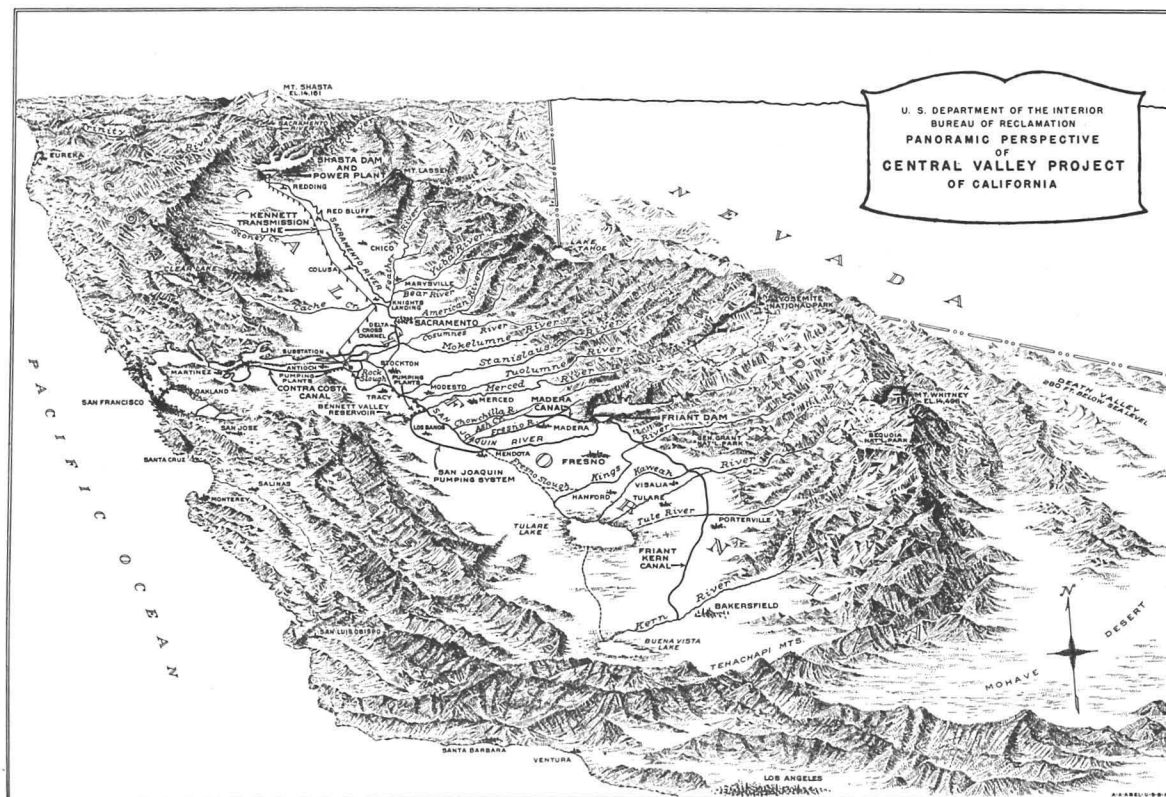


Figure 1. — Central Valley Project of California

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PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
P A C I F I C   S O U T H W E S T

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### The Region and Its Potentialities

For almost a century, adventurous Americans have looked to the Pacific Southwest as a land of opportunity. The days of quick riches from mining, agriculture, and real estate are apparently over, but westward migration continues. The Region has the essentials for greater growth and progress—large natural resources, and the man-power, equipment, and ability for expanding industry and improving conditions for living. A hundred years of settlement and development, however, have substituted new opportunities and new problems in place of the old.

The Region is no longer a virgin land awaiting exploration and settlement. The era of rapid growth is being succeeded by a period of consolidation, of filling in of gaps in the economic structure, and of more intensive use of available resources. Scientific discoveries and improvements in methods and organization make possible innumerable types of new developments and industries. Continued population growth, although slower than in former decades, is creating more business and demands for better facilities and services.

The Pacific Southwest, comprising the States of Arizona, California, Nevada, and Utah, covers 460,000 square miles, one-seventh of the Nation, and has about 8 million people, one-sixteenth of the national population. During the last decade, the population grew nearly three times as fast as that of the Nation. California, which has 85 percent of the Region's people, alone gained 1,200,000 residents, chiefly through migration from other States.

A vast storehouse of natural resources, the Region has one-fifth of the Nation's undeveloped water power, one-eighth of the remaining forest acreage, and one-third of all land in parks and recreation areas. On the other hand, more than half of the Nation's semi-arid and waste land is in the Pacific Southwest.

About 60 percent of the Region is semi-arid. Agricultural croplands, the most productive land use, comprise only about 11 million acres, or 3.8 percent of the total area. This is far below the national cropland average of 21.8 percent. In 1935, farm lands, including croplands, pasture, and farm woodlands, comprised only 18.4 percent of the Pacific Southwest, compared to 55.4 percent for the Nation. Although the Region has but one-fortieth of the Nation's farm population and croplands, its crop production is valued at one-eighth of the national total. Despite the scant rainfall and poor quality of much of its soil, the Pacific Southwest stands high in the production of livestock, citrus fruits, orchard crops, and vegetables. High productivity has been achieved through irrigation and other efficient agricultural practices on the comparatively small cultivated area.

Forests cover nearly one-fifth of the Region and contain about 240 billion board feet of timber. An important range livestock industry is dependent upon the herbaceous and shrubby vegetation on most of the area for year-long or part-time grazing of domestic livestock. These forests and range lands are also the habitat of wildlife. Its mountains, coast, and magnificent scenery provide rest and recreation for visitors from all parts of the Nation. The United States Travel Bureau estimates that in 1939 tourists visiting Grand Canyon National Park and other attractions spent 25 million dollars in Arizona. In the same year, California received over 275 million dollars from tourists who came to enjoy its climate and scenery.

The Pacific Southwest yields about one-half of the Nation's gold and silver production, two-thirds of the copper output, one-fourth of the lead, one-seventh of the petroleum, and one-eighth of the zinc. It also produces large quantities of other minerals.

The economy of the Pacific Southwest is based to a large extent on extraction and sale of raw materials derived from its natural resources. Crop production, livestock raising, and mining are the principal basic activities in Arizona, Nevada, and Utah. California, however, has well-diversified manufacturing and a wide range of commercial and service activities. In 1929, the value added by manufacture per capita was \$247 for the Nation, and \$220 in California, but only \$108 in Utah, \$89 in Nevada, and \$64 in Arizona. Most of the Region's manufacturing is concentrated in three industrial areas--in and around Los Angeles, San Francisco, and Salt Lake City.

The Region is a land of wide variety and sharp contrasts. Its diversity of climate, physiography, resources, population characteristics, agriculture, and industry is conspicuous. Here are both Mt. Whitney, the highest elevation, and Death Valley, the lowest point, in the United States. Between the metropolitan centers of Los Angeles, San Francisco, Reno, Phoenix, and Salt Lake City lie vast stretches of uninhabited desert. California has nearly the lowest birth rate in the Nation, while Utah has the highest rate of natural population increase.

In the Pacific Southwest, the struggle against nature is continuous and intense. Most of the Region is arid and inhospitable, and human habitation is dependent on conserving the scant and erratic rainfall. Without modern engineering, intensive development would not have been possible. Cities, farms, mines, and factories depend directly on perpetuation of their water supplies, which must often be brought from distant sources. The desert is ever striving to recapture the territory that has been wrested from it. Maintenance of the Region's economy requires constant preparedness and defense against adverse forces--against destruction of forests and watershed cover, damage by floods and drought, erosion of soils and beaches, shoaling of bays and harbors, lowering of underground waters, silting of reservoirs, and salting of land.

#### Future Outlook

While the general trend of growth and development in the Pacific Southwest continues

upward, conditions vary in different localities. Some communities are expanding rapidly, others remain stationary, and a few are declining. Although the general standard of living is almost the highest in the Nation, at least one-fourth of the families in the Region have incomes of less than \$1,000 a year. Most of the working population is gainfully employed, but thousands of newcomers are unable to find jobs or land on which they can make a living.

The Pacific Southwest can support a larger population at a higher average standard of living. It can contribute more to the national culture and income. From the long-range view, its growth has just begun. Earnings can be increased by providing and marketing more goods and services. More workers can be employed, seasonal fluctuations in employment lessened, and the proportion of unemployed reduced. The health of the people can be improved and better care provided for the ill and infirm. Educational facilities can be enlarged and extended, highways can be made safer, and better housing made available for low-income groups.

Workers can have more free time, and the drudgery of labor lessened, by greater use of the abundant energy resources. Less than one-fifth of the Region's potential hydroelectric power has been put to work. More than ten million kilowatts of additional power could be generated. California's large reserves of petroleum and natural gas, although subject to heavy draft, are far from exhaustion. Utah's coal and oil shales can supply fuels for a hundred years.

The acreage of irrigated land could be doubled and crop production greatly increased when needed. With better forest protection and sustained-yield management, more than three billion board feet of lumber could be produced annually without depletion. Present production averages about two billion board feet a year, and in many localities, the timber stand is being completely destroyed by clear-cutting, fires, insects, and tree diseases. Range lands can produce more livestock if over-grazing is prevented and cover restored.

The Region has enormous mineral reserves. Output of copper, silver, quicksilver, lead,

and zinc could be greatly increased. In time of war, the deposits of chromium, manganese, and tungsten can lessen the Nation's dependence on foreign imports of these strategic metals.

The Pacific Southwest will continue to grow, to use more of its resources and manpower, and to expand and diversify its business and commerce. Future growth, however, should avoid repeating the waste and errors of the past and be directed toward sound and enduring development.

Basic aims for the Pacific Southwest, like those for the Nation, are:

To create greater economic opportunities and security for present and future population;

To produce a larger income more widely distributed among the population;

To make available for the people more and better goods, facilities, and services.

#### Plans for Future Development

To aid in achieving these goals, the framework of a broad plan for future development of the Pacific Southwest is outlined below. Like all aims for the future, the outline will necessarily be clarified, extended, and revised to meet conditions that arise. The recommendations presented are by no means complete or intended to exclude others that may be necessary.

To show desirable types of development in different fields, the outline is presented in three interrelated sections:

#### Section I—Better Use of Natural Resources

• II—Expansion of Manufacturing, Commerce, and Employment

• III—Improvement of Public and Private Facilities and Services

Action recommended under Section I is designed to build a solid foundation for future progress by greater conservation and use of natural resources. More water would be made available for agriculture, industry, power generation, and growing communities. Vital water supplies would be perpetuated, soils and forests conserved, and better land use established. Agriculture would be more efficient, and forest industries would have permanent timber supplies. Larger settlement

opportunities would be created for the oncoming generation of young farmers and for newcomers seeking farms on which they can make a living. Greater incomes would be obtained from the Region's recreational attractions, and more people would enjoy the benefits of outdoor recreation. Mineral production would be increased and strategic minerals provided for national defense. Petroleum and natural gas would be produced more efficiently. Fish resources would be built up so that commercial fisheries would be preserved and sport fishing maintained.

Plans outlined under Section I aim to provide a broader and more enduring base on which a larger and stronger economy can be built. Programs presented under Section II are directed toward increasing incomes and employment through greater production of manufactured articles and more efficient distribution of goods and services. Diversified industrial development would increase economic security and create a better balanced and more closely integrated economic structure.

Action outlined under Section III would improve living conditions by providing better facilities and services for the people of the Region. Various forms of transportation would be integrated, transportation costs reduced, and highway travel made easier and safer. Blighted urban areas would be rehabilitated and future urban development guided into desirable patterns. Greater benefits would be obtained from future investments in public works. The level of public health would be raised, air and water pollution abated, and domestic water supplies improved. Housing deficiencies would be reduced and substandard structures replaced by up-to-date dwellings. Educational facilities would be enlarged and educational opportunities on all levels extended.

The specific goals set forth in the following pages can be achieved only through the cooperative efforts of public agencies, private organizations, and individual citizens. Federal, State, and local governments, working with private enterprise, can initiate and carry out many programs that will conserve natural resources and make them available for wider use. Governmental agencies protect

forests, control floods, keep rivers and harbors open for navigation, build and maintain highways, develop water supplies, and construct large engineering projects that provide water for irrigation. Because of the nature and size of the works that must be built, development of many natural resources requires action by public officials and investment of public funds. But, the initiative and enterprise of private individuals and organizations are indispensable in putting resources to use and in producing and distributing goods and services.

While the broad plan outlined herein indicates desirable patterns for future development, continuous planning and coordinated action are essential for accomplishment. Further planning is required to determine how objectives may best be achieved, to reconcile conflicts that will arise, to work out details of proposed undertakings, and to take into account the effects of each development on others that may be contemplated. Organization and machinery should be created that will provide for continuous over-all planning, for correlation of programs and projects of Federal, State, and local agencies, and for harmonizing public and private efforts.

#### 1. Better Use of Resources

Although continual progress is being made in conservation, misuse and neglect of resources are causing economic losses. Water is the economic life-blood of the Pacific Southwest, but in many localities present supplies are inadequate for increasing demands. Eroded and depleted lands, destruction of watershed cover, loss of forests by fire and improper logging, waste of natural gas, diminution of fish and wildlife are apparent. The base supporting the Region's economy is being nibbled away.

#### 1. Put More Water to Work

More water is essential for the economic progress of the Pacific Southwest. Not only does this Region have the lowest average precipitation per square mile, but many streams that are raging torrents in winter and spring are bed-dry the rest of the year. Surface water is seldom available when needed,

but must be stored and carried to farms and cities. Because of the unequal distribution of rainfall, water must often be diverted from one basin to another.

The Region's scant and variable water supplies can be completely developed only by comprehensive and integrated programs of investigations, legislation, and project construction that will provide for maximum use and reuse of surface and underground waters in each drainage basin. These integrated plans are gradually emerging through the cooperative efforts of representatives of Federal, State, and local agencies on drainage basin committees in studying the potentialities and needs of each basin and outlining procedures for correlated development of water and land resources.

Continued surveys and investigations are needed to provide additional information and data on precipitation, run-offs and stream-flow, quality and quantity of surface and underground waters, topography, and river profiles. Additional annual snow surveys are required so that accurate forecasts of irrigation water supplies can be made. In certain areas, special investigations should be made to determine the origin, movement and deposition of silt, and the effects of forests and other types of vegetative cover in controlling run-off. Flood control investigations and studies of potential dam sites and costs of water control projects must be continued. Research into improved methods for applying irrigation water to different soils and crops should be continued.

In the Pacific Southwest, floods are unusually destructive. Sudden, intensive rainfall on steep, sparsely vegetated slopes causes widespread damage. More flood control works are needed. Construction of new residences in flooded areas should be prevented. In California, present laws permit flood-plain zoning, but in Arizona, Nevada, and Utah enabling legislation for this purpose should be enacted.

Overdrafts on underground supplies have dangerously lowered water tables in central and southern California and in certain sections of Arizona and Utah. Laws governing the use of underground water in Arizona and

California should be clarified and amended to provide adequate regulation of water use. Voluntary agreements should be fostered among water users for equitable distribution of available surface and underground waters.

Full development of water resources will require construction of many large multiple-use projects, such as the Boulder Canyon project on the Colorado River, the Central Valley project in California, and the Salt River Valley project in Arizona. Such projects are more than mere reservoirs. They are key developments required for regulating stream-flow, reducing flood damage, and making water available for irrigation, industrial and domestic use, and for generating power. The manifold benefits obtained from such multiple-purpose improvements justify construction of many projects that would be uneconomic if built for a single purpose.

Principal water problems and kinds of developments needed in the five major drainage basins of the Pacific Southwest, irrespective of State boundaries, are as follows:

#### Colorado Basin

The Colorado River system, third largest drainage basin in the Nation, supplies water and electric power for domestic use, livestock, agriculture, mining, and manufacturing in Wyoming, Colorado, Utah, Arizona, New Mexico, Nevada, and California. Progress of the Colorado basin States depends to a large extent on greater development and use of their water resources. To date, irrigation projects have been constructed on approximately two million acres. More than two million additional acres may ultimately be irrigated. More than four million kilowatts of potential water power could be developed when needed.

In this basin, problems of water control are varied and complex. Silting of reservoirs is the major long-range difficulty. An average of about 300,000 tons of silt per day are deposited in Lake Mead behind Boulder Dam. Floods occur on many tributary streams. Absorption of alkali limits reuse of water drained from irrigated land and creates problems of salinity control. Numerous communities and irrigated lands lack adequate water supplies, particularly the Salt River Valley and Coolidge Valley areas in Arizona.

Efficient development of Colorado basin waters requires an interlocking system of storage reservoirs, located and built to control run-off and regulate stream-flow. Multiple-use projects are needed that will:

Provide additional water for irrigation projects and communities now suffering from inadequate supplies; also for new lands that can be irrigated economically.

Alleviate silting of reservoirs. Further investigations are needed to determine best means for erosion prevention in the plateau areas drained by the Virgin, Little Colorado and San Juan rivers above Lake Mead. These areas contribute only 10 percent of the water, but about 75 percent of the silt in the lower Colorado. Similar investigations are needed on the Williams-Big Sandy rivers above Parker Dam, and the effects of soil conservation practices on run-off and stream-flow, particularly in the upper Gila River drainage area, should be investigated.

Control floods, particularly in vulnerable areas of the Gila, Salt, San Juan, Virgin, Williams-Big Sandy, Queen Creek, Little Colorado, Freemont, Price, and Uncompaghe rivers and in the Grand Valley area in Colorado.

Provide more low-cost hydroelectric power throughout the basin and supply future demands after output of Boulder Dam is absorbed.

Because of limited water resources in the Pacific Southwest and Mountain States regions, the relative benefits from expansion of irrigation and other water uses within the Colorado basin and those from exportation of water to areas outside the basin must be considered. Economic studies of land, forest, vegetation, mineral, and recreational resources of the basin are needed so that water development can be correlated with expansion of irrigation, grazing, lumbering, mining, recreation, and manufacturing within the watershed of the Colorado River and with exportation of water to areas outside the basin.

#### Course of Action

##### Pending completion of the basin plan:

Establish agreements between Federal agencies and the Colorado basin States for future development of water, land, mineral, and recreational resources.

Complete the comprehensive plan for development of the Colorado basin provided for in Section 15 of the Boulder Canyon Project Act with funds made available by the Boulder Canyon Project Adjustment Act, effective May 31, 1941.

(See also discussion of problems, potentialities, and recommendations for development of the upper Colorado River basin in the report of Region 7.)

*Great Basin*

The Great Basin, covering most of Nevada, western Utah, and parts of Oregon and California, has the lowest mean annual run-off in the Nation, only 3.5 acre-feet per square mile. Practically all stream-flow has been appropriated. Less than one-third of the 2 million acres in existing irrigation projects has adequate water supply. Salt Lake City, Ogden, and other cities suffer from recurring water shortages. Supplemental supplies are imported from the Colorado basin, and additional importations are needed.

Destructive floods occur frequently in many localities, especially along the Wasatch front in Utah and on the eastern slopes of the Sierra Nevada range. Erosion on watershed lands is causing sedimentation on downstream areas.

Opportunities for further development of water resources are limited not only by the scant precipitation and small stream-flow, but also by the dearth of suitable reservoir sites and by the hazards from floods and sedimentation. Action is required that will provide more water for irrigation, stock raising, and domestic and industrial uses.

*Course of Action*

Construct multiple-purpose projects, such as the Pine View project in Ogden Canyon.

Construct small reservoirs and develop springs and wells to provide additional water supplies for domestic use and for livestock, similar to projects being built by the Grazing Service.

Construct water-spreading works, develop underground water supplies, and regulate their use.

Improve water-use practices, especially reduction of water losses through wasteful irrigation and seepage from canals and conduits.

Where economically feasible, develop mountain lakes and streams for multiple purposes of irrigation, power generation, recreation, and wildlife.

Investigate possibilities for reducing flood damage and obtaining additional supplies through storage on the Walker, Truckee, Carson, Humboldt, Sevier, Provo, Weber, and Ogden rivers.

*Northern California Klamath Basin*

This basin supplies water and hydroelectric power for domestic use, agriculture, mining, lumbering, and other industries in northwestern

California, and in Klamath County, Oregon. It has the highest average precipitation of any basin in the Pacific Southwest, and its resources are still largely undeveloped.

The basin has large redwood, pine, and fir forests, which can support a permanent forest industry if operated under sustained-yield management. Harbors at Crescent City, Eureka, and other points permit ocean transportation for lumber and other products. Agriculture can be expanded by providing more supplemental irrigation during the dry months. Installed hydroelectric capacity totals only 65,000 kilowatts, but more than 2 million kilowatts could be generated. Salmon fishing is a major activity on the Klamath River, and California laws prohibit construction of dams that would interfere with the valuable salmon runs. However, plans might be developed that would both preserve fish life and permit power generation. Income from recreation, already substantial, can be increased by greater development of recreation attractions.

*Course of Action*

Complete investigations required for a comprehensive long-range plan for coordinated development of land and water resources that will:

Provide more water for irrigation, domestic, and industrial use.

Provide low-cost electric power and supply future power demands.

Provide for propagating and conserving fish life in such manner that both multiple-purpose dams may be constructed and valuable fish resources preserved.

Maintain harbors and provide improvements required for ocean navigation.

Conserve and develop land and water for recreation purposes.

*California Central Valley--**Central Coast Basin*

Major problems in this basin are: inequalities in distribution of water, insufficient surface water for irrigation, serious depletion of underground supplies, intrusion of salt water in the delta area, damage from recurring floods, and shortage of water for domestic and industrial use in the San Francisco Bay Region.

To overcome these difficulties, the State of California has prepared a long-range State

water plan for control and use of water throughout the basin, of which the Central Valley project is the key unit. It is the first step toward full control and efficient redistribution of water resources throughout the basin. This project will confer great economic benefits by maintaining agriculture and expanding industry in this highly developed basin. Of the three million acres now irrigated, one million acres face acute water shortage.

#### Course of Action

Complete the Central Valley project now under construction by the Bureau of Reclamation in cooperation with the State of California. This project will regulate stream-flow, protect valuable bottom lands above Sacramento against floods, and generate about 300,000 kilowatts of low-cost power at Shasta Dam. It will supply water for municipalities, agriculture, and industries in the upper Bay region, reduce salt water intrusion in the delta area, and improve navigation on the lower Sacramento River. Sacramento River water will be conveyed to lands in the lower San Joaquin Valley, replacing San Joaquin River water that will then be diverted to lands needing supplemental irrigation supply in the upper San Joaquin Valley.

Construct additional multiple-purpose water control projects, as rapidly as needed, under the California State Water Plan on the Feather, Yuba, American, and other rivers to reduce flood damage and provide additional water supplies and future power generation.

Replenish underground water supplies through more percolation areas and spreading-grounds, such as those developed by the Santa Clara Valley Water Conservation District.

#### Southern California Coastal Basin

Although one of the most rapidly growing areas in the Nation, this basin has only one percent of California's water supply. To supply industrial and domestic needs, water and hydroelectric power are imported from the Colorado River and the Great Basin.

Intensive irrigation has made this one of the Nation's richest agricultural areas. About 650,000 acres are irrigated, chiefly from pumping of underground supplies. Because of intermittent stream flow, hydroelectric power cannot be generated in any appreciable quantity.

Watershed protection, flood control, and maintenance of underground supplies are the major problems. Although every large stream

is dry most of the year, sudden and severe floods cause heavy damage. In many places, continued overdrafts have lowered groundwater tables below economic pumping lifts. To some extent, salt water is intruding into irrigation supplies.

#### Course of Action

Complete flood control program of the U. S. Corps of Engineers and the Department of Agriculture. Correlate watershed protection, flood control, and water conservation programs of Federal, State, and local agencies through an integrated water plan.

Develop additional spreading grounds to replenish ground-water and to conserve run-off and prevent salt water intrusion.

Continue necessary dredging of harbors and other improvements required for maintenance of navigation at ocean ports.

#### Increase Electric Generating Capacity

Consumption of electric power is rapidly increasing in the Pacific Southwest. Besides the larger demands from normal growth, expansion of national defense industries is fast absorbing existing generating capacity. Ample supplies of low-cost electric energy are essential for greater industrial development.

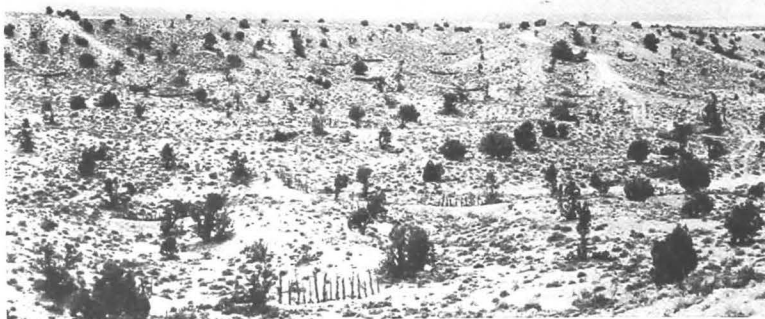
For northern California, it is conservatively estimated that a minimum of 80,000 kilowatts additional capacity annually will be required. At this rate, the 300,000 kilowatts to be provided by Shasta Dam in 1944 will be absorbed within 4 years thereafter. Further increase in shipbuilding and other defense activities may create still greater demands.

Future increased generating capacity, required for southern California, Arizona, and Nevada is estimated at 150,000 kilowatts per year. While the increased demands during the next five years will probably be supplied by additional generators at Boulder Dam and by construction of stand-by steam plants at Los Angeles, Glendale, and Burbank, the Bullshead project on the Colorado River should be completed and in operation by 1944.

Surveys for transmission systems that will be required to distribute power from Shasta Dam and other projects should be started immediately so that necessary transmission networks will be ready when dams are completed.



Good Pasture  
Land Typical  
of Many Parts  
of The Great  
Basin



Thinly-Covered  
Slopes, Charac-  
teristic of East-  
ern Section of  
the Great Basin  
Where Brush  
Spreaders Have  
Been Built To  
Retard Run-Off

Small Rubble Banks  
Constructed to Pre-  
vent Storm Water  
From Backing Up In-  
to the Meadow Shown  
in the Background



Courtesy of Soil Conservation Service

Figure 2. — Examples of Land and Water Development in The Great Basin

2. Conserve Land Resources, Improve Land Use, and Preserve Water Supplies.

Land and water conservation are inseparable. In critical areas, particularly southern California and many parts of the Colorado basin, maintenance of watershed cover is of utmost importance for perpetuation of water supplies. Present protection in these areas is inadequate. Destruction of forests, over-grazing, and soil erosion are endangering water sources and causing serious damage to cultivated lands, storage reservoirs, and irrigation works along the Colorado River and its tributaries. Once denuded, the highly erodible soils are easily washed away. An adequate program of watershed protection requires not only protection of forests and other cover, but also better land-management practices—soil conservation, prevention of over-grazing, and construction of upstream protection works.

The basic problem of land use—of obtaining the maximum continuing income and at the same time preserving land resources—is intensified by the large proportion of semiarid land in the Region. While the land resources of the Pacific Southwest have generally been developed for constructive purposes, numerous readjustments in land use are required. Much progress in conservation has already been made through the work of Federal, State, and local agencies and individuals, but more intensive efforts and closer cooperation are needed.

To perpetuate water supplies, improve land use, and provide a stable foundation for agriculture, livestock raising, lumbering, and manufacturing in the Pacific Southwest, land conservation programs of Federal, State, and local agencies should be continued, enlarged, and correlated. Not only should land be used for the purpose for which it is best suited, but conservation practices should be followed in using the land and its cover.

Course of Action

To expedite needed land-use adjustments and to promote better land-management practices: Reduce erosion through soil conservation and readjustments in land use. Put cropland subject to severe erosion in soil conservation districts. Enact enabling legislation authorizing soil conservation

districts in Arizona. Restore vegetative cover on submarginal lands retired from cultivation. Regulate cultivation on steep slopes. Protect highway cuts and fills from erosion by planting or other effective means.

Protect beaches by acquiring and administering under public ownership ocean-shore land subject to severe erosion, and regulating construction of jetties, breakwaters, and bulkheads.

Correlate watershed protection with downstream control structures. Construct upstream works that have proved effective in reducing erosion. Continue field studies to determine best methods of watershed protection and upstream control. Continue present control of hydraulic mining in California to prevent silting of streams and destructive debris.

Increase protection of forests, brush, and other cover against uncontrolled fires, particularly in critical areas, such as southern California and central Arizona. Greater protection against forest fires is especially needed on State and private lands, and also on some Federal lands. Fire protection funds should be increased as authorized under the Clark-McNary Act.

Increase protection of trees against insects, white pine blister rust, and other diseases, particularly in the pine region of northeastern California, where continuing depletion on 3 million acres in Lassen, Modoc, Shasta and Siskiyou counties, California, is threatening industries dependent on pine forests. Encourage selective salvage logging of high-risk trees by private timber operators on both public and private forests under control methods and plans developed by forest conservation agencies.

Put forest lands under sustained-yield management to perpetuate timber supplies. Encourage owners of private forest lands to practice selective cutting by approved logging methods. Establish more forest-management units providing for multiple-use of forest lands for watershed protection, timber production, grazing, recreation and wildlife, similar to the management program proposed for timber land adjacent to Diamond Spring, California.

Put more range land in regulated grazing districts, or under sustained-range management. Restore depleted ranges by restricting grazing of livestock to the capacity the land can support, constructing small dams, water-spreading projects, and stock watering places, and reseeding with forage grasses.

Put valuable forest and range lands that cannot be adequately protected or economically operated by private owners under public ownership through purchase, exchange, or other equitable methods. Acquire in Federal ownership lands within national forest boundaries on which conservation is not practiced by private owners. Approximately 50,000 acres of redwood forest in

Del Norte and Humboldt counties, California, should be acquired for research and as a demonstration area for good forestry practices in heavy virgin timber stands. Another area of approximately 100,000 acres of lighter redwood timber in Mendocino and Sonoma counties, California, should be acquired for similar purposes.

Encourage blocking together and unification of land ownerships. Retain tax-abandoned forest lands in State ownership for reforestation, protection, and management for multiple uses. Establish county forests on rural woodland areas, especially near cities. Clarify mining laws to eliminate mining claims in critical watershed areas.

Adjust production of forage crops for winter feed to the livestock-carrying capacities of adjacent grazing areas. Where economically feasible, increase use of farm-grown forage crops for livestock feed to reduce intensity of grazing on depleted range lands. Lands uneconomic for crop production, may often be economically developed for pasture by proper seeding. Expand research in protection, management, and economic uses of forest and range lands, including studies of possible new or larger uses for forest products. Continue research in San Dimas Experimental Forest, San Joaquin Range and Black Mountain Experimental Forests.

Continue programs for employment of youth in conservation of lands and forests.

Continue and expand cooperative land-use planning by Federal, State, and county land planning committees. Classify rural lands according to desirable long-time uses, and convert the land to such uses through rural land zoning and other acceptable corrective measures. Enact legislation providing for classification and zoning of rural lands in Arizona, Nevada, and Utah.

Establish legal ownership of tax-reverted lands. Distribute equitably assessments on rural lands, and adjust property taxes to incomes the lands can produce. Change taxing methods tending to force wasteful use of land to methods that will encourage conservation of land resources.

### 3. Maintain Agricultural Productivity and Increase Opportunities for Farm Settlement

Through irrigation, crop specialization, and intensive use of mechanized equipment, the Pacific Southwest has developed a highly productive agriculture. Further expansion of the Region's cropland is limited by market demands for agricultural products and by the availability and cost of water for irrigation. Creation of larger settlement opportunities depends on development of lands that can be economically irrigated and on more intensive use of present crop acreage.

The Soil Conservation Service estimates that, when justified by economic demands, about 7 million acres of new land can be brought under cultivation in the Region through extension of irrigation and soil conservation practices. Ultimately, a half million or more acres of uneconomic cropland should be retired from production and converted to other uses.

While the specialized agriculture of the Pacific Southwest produces high yields per acre, improvements can be effected by organizing production in units of more economic size and gradually supplanting some of the present crops, such as dry-farmed wheat, by others more suitable to the land and climate. On many farms, improvements can be made in organization and management, and in production and marketing of crops.

Thousands of extra workers are required during certain seasons, but opportunities for year-round employment or farm settlement are limited. As a result, seasonal migrations of farm workers and the continuous influx of newcomers seeking employment in agriculture create difficult problems.

Primary needs are to maintain soil fertility, improve and stabilize agricultural land use, and create larger opportunities for farm settlement and more stable employment in agriculture.

#### Course of Action

Where economically feasible, construct water control projects described under Subsection 1 to provide more water for irrigation, and open up new lands for farm settlement:

- a. Where additional supplies are required in areas now under irrigation.
- b. Where new irrigated lands may be brought under cultivation at such a rate that the prices of agricultural products will not be adversely affected.
- c. Where such supplies, either for land now under irrigation, or lands to be brought under irrigation, can be provided at costs that can be repaid from agricultural income.

Develop and settle large irrigation projects constructed by the Bureau of Reclamation and other agencies under cooperative plans for land use, farm organization, crop production, community development, roads, schools, and other necessary facilities, similar to comprehensive plans being prepared for the Columbia Basin project in Washington.

Conserve resources and stabilize farm communities by employing rural workers during off-seasons in constructing small land and water conservation projects, and in developing forest, range, wildlife, and recreational resources. Expand the water facilities program of the Department of Agriculture, in providing assistance to farmers and ranchers, particularly those with low incomes, in the development of wells, stock tanks, the rehabilitation and repair of small irrigation facilities, and the construction of small storage reservoirs.

As more cropland becomes available, encourage and aid farm families now stranded on submarginal land in the Region to settle on new land.

Preserve soil fertility by crop rotation and other soil conservation practices. Retire lands on which erosion and soil depletion cannot be economically arrested.

Encourage farmers to reduce excessive use of irrigation water; prevent waterlogging of land and flooding of crops. Continue the work of the Department of Agriculture in installing water-saving devices and informing farmers of improved irrigation practices.

Continue soil conservation and farm rehabilitation programs. Encourage farmers to help themselves by extending financial and technical aid in voluntary cooperation in crop rotation, soil conservation, and crop marketing programs.

Continue purchases and distribution of surplus agricultural products to persons on relief.

Encourage establishment of part-time farms in stable mining and lumbering areas, or adjacent to urban centers, where non-farm employment can regularly be obtained during part of the year.

Encourage voluntary organization of farms into cooperative production units providing for common ownership and use of mechanical equipment and breeding stock too costly for purchase by individual operators.

#### 4. Obtain Larger Incomes and Greater Benefits From Recreation and Wildlife

The Pacific Southwest is endowed with extensive and varied recreation areas, many of

which are scenic wonders of national importance, protected and administered by the Forest Service, National Park Service and State park agencies. The parks and scenery of the Region are lucrative sources of income. Numerous potential recreation areas, however, are still undeveloped. Although acreage devoted primarily to recreation has nearly doubled in the last decade, the possibilities of obtaining larger incomes and greater human benefits from outdoor recreation have not yet been recognized. Properly developed, recreation areas are an inexhaustible resource, capable of returning continuous incomes year after year.

Conservation for recreation, however, does not mean that other potential benefits from land and water resources must be lost. Programs for protection and development of recreation areas in the Pacific Southwest must take into account other possible uses so that valuable minerals, water supplies, and power will be available for development. Likewise, plans for land and water development should include maximum provisions for recreation consistent with other economic uses. On the other hand, in establishing parks, monuments, and recreation areas on land possessing superlative scenic attractions, non-conforming uses that would destroy or depreciate recreation, historic, scenic, or scientific values should be excluded.

#### *Course of Action*

Acquire and develop more public recreation areas. Provide a great diversity of outdoor attractions and make these accessible throughout the Region to persons at all income levels.

Complete recreation development programs of State park commissions and county agencies. Make into public parks tax-reverted lands that are valuable primarily for recreational and scenic purposes.

Provide and maintain more low-cost facilities and services for recreation, especially accommodations for eating, sleeping, and swimming. Provide adequate drinking water supplies, sanitary facilities and parking space. Large populations in and around metropolitan areas lack sufficient parks, picnic grounds, and public beaches that can be easily reached and enjoyed at small expense. Rural families living in agricultural areas surrounded by barren deserts should also have more opportunities for enjoying cool mountains, forests, and seashores during the hot summers.

Make more forests available for recreation by providing additional camping grounds properly protected against fire hazards. Flat or gentle slopes provide desirable locations for camping or picnicking spots, while rougher ground may be advantageously used for summer homes. Small, isolated tracts may often be converted into attractive city or county park and camp sites.

Develop more youth camps and winter sports areas. Where conditions permit, develop ski trails and other winter sport facilities.

Establish more regional parks and parkways, similar to the East Bay regional parks, accessible from the metropolitan areas of Los Angeles, San Francisco, Salt Lake City, Phoenix, and other cities.

Acquire and develop for public use more ocean beach lands, particularly south of Santa Barbara, California. Develop small boat harbors, recreation areas, and wildlife refuges at esteros and lagoons along the California coast.

Preserve unique scenic attractions and geological formations, archeological remains, and historic sites.

Preserve roadside timber stands along the Region's scenic highways.

Protect roadsides by zoning or other legal measures against despoliation and defacement. Eliminate hazardous and unsightly advertising signs and ramshackle structures. In constructing new highways, include adequate protection of scenic values, and develop roadside parks wherever feasible.

Develop as a national recreation area the Escalante wilderness and scenic territory along both sides of the Colorado River, from Grand Canyon National Park to Moab, Utah, and Labyrinth Canyon on the Green River, provided adequate guarantees can be obtained for future development and use of water, land, and mineral resources within the area by private enterprise as well as by Federal, State, and local public agencies.

Acquire and develop the following outstanding recreation areas for public use:

In Arizona—Meteor Crater and Tonto Natural Bridge.

In California—Redwood park extension in Big Basin and Butano forests, San Mateo and Santa Cruz counties; redwood forests in Humboldt and Del Norte counties; South Calaveras Grove Big Trees, Tuolumne County; Petrified Forest in Napa County.

In Nevada—Hudson Fossil Field, Lovelock Caves, Beowawe, Minden and other hot springs, and Virginia City as a national historic site.

In constructing dams and reservoirs, such as Shasta and Friant dams, provide for recreation use of the impounded waters and adjacent areas, similar to the recent development of Lake Mead behind Boulder Dam. Include necessary studies for this

development with preliminary economic and engineering investigations for such projects.

Distribute more widely among the people of the Region and the Nation reliable information concerning opportunities for different kinds of outdoor recreation in the Pacific Southwest, together with information on the facilities available, and the cost of visiting different areas.

Because of the increasing proportion of older persons in the Pacific Southwest, expand facilities for adult recreation, and develop community programs for recreational activities.

Hunting and fishing attract thousands of tourists, but the Region's forests and range lands could support a much larger wildlife population in certain areas. Thinning species of wild game, birds, and sport fish should be replenished by more scientific protection, artificial propagation, and adequate stocking. On the other hand, excessive concentrations of certain species of game are causing serious difficulties in critical localities, particularly the concentration of deer and elk on winter ranges. A scientific game-management program is needed that will preserve healthy game populations and proper wildlife balance.

Course of action toward this end:

Protect wild animals, birds, and fish by establishing more wildlife refuges and more effective conservation measures. In developing land and water resources for other uses, provide all feasible protection for wild game, birds, and fish. Small improvements in the form of check dams and water-spreading devices are valuable aids in preserving and restoring wildlife. Where water is diverted, range lands should be reseeded with grasses and other forage plants to provide feed for livestock, wild animals, and birds. Revise game laws of the hunting and fishing season and limits of catch and kill as needed for better protection of wildlife.

5. Develop Mineral Resources to Aid National Defense and Maintain Mining Industries

The Pacific Southwest is the custodian of vast stores of minerals, including strategic metals for national defense—chromium, manganese, mercury, and tungsten. California has the Nation's largest chromite deposits and extensive deposits of manganese ore. Although the ores are of comparatively low grade, considerable quantities of these two metals could

be mined in an emergency. Other deficiency minerals imported from foreign countries—antimony, vanadium ores, molybdenum, graphite, talc, and barite—are also found in this Region.

The Region supplies a large part of the Nation's output of gold, copper, silver, quicksilver, and lead. Non-metallics produced in commercial quantities are: cement, iodine, pumice, peat, sodium salts, borates, slate, arsenous oxide, sulphur, bromine, and fluorspar.

Mining normally produces one-half or more of the basic income derived from extractive and manufacturing activities in Arizona, Nevada, and Utah. Many communities depend solely on mining. As high-grade ores become exhausted, development of lower grade deposits will become increasingly important for maintenance of the mining industry.

#### *Course of Action*

Encourage development of strategic materials for national defense, and allocate public funds to acquire adequate reserve stocks. Foster continued development of strategic minerals by loaning funds at low interest rates to mine operators.

Continue exploration and investigation of mineral occurrences, especially of deficiency minerals now imported from foreign countries, to determine more completely the quantity, quality, and properties of known deposits.

Expedite completion of topographic and geologic maps of unmapped areas in the Region.

Aid development by making more water, electric power, and transportation available to mineralized areas. The increasing availability of large blocks of low-cost water power creates opportunities for new mineral industries. Investigate possibilities for establishment of reduction plants and mineral industries through use of low-cost power from Boulder and Shasta dams and future hydro-electric projects.

Expand technical research and experimentation in improving methods for treating and processing Pacific Southwest minerals. Establish experimental and pilot plants to demonstrate the commercial feasibility of improved methods of processing and treatment, particularly reduction of ores by electrochemical and electrometallurgical processes.

Continue and expand research in production of new by-products and new uses for present by-products from minerals found in the Region.

#### *6. Improve Methods of Producing Petroleum and Natural Gas*

California has about one-sixth of the Nation's known underground reserves of petroleum and a large proportion of the natural gas. In Utah, Colorado, and Wyoming, five times the present known petroleum reserve producible from the Nation's oil fields are locked up in oil-bearing shales. Utah also has enormous beds of low-grade coal; Carbon County alone contains many billion tons.

Since 1929, petroleum production in California has been prorated to some extent by voluntary agreement, under umpires selected by oil producers. This voluntary control has been helpful in preventing over-production and stabilizing prices. Further regulation of petroleum production, however, would make voluntary agreements more effective.

While there is little evidence that petroleum is needlessly lost or wasted due to technical inefficiency, more wells are still being drilled than are needed. Unit operation of oil fields permitted by California law should be extended. Unit operation means the development as a whole of a geological unit according to a definite program, with royalties shared on the basis of acreage, oil in place, or some other equitable arrangement irrespective of the location of producing wells.

Since 1929, wastage of natural gas in California has been reduced. Because oil and gas are produced together, gas losses are difficult to overcome completely.

#### *Course of Action*

Enact State legislation establishing production quotas for zones, properties, and wells in each oil field, through a comprehensive system of proration of oil production in California.

Establish a national policy and conservation program, supplementing State legislation, to regulate production and export of petroleum throughout the Nation.

Encourage the unit plan of operation of oil and gas fields.

Curtailed further gas wastage by intensive repressuring and storing in the ground. Encourage production and marketing of liquefied natural gas.

Continue scientific research and extensive inquiry to determine practicable methods for more effective conservation and utilization of petroleum and natural gas. On the basis of these studies, adopt a long-term conservation plan that will point the way toward more efficient utilization of the Region's energy resources.

Investigate methods for recovering higher percentages of oil from natural deposits.

Develop economical processes for utilization of the Region's oil shales and low-grade coal.

Wherever economically feasible, substitute energy generated from water power for consumable fuels that can be preserved for future use.

#### 7. Preserve and Build Up Commercial Fisheries and Sport Fishing

Commercial fisheries and sport fishing in California's coastal waters and streams produce large incomes. California leads the Nation in value of commercial fish products. Sport fishing in the mountain lakes and streams of Arizona, California, Nevada, and Utah are important tourist attractions.

Many species of fish life, however, are rapidly dwindling, particularly sardines, mackerel, and salmon. Stream pollution, dams, irrigation ditches, diversions of water, unregulated ocean trolling, and overfishing by both commercial and sports fishermen are the principal causes of depletion. Everyone seems to have water rights except fish. To perpetuate commercial fisheries and communities dependent on commercial and sport fishing, the fish resources of the Pacific Southwest should be further conserved and built up.

#### Course of Action

Make biological studies of fish life concurrently with preliminary engineering investigations for proposed dams and water control projects, so that adequate conservation measures can be provided before structures are built.

Where economically feasible in construction of dams and control works, provide ladders or other means by which migratory fish in coastal rivers may reach their spawning-grounds. On irrigation and power diversions, provide suitable screens to keep out young fish. Endeavor to maintain sufficient water flow in spawning streams and trout fishing areas.

Continue and expand research by Federal and State agencies to determine effective means for perpetuating various species and runs. Continue the cooperative research projects of the fish and game commissions and the Fish and Wildlife Service.

Regulate off-shore fishing along the Pacific Coast by enacting necessary legislation, interstate compacts, and treaties with Mexico and Canada, based on scientific surveys and studies.

#### 11. Expansion of Manufacturing, Commerce, and Employment

The Pacific Southwest in general exchanges agricultural foodstuffs and low-priced raw materials for manufactured goods produced elsewhere. Many of its natural assets of metals, minerals, petroleum, forests, and top soil are gradually being liquidated to pay for shoes, refrigerators, automobiles, and other needed articles.

Moreover, a large part of the income derived from natural resources in Arizona and Utah does not remain in the Region but accrues to residents of other areas who own the mines and land from which the wealth is taken. Some of this wealth is returned to the Pacific Southwest in the form of wages to workers, dividends, taxes, reinvestment of capital, government payments, and expenditures by tourists. But these together return less than the value extracted.

Employment in the Region's agriculture, lumbering, and mining is highly variable. In agriculture, it fluctuates with the crop seasons. In mining, it varies from year to year, depending on the demand for copper, silver, lead, zinc, and other minerals. Similar fluctuations occur in lumbering.

The slowing down of population growth and the reduction of exports to foreign countries are forcing a gradual shift from an economy

based on the extraction and sale of raw materials to a broader economy better organized to produce finished goods and to distribute them among the regional and national population. Employment is increasing in distributive and service activities throughout the Region and the Nation and will probably continue to increase as new appliances requiring continual repair and servicing are developed.

Future industrial growth in the Pacific Southwest will be determined not only by developments within the Region, but also by those in the rest of the Nation and the world. Policies and programs of the Federal Government will have an important bearing on economic expansion, both by their direct local effects and by their indirect effects on the national economy. Programs for industrial development in the Region must, therefore, be correlated with those for other regions and for the Nation as a whole.

#### *Economic Objectives*

To increase incomes and buying power, and provide more stable employment for its growing population, the Region should strive for a better balanced economy, in which, as far as possible, the advantages both of specialization and of diversification would be retained and harmonized for more efficient production and greater stability. Extractive activities, such as mining, agriculture, and lumbering, particularly in Arizona, Nevada, and Utah, should be supplemented with more processing and manufacturing industries wherever they can be economically established.

#### *Course of Action*

Expand industries for national defense under a comprehensive plan that would meet all military requirements and also strengthen the economic structures of the Pacific Southwest and of the Nation as a whole. Increase industrial output by locating industries so that resources available in each region would be used most effectively.

Continue construction of works that would facilitate and foster larger use of the varied natural resources of the Region, many of which are not now fully developed.

Expand programs for conserving and rebuilding soils, forests, and range land to

perpetuate employment and industries dependent on these resources. Further development of land and water, particularly low-cost hydroelectric power and extension of power transmission and distribution systems, should create opportunities for new factories.

Endeavor to lower costs of distribution, stimulate trade, and widen markets by improving and coordinating transportation facilities. (See Section III, Transportation.)

Encourage establishment of new key industries, such as electro-chemical and electro-metallurgical plants, that would induce development of subsidiary industries to provide special services and convert semi-finished products into finished goods. Key industries tend to create expanding economic spirals. The Nation's industrial plant requires continual improvement to overcome obsolescence. In modernizing and rebuilding the Nation's factories, opportunities should arise for establishment of new plants in the Pacific Southwest to serve western markets.

Wherever economically feasible, encourage expansion of commodity-producing industries that would manufacture more finished articles from local resources for consumption within the Region. For example, frozen food processing plants might be established in certain agricultural areas.

Endeavor to increase the value of commodities shipped out by more intensive manufacturing and processing before shipment. For example, instead of shipping range animals to distant processing plants, develop more livestock packing plants within the Region.

Encourage, likewise, the establishment of local manufacturing and processing industries that would provide off-season employment in agricultural, forest, and mining communities. Investigate possibilities for establishment of local industries in new irrigation areas soon to be open for settlement.

Aid financing of desirable industries, particularly those that would help balance and integrate the regional economy, by loan of public funds at low interest rates. Investigate the extent to which taxes and restrictive regulations are retarding industrial development.

Encourage establishment of marketing cooperatives with adequate protection of indi-



vidual stockholders to aid distribution and marketing of Pacific Southwest products, particularly agricultural and forest products. For example, cooperative marketing of lumber in forest areas might enable small timber owners to develop their holdings.

Continue and expand research by public agencies and private organizations into possibilities for establishment of new industries throughout the Region. Such research should point out advantages offered by local resources, fuels, power, labor supply, transportation facilities, potential markets, and other factors. Recent development of highly efficient electrically-operated industrial units of small size offers possibilities for establishment of new industries in areas where raw materials are insufficient to justify investment in large factories. As an example, small electric furnaces have recently been built in California to manufacture reinforcing bars from scrap steel. Although these plants are of small capacity, their efficiency enables them to compete with mills of larger size. Small electric smelters for reducing metallic ores may often be established in localities where limited mineral deposits are available. Recent technological developments in lumbering offer similar opportunities for efficient small operations in forest areas.

Provide necessary authority, organization, and funds for studies by the Federal government, in cooperation with State and local agencies, of prospective industrial uses and markets for water and power to be supplied by large public works, including the electric power generated at Boulder and Shasta dams and future power projects, similar to the research program of the Bonneville Project Administration.

Establish State industrial development commissions to cooperate with public and private organizations in fostering desirable industrial expansion and distributing reliable information concerning economic opportunities and potential markets for prospective industries.

Investigate declining industries and those that are using up or losing their basic resources to determine what can be done to

keep them in operation, or to transform them into industries that can operate successfully.

Reduce labor turnover and fruitless migration within the Region by determining reasonable labor demands in different localities and improving methods for supplying workers by employment services.

Integrate agriculture and industry through the catalytic action of modern science. Continue and expand research at the Western Agricultural Research Laboratory into industrial uses for the wide variety of crop and animal products raised in the Pacific Southwest. Foster industrial research to develop new uses for by-products now wasted.

### III. Improvement of Public and Private Facilities and Services

#### Transportation

The agriculture, industry, and commerce of the Pacific Southwest depend on long distance transportation. Because of the Region's great area and distance from eastern markets, low-cost transportation is vital to its economy. Transportation costs are a heavy burden. Residents of the Region pay the freight on purchases of practically all commodities manufactured outside the Region. At the same time, many of the Region's producers indirectly absorb freight charges on shipments of their raw materials to outside markets because they must sell their products at delivered prices in competition with producers closer to market centers. Lowering of transportation costs would increase buying power and encourage expansion of agriculture and industry.

While the Region is served by all types of modern transportation, these facilities can be welded into a more efficient system. In certain localities, present services are inadequate. In others, wasteful and costly duplication exists. Highway trucking, especially, can be better correlated with railroad transportation, each furnishing the type of service for which it is most efficient. Terminals, warehouses, railroad yards, and facilities for handling goods can be coordinated to furnish better services at lower cost.

#### Course of Action

Lower costs and improve services by coordinating railroad, waterway, highway, pipe-line,

and airplane transportation under a comprehensive plan for the Region. Encourage closer coordination among transcontinental railroad services within the Region. Avoid duplication and overlapping of facilities.

Substitute cheaper forms of transportation for non-profitable railroad branch lines.

#### Highways

Reconstruct in accordance with military requirements arterial highways essential for national defense; widen shoulders, strengthen bridges, and provide pavement durability on standards adequate for such purposes where necessary to meet these requirements.

Gradually complete the regional system of Federal highways, and extend and modernize State highways as planned by the Public Roads Administration and State highway departments. Build new roads and reconstruct obsolete highways to meet modern standards. Estimated costs of improving the Federal-Aid Highway system to standards justified by present traffic and recommended by the Public Roads Administration are: Arizona, \$21,311,000; California, \$214,000,000; Nevada, \$10,180,000; Utah, \$30,000,000.

Construct forest highway systems throughout the Region. Build farm-to-market, mine-to-market, and forest- and range-to-farm roads in agricultural, mineral, forest, and range areas lacking adequate transportation. Construct additional roads providing easier access to national and State parks and national monuments where such areas are relatively inaccessible.

To protect public investment in high-speed highways, enact enabling legislation permitting establishment of transportation corridors or freeways along primary roads. This would eliminate dangerous intersections and prevent encroachments along highway rights-of-way by private commercial interests that tend to create congestion and cause traffic hazards. California has enabling legislation for freeways and has begun establishment of freeway routing.

Create Federal and State land authorities empowered to acquire, hold, sell, and lease lands needed for public highways and to acquire, sell, and transfer excess lands for the purpose of recoupment.

Carry arterial highways through large cities and by-pass small towns except in sparsely populated areas. Construct belt lines around large cities. Provide adequate safety measures at intersections with through highways in urban areas.

To reduce traffic hazards, eliminate dangerous railroad grade crossings on heavily traveled roads; at highway intersections, construct separate grade crossings where economically justified, or provide channelization and modern intersection design. Construct multiple-lane divided highways on roads carrying 5,000 cars per day, particularly on the arterial highway from Sacramento connecting with the eastshore highway at Richmond, the eastshore highway between Richmond and San Jose, California and the arterial highway between San Francisco and Los Angeles, California, through the Central Valley.

Establish city, county, State and regional master street and highway plans that will include adequate zoning and set-back lines for proposed developments.

In metropolitan areas, construct systems of parkways and through highways under coordinated State and local plans providing for both individual and mass transportation.

Devise methods for obtaining equitable tax returns for maintenance of arterial cross-State highways from vehicles crossing Arizona, Utah, and Nevada. Maintenance of extensive systems of through highways serving residents of other States imposes undue burdens on these States, which have large areas and sparse populations. Many trucks with large fuel tanks traverse these States without purchasing gasoline or Diesel oil, thus paying no tax for use of their highways.

Encourage and establish more equitable taxation of motor vehicles. Revise or adjust taxes so that each type of transportation will return revenues in equitable relation to the use it makes of the highway and to the costs it imposes in maintaining highway facilities.

#### Waterways

Complete channel improvements and rectifications in the Sacramento River as proposed under the Central Valley project.

Maintain harbors and construct necessary navigation improvements at Bodega Bay, Monterey

Bay, and Los Angeles-Long Beach and other harbors, recommended by the U. S. Corps of Engineers.

Kliminate costly tie-ups of ocean commerce on the Pacific Coast by more effective procedure for adjusting differences between ship operators and maritime labor.

#### Airways

Construct the additional military and naval airports for national defense recommended by the Army and Navy Departments.

Construct the additional general and commercial airports, emergency landing fields, and improved ground facilities recommended by the Civil Aeronautics Authority and State planning agencies.

Zone lands and limit heights of structures around all airports to reduce hazards of flying and provide for future expansion.

Provide easier access and quicker travel between commercial airports and centers of cities.

#### Urban Development

The economic and cultural life of the Pacific Southwest is focused in its cities. The cities are centers of the finance, manufacturing, and distribution that provide goods and services for residents of other areas as well as for their own inhabitants. Three-fourths of California's population and more than one-half of that of Utah live in urban areas. The Region will prosper only if its urban life remains strong and vigorous.

During the last decade, San Diego and Los Angeles were among the fastest growing large cities in the Nation. Many small and medium-sized cities, particularly Phoenix (Arizona), Logan and Provo (Utah), Lodi, Merced, Vallejo, Riverside, San Bernardino, and El Centro (California), also grew rapidly. Continued decentralization of manufacturing and distribution will probably further diffuse the Region's urban population. Completion of the Central Valley project and other development programs will likewise foster urban expansion throughout the Pacific Southwest.

Most urban areas in the Pacific Southwest are growing, but internal shifts of population and business are creating serious problems, particularly in and around Los Angeles,

San Francisco, and San Diego. Expansion is taking place around, rather than within, the cities. Many medium-sized cities are actually "exploding" into the surrounding unincorporated areas. Not only are newcomers settling on the outskirts, but people living in older residential areas are moving to the suburbs. As a result, blighted areas are left behind, while suburbs are experiencing mushroom growth of shack dwellings and haphazard development. The older districts are running down; the newer areas are running wild.

In varying degrees throughout the Region, urban areas are undergoing gradual transition to new forms of organization. The conventional pattern of a central industrial and commercial core surrounded by residential districts is being displaced by new designs, not yet clearly understood, in which residential areas are pushed farther outward and new industrial and commercial centers are created outside the central city. The effects of technological advances, such as the automobile, radio, air-conditioning, and electric refrigeration, in shifting urban populations are just beginning to be felt.

Population shifts, however, offer prospective benefits in improved living and working conditions, if dilapidated districts are rehabilitated and suburban expansion is properly controlled. Desirable urban development would provide:

A variety of places to live, ranging from apartments and compact residential neighborhoods in the heart of the city, to suburban communities in the open countryside with various types of living units--single and multi-family dwellings and apartments--available to persons of all income groups.

Areas for homes, playgrounds, and schools separated from commercial and industrial districts. There should be shopping centers within walking distance of every home, and larger community centers with ample parking space located off main highways.

Plenty of light and air and open green spaces throughout business and residential districts. An extensive system of playgrounds and parks linked by parkways that will facilitate travel about the metropolitan area and into the surrounding countryside.

Adequate facilities for individual and mass transportation with a coordinated system of highways, airports, rail and interurban transit lines.

The problem of the cities is that of analyzing causes, trends, and effects of urban changes and making necessary readjustments with minimum disturbance and loss. Rehabilitation of blighted areas within the city centers and necessary guidance for new development in outlying districts require cooperation of city and county officials, civic organizations, property owners and residents, in:

Studying changes and emerging problems in each urban area and establishing a coordinated pattern of land use, transit and transportation, recreation development, water supplies, sanitary systems, and other essential facilities throughout the entire urban area.

Establishing effective controls that will regulate land use, open spaces, set-backs, lot sizes, arrangement, spacing, types and construction of buildings, sanitation, highway traffic, parking, and other facilities necessary for protection of property values and the public welfare.

Coordinating the activities of local governmental agencies in preparing and carrying out comprehensive plans and establishing and administering controls in the public interest. Coordination may be accomplished by voluntary cooperation among local agencies, or by the establishment of regional planning commissions as authorized by California law to prepare comprehensive plans (similar to those in preparation by the Los Angeles County Regional Planning Commission). Adequate control of urban development, however, may require that the boundaries of central cities be extended to cover adjacent communities and suburbs, or that separate regional agencies be created to administer particular facilities and services over the entire area.

#### Course of Action

Plans, controls, and governmental coordination should be designed to:

Restore balance throughout the area among business, industrial, commercial, and residential districts by gradual readjustments in land use.

Reduce congestion in business and shopping centers by reorganizing the street and highway pattern to provide easier access to and parking facilities at city centers. Route through traffic on freeways with parallel service roads. Eliminate parking on major thoroughfares, and provide additional off-street parking and loading facilities. Establish building set-back lines on streets planned for future widening. Provide adequate parking facilities in or adjacent to new downtown buildings, according to bulk and type of occupancy.

Improve mass transit services by better equipment, skip-stop operations, and coordination of train and bus schedules. Integrate transportation services through

coordinated plans covering all forms of transport throughout the urban regions.

Encourage rehabilitation and rebuilding of blighted areas. By zoning and other controls, prevent invasion of detrimental uses into areas where present use and development are in conformity with a master plan.

Provide sufficient lands for civic centers, public buildings, schools, parks, parkways, and play spaces, especially for open spaces and parks in downtown residential areas. Increase open spaces and street planting in commercial sections.

Prevent rise and spread of slums. Guide population growth around cities into desirable suburban patterns through control of subdivision developments, land-use zoning, and extension of needed public services—improved streets, sidewalks, water supplies and sewers, schools, parks and playgrounds, and other essential facilities. Simplify governmental jurisdictions and equalize costs of essential public facilities and services throughout the urban area.

#### Public Works

One hundred thousand people in 50,000 vehicles cross the San Francisco-Oakland Bay Bridge every day. Despite this heavy traffic, it will take about 20 years to repay the investment of 70 million dollars. But the real value of the structure transcends its monetary cost. Each year it saves 35 million hours of travel time. Not only has it made life easier for thousands of commuters, but it has expedited the production and distribution of goods and services. After it is paid for, the bridge will continue to serve the public at almost no expense. It exemplifies the principle that the value of public works is measured by their usefulness and benefits to people, rather than by their initial cost.

Public works have played an important part in settlement and development of the Pacific Southwest. They have provided physical facilities necessary for economic and social progress. A growing region cannot stop building. Thousands of new structures are needed for the larger population and to replace those that become obsolete.

Because of the large area and diversity of conditions, many kinds of public works will be needed. Army and naval bases, military fields, and training camps must be expanded for national defense. Irrigation, flood control, and power projects (discussed

under Section I) will create larger opportunities for industry and agriculture. More highways, waterways, harbor improvements, and airports are necessary for continued growth. Projects that will provide pure water supplies and abate pollution from sewage and industrial wastes are required for the protection of public health. Sewage treatment plants are especially needed in Utah and Arizona. More school buildings are needed for the rapidly growing population in California. To keep pace with increasing demands, the Region must construct many more hospitals, schools, libraries, and public buildings.

These projects will be sponsored, financed and constructed by various public agencies—Federal, State, and local. Works for national defense and the larger projects for conservation and development of resources will generally be constructed by the Federal Government. Highways, bridges, armories, and structures required for State institutions and departments will be sponsored by the several States. It is estimated that investment in such works during the next ten years will exceed 500 million dollars. Local public bodies will build a wide variety of improvements. The Public Works Administration has investigated and approved applications for approximately 600 non-Federal projects in the Pacific Southwest, estimated to cost nearly 300 million dollars.

Maximum benefits from the huge expenditures for public works can be achieved only by broad planning, programming, and budgeting well in advance of construction. Planning means a study of conditions and needs throughout the area, determination of the kind of development that will be most beneficial, and the types of projects by which such development can be achieved. Programming means determining the size and cost of needed projects and scheduling them in proper sequence for construction. Budgeting means determination of funds that may be available for future construction, either from revenues or from borrowings, and the earmarking of specific amounts each year for projects listed in the program. The six-year construction programs and budgets recently completed by Sacramento and San Diego are excellent examples of broad planning for municipal public works.

#### Course of Action

Build public works required immediately for national defense and projects needed to provide water, power, transportation, and other facilities for national defense industries.

Complete projects under construction within the Region.

Where prospective benefits justify expenditures, build projects that will conserve and develop natural resources, create larger opportunities for agriculture, lumbering, mining, and manufacturing, or improve facilities and services.

Construct future public works under plans, programs, and budgets prepared in advance on each governmental level—Federal, State, and local. Continue studies and investigations necessary to determine kinds and feasibility of developments and improvements needed in each locality and in the Region as a whole. Correlate public works on the various governmental levels through exchange of information and voluntary cooperation in planning, programming, and budgeting.

Provide for construction of essential related works concurrently with construction of basic projects. For example, in southern California, spreading grounds, storage basins, and other water conservation projects should be constructed along with flood protection works that expedite discharge of water from river and stream channels. Likewise, transmission lines necessary for power distribution should be built during, instead of after, construction of hydroelectric plants.

Expand public construction in times of economic depression, and reduce public expenditures in periods of high employment.

Enact legislation permitting financing of public works by revenue bonds in California.

#### Public Health and Sanitation

While climate and environment are generally healthful throughout the Pacific Southwest, the large numbers of American Indians and of foreign-born, particularly those of Oriental and Mexican origin, have added to public health problems. In 1937, Arizona had the highest death rate in the Nation, while Nevada, California, and Utah ranked fifth, sixth, and forty-second respectively. Arizona also has the Nation's highest mortality rate from gastro-intestinal disorders.

#### Course of Action

Enact State legislation to permit the establishment of district health units in sparsely settled areas unable to support county health units.

Extend existing hospital facilities under a long-range program to provide medical, surgical, and obstetrical care for those who cannot afford private medical services.

Bring hospital bed facilities throughout the Region up to the minimum standard set forth in the 1938 Report of the Technical Committee on Medical Care, Interdepartmental Committee to Coordinate Health and Welfare Activities, Washington, D. C.

Extend hospital and medical care to migrants who are not eligible for observation or treatment in local institutions.

Expand hospital facilities for tubercular patients in Arizona, and establish tuberculosis hospitals in Nevada.

Develop municipal sewer systems and sewage disposal plants where these facilities are non-existent or inadequate. Nearly every urban community in Arizona has unsewered areas endangering underground water supplies, and the general use of open privies makes fly-borne diseases a menace. Areas in and around many California cities, particularly Fresno, Oakland, Bakersfield, Stockton, Sacramento, and San Jose, are served by individual household septic tanks that create serious health hazards. In many Arizona towns, garbage disposal methods are unsanitary and unregulated.

Reenact the Arizona Revenue Bond Act to provide means for financing sanitary and waterworks improvements. Construct sewerage and waterworks facilities for cities in Arizona outlined in the report *A Sanitation Study for the Arizona Resources Board*, June, 1940.

Provide better sanitary facilities for resorts and summer home areas in the Pacific Southwest where facilities are now inadequate, particularly along the Russian River in California.

Treat sewage discharged into the main and tributary streams of the Sacramento and San Joaquin rivers, California, to a degree compatible with the downstream use of river waters.

Prohibit the discharge of untreated sewage and untreated industrial wastes into the Los Angeles-Long Beach harbor and San Diego harbor and along other water fronts to which the public has access.

Abate San Francisco East Bay air and water pollution in accordance with findings of the East Bay Cities Sewage Disposal Survey.

Abate pollution of lakes, streams, and harbors from industrial plants through cooperative action based on adequate surveys.

Control wastes from hydraulic mining so as not to impose burdens on water supply treatment plants or destroy aquatic life.

Provide reasonable protection against pollution on all irrigation projects where water is used for domestic purposes. Prohibit discharge of polluttional wastes into

reservoirs, and prohibit swimming except in the upper end of large reservoirs.

Intensify existing control measures to prevent the breeding of mosquitoes. Urge and assist the organization of mosquito control measures in the Sacramento and San Joaquin valleys.

Improve and extend rodent control to prevent recurrence and spread of bubonic plague by rigid control measures for harbor cities.

Reduce pollution of the air by bacteria, smoke, and other odor nuisances in metropolitan areas, particularly those of Los Angeles, San Francisco, and Salt Lake City. Abate air pollution from toxic smelter fumes in the vicinity of mining towns.

Develop and improve water supplies for communities without waterworks. Require adequate water supplies and sewage disposal facilities for motor courts, tourist camps, recreational areas in public parks and forests, private resorts, and dude ranches. For example, Oak Creek Canyon recreational area in Arizona, visited by thousands of vacationists, has no protected water supplies or sanitary sewage disposal.

Investigate incidence and effects on the human system of the rarer elements, boron, fluorine, and selenium, occurring in ground and surface waters.

In many areas, particularly southern California and the mining districts of Arizona, Nevada, and Utah, water is so contaminated by minerals and salts that it becomes unfit for agricultural, domestic, or industrial uses. Studies should be made to determine economic methods of treating this water, and wherever economically feasible, treatment plants should be installed.

#### Housing

The Pacific Southwest needs more and better houses for its growing population. More dwellings will be needed at military and naval bases and for workers in national defense industries. Migratory workers and resident families in rural areas should have houses instead of shacks to live in. Adequate housing implies more than it defines—it connotes happier families and more enduring homes.

Housing surveys in Los Angeles, San Francisco, Sacramento, Oakland, San Diego, Fresno, Salt Lake City, Phoenix, and Reno show that from 15 to 25 percent of the housing facilities are below minimum standards. Approximately 200,000 urban dwellings in the Pacific Southwest should be replaced or rehabilitated. Minimum provisions for low-cost housing during the next six years, exclusive of dwellings for migratory workers, should result in construction of 20,000 family units.

*Course of Action*

Encourage building and remodeling of private homes and extension of home ownership through low-interest loans and other legitimate aids to home owners.

Provide additional housing needed at military and naval bases and for workers in national defense industries through private builders or local housing authorities, wherever possible, and with full cooperation of available housing associations and planning agencies.

Encourage construction of low-cost housing for low-income families through both public and private efforts. Where private builders are unable to provide adequate housing for low-income groups, construct low-cost housing projects under local authorities, with cooperation of State and Federal housing agencies.

Enact necessary enabling legislation authorizing establishment of city and county housing authorities in Nevada and Utah, county housing authorities in Arizona, and a State housing authority in California, as recommended by the State planning board.

Locate, design, and construct housing projects in conformity with the official plans established by city, county, and regional planning commissions.

Investigate the special needs of migratory workers in California and Arizona, and provide adequate housing for such workers. Advance Federal loans to farmers that will enable them to provide better housing for their workers. Establish camps on public lands where suitable sites are available.

Modernize city and county building codes to conform with improved standards of design and construction. In many places, obsolete restrictions prevent construction of modern housing and increase costs of home building. Establish and enforce county building codes, similar to the Los Angeles County Code, regulating construction of suburban structures in counties where population is growing around peripheries of cities.

Encourage cities and counties to make comprehensive surveys of housing conditions and needs to provide the basis for actual housing programs and the establishment of local housing authorities. Make the State-wide survey of rural housing conditions and needs recommended by the California State Planning Board.

Expand research and experiments by State universities, industries, financial institutions, and other public and private agencies to lower building costs, improve construction methods, reduce speculative waste, facilitate sound investment financing of homes, blight-proof community planning, and more efficient upkeep and operation of small dwellings.

*Education**Course of Action*

To extend the scope and raise the level of education in the Pacific Southwest:

Expand opportunities and facilities for education to all classes and age groups in order to aid the thousands of newcomers in adjusting themselves to their new environment.

Provide better facilities for families living around the outskirts of cities. Arrangements for exchanges of students across county and district lines may aid in accomplishing this.

Provide necessary facilities so that the children of migratory families may complete their elementary and secondary education.

Continue and expand the educational work of the Civilian Conservation Corps and the National Youth Administration.

Extend library privileges to employees of the Civilian Conservation Corps, migratory workers, and similar transient groups.

To provide more adult education for the steadily increasing number of older persons:

Coordinate programs for university extension education and organize more self-supporting adult educational classes throughout the Region.

Establish more forums for the study of public questions, for discussions of important issues, and for pursuit of studies in specialized fields. The 177 public forums in California in 1939 should be more than doubled by 1950.

To reduce inequalities of education and training in urban and rural areas for both children and adults, improve educational facilities, and reduce over-all costs:

Consolidate rural schools into central community schools.

Organize regional vocational schools such as the Division of Vocational Forestry and Lumbering in the Lassen Junior College, Susanville, California, and the California Polytechnic School for agriculture and industry at San Luis Obispo, California.

Provide more libraries and trained librarians in rural communities. This might be accomplished by creating regional libraries under district organizations, or by establishing regional branches of State library systems, supported by the State.

To provide more technically trained workers in agriculture and industry:

Increase effectiveness of vocational guidance by coordinating the services of Federal

and State labor departments, employment services, and educational institutions on all levels. Distribute widely current information on labor demands in different occupations, and plan vocational and professional curricula in the light of this information.

Expand vocational education to equip workers for occupations in which employment opportunities are increasing in the Region. This would be of particular aid to inexperienced youth, to adults without special skills, and to newcomers expecting to find work.

Inform students on all levels of the importance of conservation of basic natural resources and of means whereby these resources can be conserved.

To educate Indians for employment in agriculture and industry:

Continue and expand subsidies to local schools for Indian education, and insist upon better adaptation of school programs to the needs of the Indians.

To increase efficiency of public services:

Provide more funds for the in-service training of public employees, and for in-

stitutions of higher learning to enable them to train more students for public service.

To improve education on the college and university level:

Raise university entrance requirements throughout the Pacific Southwest.

Emphasize vocational education in junior and State colleges.

Develop technological research in universities.

Encourage student and faculty self-government to foster a more responsible citizenry.

Emphasize individual and group recreation in athletic programs, rather than inter-collegiate athletic competition.

Include study of regional resources and needs in educational curricula to create a better understanding of local and national problems.

Provide more scholarships to State universities, sufficient to cover minimum living expenses, so that qualified young people, remote from proper educational opportunities, can obtain a higher education.



PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

REGION 8

HAWAII

BERKELEY, CALIFORNIA

1940

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Report of the  
HAWAII TERRITORIAL PLANNING BOARD

## F O R E W O R D

The following report is a brief summary of some of the principal facts about the resources, economic activities, and possibilities for development of the Hawaiian Islands. The information and data were taken from the First Progress Report of the Hawaii Territorial Planning Board, entitled, *An Historical Inventory of the Physical, Social and Economic and Industrial Resources of the Territory of Hawaii*, published February 8, 1939. The recommendations for action have been prepared and submitted by the Director and staff of the Hawaii Territorial Planning Board after consultation with members of the board and representatives of Federal, territorial, and local agencies and private organizations interested in development of the Islands.

The purpose of the report is to outline some of the initial steps in a broad program for the conservation and development of the physical and human resources of the Territory.

## INITIAL STEPS IN A PROGRAM FOR THE DEVELOPMENT OF THE TERRITORY OF HAWAII

The Hawaiian Islands are the tips of a 2,000-mile range of volcanic mountains rising from the bed of the Pacific Ocean, about 2,000 miles southwest of San Francisco. The Territory consists of 8 major islands, organized into 4 isolated county units. The islands lying west of Longitude 161° west are known as the Leeward Islands and comprise about 15 small uninhabited islands consisting of volcanic rocks or coral reef rocks and sand.

The area and 1940 populations of the 4 principal county units are as follows:

County	Area (sq. miles)	1940 Population
Hawaii	4,015	73,375
Mau	1,172	55,534
Kauai	630	35,818
Honolulu (including Oahu)	600	255,256
<b>Total</b>	<b>6,407</b>	<b>423,329</b>

In 1930, about 18.6 percent of the total population of the Territory was foreign-born, fairly well distributed among the 4 counties. The largest increases in Hawaii's population came through the rise in births following the immigration in the 1880's and 1890's. The Japanese population increased rapidly during 1896-1898. The pure Hawaiian population remains about stationary at 20,000 persons; but the number of Hawaiian people partly Caucasian and partly Asiatic is increasing. Since 1917, "other Caucasians" have been in the ascendancy, their number nearly tripling in the last 20 years.

Future growth of population in Hawaii will probably arise largely from the excess of births over deaths. The Territory's population should continue to increase at a higher rate than that of the Mainland of the United States, because of its

- (1) relatively younger population,
  - (2) proportionately greater number of mature women in the future than in the past,
  - (3) higher birth rate and lower death rate, and
  - (4) gain from Mainland immigration.
- The per capita wealth in Hawaii ranks

with the two lowest of the States, being one-half of the average value in the United States. The per capita income in Hawaii ranks with the four lowest of the States, being one-half of the average value in the United States.

Hawaii's physical resources are limited. There exist no mineral deposits in the form of ores; no coal, oil, or natural gas; no deposits of phosphate rock containing the plant food element phosphorus, so abundant on many South Sea islands. There is no large source of energy held in restraint in the form of snow, ice, or water, as such, on mountains, in lakes and streams at elevations, or constantly on the move to the sea; and there are no extensive forests of pine, spruce, hemlock, and hard woods. Hawaii is relatively poor in natural resources, but it has three important assets—land, rain, and sunshine.

The outstanding features of the climate of the Hawaiian Islands are the remarkable differences in rainfall over adjacent areas; the tenaciousness of the trade winds through practically all seasons and over all islands of the group; and the persistently equable temperature, which passes through the cycle of the seasons devoid of marked or sudden changes and with only a very moderate difference between the averages of winter and summer months.

The four largest islands and their principal characteristics are as follows:

### Hawaii

Largest island of the group, Hawaii is a small "continent" of snow-capped mountains (tallest in the Islands), live volcanoes, palm-lined beaches, fern forests, and an impressive section of the U. S. National Park chain. It offers a great diversity of travel experiences, and its off-the-beaten-track sections are steeped in Hawaiian tradition and history. They are the last strongholds, in fact, of the so-called "Old-Hawaii".

Sugar is king on Hawaii, the other important industrial activities of the island being cattle-raising and coffee-growing. Hawaii is connected with Honolulu and with the main islands of the group by steamship

and airplane service, radio telephone, wireless, and regular U. S. airmail routes. It is about 200 miles from Honolulu; an overnight trip by steamer or one hour and 45 minutes by passenger plane.

#### Maui

Famous for its Hawaiian hospitality is the great "Valley Island"--Maui. Its location between Honolulu and the largest island (Hawaii) facilitates its inclusion on every tourist itinerary, and its massive dormant volcano, Haleakala, is one of the major attractions of the entire island group. The population of Maui is small in comparison to its size, and this fact accents the "unspoiled" atmosphere that pervades the island. It is rural and, at the same time, sophisticated.

Maui is also important from an industrial standpoint, its commercial activities including stock-raising, in addition to the major industries, sugar and pineapples. Maui is connected with Honolulu and with the main islands of the group by steamer and airplane services, radio-telephone, wireless, and regular U. S. airmail routes. It is about 70 miles from Honolulu; a 5-hour trip by steamer or an hour by passenger plane.

#### Oahu

The Hawaiian translation for the island name, Oahu, is "gathering place". From the traveler's viewpoint, that is an apt description. It is the gathering place, the starting point for all Hawaiian tours and vacations--whether they are confined to Honolulu and the island of Oahu, or whether they include trips to the other islands.

It is the transportation and commercial center for the Hawaiian group--for the entire Pacific area, in fact. Honolulu (on Oahu Island), the principal port, largest city of the Islands, and capital of the Territorial government, has long been known as the "Crossroads of the Pacific".

Oahu embraces many of the scenic and vacation attractions--such as Waikiki Beach and Nuuanu Pali--for which the Hawaiian Islands are world-famous. Honolulu is connected by passenger steamship lines with North American, Oriental, and Australasian ports; and is the center for the regular steamer and airplane services to the outlying islands of the group.

#### Kauai

Because of its lush, flaming foliage,

Kauai is known as the "Garden Isle" of the group. Geologically, it is the oldest island, and it was here that Captain Cook first landed when he discovered the "Sandwich Isles" in 1778. The only main island not actually conquered in person by Kamehameha, it was voluntarily ceded to his kingdom in 1810. This gem in the "loveliest fleet of islands" is rich in Hawaiian folklore. Romantic legends are related to account for many of the interesting physical characteristics of Kauai, such as the Sleeping Giant, the Hole-in-the-Mountain, and the Menehune Ditch built by Hawaiian "good fairies" (mehemehes).

The population is scattered in small settlements near the main ports and in plantation towns in the bountiful agricultural areas, as the territory's leading industries (sugar and pineapples) are the major Kauai activities. Kauai is connected with Honolulu and with the main islands of the group by steamship and airplane service, radio-telephone, wireless, and regular U. S. airmail routes. It is about 100 miles from Honolulu; an overnight trip by steamer, or an hour and a half by passenger plane.

Nature has done much for Hawaii. Her satisfying scenery, equable climate, and temperate bathing waters have given the Islands an enviable place in the world's attentions, but progressive citizens of the Islands have contributed even more. They have provided modern hotels, apartments, cottages, and all the public utilities. They have developed all the social amenities such as schools, theaters, playgrounds, parks, and facilities for recreation such as innumerable golf courses and tennis courts. Along with this has come the necessary transportation in the form of fine ocean steamers, trans-Pacific airplanes, and inter-island steamers and planes of the most modern variety.

#### Conservation and Development of Land and Water Resources

##### Land Resources

Hawaii's arable land area, although fairly extensive, on the whole does not comprise many single units in very large tracts possessing soil of high natural fertility; nor are many tracts particularly favored as to topography. With the exception of relatively limited coastal plains, lands put to agricultural use are the gentle mountain slopes cut by many deep ravines or gulches.

The lands that make up the intensively

farmed portions of the Islands are bounded on all sides by areas of varying sizes and shapes--marginal, submarginal, and waste. In this category are gulch or pali slopes; sections in districts of excessive rainfall; of very light rainfall, or semi-desert conditions; of very rugged terrains; of coral and lava; of inaccessible mountainous regions and outcroppings at sea level or elevations, of swamp-lands and tidal marsh areas. Most of the lands in these classes are at present in pasture, others have been left to lie idle and are covered with vegetation of many kinds but chiefly brush and trees.

For ultimate proper utilization of the areas now idle and of those pasture areas that may possibly be more profitably put to other uses, a careful survey must first be made.

#### Needs

Protect watersheds by maintaining forest and grass cover.

Prevent erosion by recognized soil conservation practices, including the enactment of a soil conservation district law.

Construct irrigation projects with correlated plans for agricultural and community development.

Control erosion by eradicating wild goats, pigs, etc.

Classify rural lands according to the long-time uses for which they are best suited, and tax them in accordance therewith. Study possibilities for establishing a graduated land tax.

Retain in public ownership all lands so presently held that cannot produce economic returns for private owners and that may be required for the development of public facilities and institutions, and plan a long-range program for their most effective use.

Expand research and experimentation to develop new crops and new uses for agricultural products in industry.

Endeavor to develop markets for surplus crops.

#### Water Resources

The surface-water resources of the Territory of Hawaii are dependent on rainfall and evaporation, the porosity of the ground, the shape and slopes of the drainage areas of the streams, and the amount and character of vegetative cover. The characteristic drainage areas of the Territory are short, extending from the crests of the mountains to

the sea in narrow closely-spaced strips, and are very steep.

On most plantations, surface water is used when available, and ground water is used when the surface supply is inadequate.

A small quantity of ground water is used for generating power. Large quantities of water used in the Islands are derived from springs, but the discharge of springs is not usually segregated from surface run-off by the plantations. Large supplies of ground water await development on Oahu, Kauai, Maui, Molokai, and Hawaii.

Several tunnels, Maui-type wells, and drilled wells are being driven to develop additional ground water on Oahu, Maui, and Molokai. A large project is proposed for the irrigation of 15,000 acres on Molokai. This would require the excavation of about 10 miles of tunnels to develop ground water in the dike complex of east Molokai and to utilize, on a large scale, the principle of storing water underground by means of bulkheads at certain dikes.

#### Needs

Save more rainfall by diverting more surface stream water, whenever and wherever available, to conserve ground water for periods of drought.

Conserve and develop by "exportation" to drier sections spring waters that are wasted in favored humid regions. Concentrated flows of approximately 50 million gallons daily have always been wasting at Pearl Harbor Springs on Oahu, at East Coast Molokai, at Waiakea Pond on Hawaii, and elsewhere. True conservation of land and water will involve the "exportation" of these and other valuable water supplies to nearby fertile lands of little rainfall and without ground water supplies.

Investigate possibilities for using ground water in undeveloped areas with a view to providing water for tillable lands throughout the Territory.

Revise and clarify territorial water laws, particularly those relating to ground water, and establish equitable regulations governing water rights and use of water. Study possibilities for establishing a separation tax.

#### Development of Additional Public Recreation Areas

There is no regular Territorial park system corresponding to those of many of the States on the Mainland, although there are

recreational areas controlled by the Territory. Most of the public parks are operated and maintained by the several counties. However, many recreational facilities are provided by various branches, commissions, and institutions of the Territorial Government.

Great improvements to recreation facilities and program content have been made throughout the Territory since the first municipal playground was established in Honolulu in 1911. The last decade is noteworthy in Hawaii's recreation history because of the marked popular recognition of the recreation needs, and the enthusiasm and demand for meeting them.

Every major island of the Territory can point to many recreational facilities provided through either private or public organizations or by both. In general, the several county governments have taken the initiative in providing public areas, through the Territorial Land Commissioner, through outright purchase, or through gifts by residents. Plantation managers and estates have added materially to such facilities. However, Hawaii can develop more recreation opportunities for its thousands of visitors, as well as for officers and men of the United States Army and Navy and for its own residents.

#### Needs

Investigate and determine feasibility of establishing a system of Territorial parks.

Aid with an effective administrative organization in carrying out the Government travel bureau programs.

Provide access for travelers to visit more of Hawaii's varied volcanic features.

Develop highland recreational areas on Oahu, Molokai, and Lanai similar to those of Kauai (Mokee), Maui (Haleakala), and Hawaii (Kilauea), and other areas on all islands, also lowland forest recreational areas.

Preserve and protect Hawaii's beach areas for the use and enjoyment of all. Retain in ownership all public beaches. Provide small boat public landing beaches in all districts.

Continue the present program of protecting Hawaiian roadsides against defacement by billboards and ramshackle structures.

#### Improvement of Transportation Facilities

The economy of the Territory depends on ocean transportation. The geographical location of the Islands in the Pacific Ocean places the Territory in a strategic position

with relation to trans-Pacific steamship lines. The Islands may be likened to the hub of a wheel, the spokes of which represent steamship lines serving the Eastern Gulf and western coast of the United States, western Canada, and practically all important ports in the Pacific area. As a result, the Territory is served by the American merchant marine as well as by vessels of other nations.

As long as Hawaii has been inhabited, there has been intercourse and exchange of goods between the islands. The white man first introduced the sailing schooner as a means of travel. As the need for transportation between the islands grew, more steamships were brought over from the Mainland.

The most common and popular form of public passenger transportation on the various islands is the motor bus lines. The populated areas are connected by paved roads, and as the distances are not great, buses have to a large extent displaced railroads as passenger carriers.

Commodities are transported on the various islands largely by numerous short railroad lines. The development of railroad transportation by both plantation and public utility companies has greatly aided economic progress in the Territory.

One of Hawaii's major sources of revenue is its tourist business, which ranks third, with agriculture first, and Army-Navy expenditures second. Through active promotion by the Hawaii Tourist Bureau for more than thirty-five years, the tourist business has grown to produce a ten-million-dollar-a-year gross income. This income is especially valuable, because it is new money brought in and left in the Territory. It trickles down through all Island businesses and professions so that even those not directly in contact with tourists are nevertheless benefited indirectly.

Until more transportation facilities are available, it is not likely that the tourist travel to Hawaii can grow materially; in fact, for the last three years, the number of arrivals has been almost constant. Until such transportation is available, every effort should be exerted to develop tourist travel to Hawaii during the lighter spring and, particularly, fall seasons.

#### Development of New Industries

The principal industries of the Territory are based on agriculture. This condition has resulted largely from an absence of ores

and other minerals; the natural resources consisting mainly of land, water, sunshine, and a 365-day growing season.

Practically all of the sugar plantations are nearly self-contained units with their own transportation systems, shops, utilities, and mills for manufacturing sugar from sugar cane. Hawaiian Sugar Planters Association data indicate that about 70 percent of the employees are engaged in strictly agricultural pursuits, while the remaining 30 percent are employed in administrative and industrial phases of sugar production. In nearly all cases, the product of the mills is in the form of "raw" sugar, but two plantations, one on Oahu, the other on Maui, produce refined sugar. A by-product of the sugar mills is molasses, much of which is used locally, but it is also shipped in large quantities to the Mainland. Another by-product of the industry is a fiber board called "canec" which is manufactured from bagasse or the fibrous part of sugar cane.

Only a very small part of the annual pineapple crop is consumed as fresh fruit. The great bulk of it is canned in 9 canneries: 3 on Oahu, 3 on Kauai, and 3 on Maui. The cannery companies do most of their packing in the summer months, at which time most of the fruit ripens. This results in seasonal employment as compared with the more steady employment on the sugar plantations. The crops from Molokai and Lanai are transported by barge to Honolulu for canning, as there are no canneries on those islands.

Although Hawaii is not an industrial territory, favored with a world-wide commercial background, many large specialized industries have been established in the Territory. Products range from lauhala hats and houseware to foodstuffs, and wood-carvings.

The annual yield of the commercial fisheries of Hawaii during the past ten years has averaged 11,800,000 pounds, with a value as landed of a million to a million and a half dollars, according to the published reports of the Division of Fish and Game of the Board of Agriculture and Forestry.

There is a widespread feeling in Hawaii that the fish resources have declined in abundance during the last quarter century. It is generally believed that depletion from overfishing has occurred primarily among the inshore or shallow water species, no anxiety being expressed over the condition of the offshore fisheries for pelagic or deepwater species.

#### Needs

Investigate possibilities for manufacture for local use and for export of volcanic, oceanic, ceramic, etc., mineral products, including cement.

Study possibilities for manufacture of motor fuel from molasses, thus converting an important agricultural waste product into a usable commodity. Study possibilities for washing brown sugar for local consumption.

Develop new uses for local forestry products. With changed demands, investigate possibilities for rehabilitating rubber growing as an agricultural industry.

Continue exploration of possibilities of building up Hawaiian fishing industries. A Federal fishery station and hatchery are needed.

Develop export markets for local products, especially for shipment to the Mainland of tropical fruits and winter vegetables.

#### Public Health and Sanitation

Hawaii's health problem is unique because of the isolation of the Islands and the heterogeneous races and customs. Organization for health protection, evolved in the last hundred years, is governed by increased knowledge in the field of science and experiments in application by various agencies. The trend in the Islands is toward centralization of public health work.

The future health problem seems to be chiefly one of prevention and covers the fields of engineering, communicable disease, sanitation, and a higher standard of community welfare. The trend is towards specialization of activities with highly trained personnel, responsible to the Territorial government or its agents. Urgent needs are to:

Provide more public aid through necessary legislation for the indigent sick and infirm, including county hospitals and dispensaries.

Provide Federal financial aid for leprosy treatment.

#### Improvement of Living Conditions

Much has been done in recent years in national building and housing legislation. Local offices of the Federal Housing Administration, the Home Owners' Loan Corporation, and the Hawaii Housing Authority have been established in the Territory.

Slum clearance and low-rent housing have been considered in Hawaii since 1935, when

an attempt was made to obtain Federal aid. Surveys are being made for projects to be approved by the United States Housing Authority for demolition of slum, sub-standard dwellings. The Honolulu City Planning Commission, the Board of Health, building departments, and the Territorial Fire Marshal are cooperating to reduce sub-standard living conditions.

#### Needs

Encourage building of private homes and extension of home ownership through low-interest loans and other legitimate aids to home owners.

Provide low-cost housing for low-income families through cooperative public and private efforts.

Enact necessary enabling legislation providing for establishment of local agencies to cooperate with the Federal Government on housing programs in rural as well as urban areas.

Cooperate with the Agricultural Extension Service of the University of Hawaii and the Farm Security Administration and other agencies in promoting rural welfare.

#### Prevention of Slums by Control of Urban Development

Guide population growth in and around cities into desirable settlement patterns through control of subdivision developments, land-use zoning, and orderly expansion of needed public services. Improve streets, sidewalks, water supplies and sewers, parks, playgrounds, schools, and other essential facilities.

Prevent inadequate control of land use, lot sizes, spacing, and type of structures that destroy property values and produce blighted areas. This control and regulation of urban and suburban growth is required so that necessary public facilities and services can be supported by tax revenues.

#### Expansion of Education

The rapidly increasing school population, particularly during the decade from 1924 to 1934, introduced a serious housing problem. While the number of public schools in the Territory has not increased materially since 1900, it has been necessary in many instances to arrange for additional land area. To provide for seven times as great a school population, it has been necessary to provide a large number of new classrooms. In 1925 and again in 1933, the building programs

legged, resulting in acute housing problems in many parts of the Territory. Such periods of lag, of course, necessitate heavy outlays in order to care for existing situations. Extensive building programs were found necessary during the period following 1925 and again during the biennium ending February 1939.

As a result of the expansion in secondary education authorized by the Legislature in 1937, high school building requirements have been abnormal. The great expansion of vocational work during the past fifteen years has necessitated the erection and equipment of classrooms designed for the teaching of agriculture, home economics, and the various types of shop work.

In Hawaii, the design of buildings is affected in marked degree by climatic conditions. The compact buildings required elsewhere because of the heating problem are out of place. Throughout rural Hawaii, especially, the one-story building with all classrooms opening upon lanais seems to be most suitable. In certain densely populated areas, especially in Honolulu and Hilo, land costs and the necessity for conserving space make it necessary to construct two-story buildings with corridors instead of lanais. The lack of any need of central heating, however, gives opportunity for a type of architecture not generally found on the Mainland. Much remains to be done in designing the type of school architecture that is most admirably suited to conditions in the Territory.

Extension of education among all classes and age groups is essential to an efficient democracy. Educational facilities should be improved, and teachers should be trained in curricula of particular application to Hawaii. Increased attention to the agricultural and industrial demands of the Islands should be given, and a definite program of vocational guidance should be initiated.

#### Needs

Expand local public problems forums for discussion of important issues and for pursuit of studies in specialized fields.

Provide expansion in training of citizens of Hawaii in understanding of aims and methods of American democracy.

Reduce dual citizenship and work for cooperative modification of foreign language school programs.



**Consideration of National Defense**

The activities of the Army and Navy for national defense in the Pacific are important factors in the economic and social welfare of the Territory. The Hawaiian Islands comprise the 14th Naval District, the headquarters of which are at Pearl Harbor, Oahu.

*Needs*

Cooperate in every possible way with the United States Military and Naval forces by providing organizations for civilian assistance in national defense.

Develop civilian projects contributory to the maintenance and operation of organized forces for national defense, including adequate housing for Army and Navy officers and enlisted men, at reasonable cost.

Continue to study possibilities for closer economic integration of the Territory with the United States and of ultimately establishing statehood for Hawaii.

Obtain maximum benefits from future expenditures for public improvements by planning, programming, and budgeting public works well in advance of construction.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

REGION 9

PACIFIC NORTHWEST

PORTLAND, OREGON

1940

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Report of the  
PACIFIC NORTHWEST REGIONAL PLANNING COMMISSION

B. B. Kizer, *Chairman*  
*Washington State Planning Council*  
*Spokane, Washington*

Walter Clark, *Vice Chairman*  
*Idaho State Planning Board*  
*Boise, Idaho*

D. P. Fabrick, *Chairman*  
*Montana State Planning Board*  
*Helena, Montana*

David Eccles  
*Executive Secretary*  
*to the Governor*  
*State Capitol Building*  
*Salem, Oregon*

Roy F. Bessey, *Counselor, Region 9*  
*National Resources Planning Board*

## FOREWORD

In the social consciousness of every region, there is some general conception of the goals toward which that community should be striving.<sup>1</sup> Within recent years, there has been a rapid development of this community consciousness in all parts of the country, accompanied by a conviction that we should realistically take stock of what resources we have, and carefully think out how these resources can best be used in promoting the welfare and security of the people who are dependent on them.

In response to this movement, which has been particularly strong in the Pacific Northwest, the Pacific Northwest Regional Planning Commission, together with the other eight regional offices of the National Resources Planning Board, has been asked by that Board to submit reports, each delineating the essential framework of the regional development plan that has thus far emerged in each of the great regions of the United States. In this request, it has been suggested that each region attempt to convey in its report an idea of what that region may become within the next one or two decades on the basis of feasible use of the natural and human resources that are known to be available.

In proceeding with this assignment, the Pacific Northwest Regional Planning Commission does not presume to adopt the role of regional master architect. It does attempt to report relevant facts and to draw together and harmonize the various plans that have been developed by the people of the Region, and by the technical agencies that serve them.

Such a regional development plan does not need to be drawn out of the imagination. Beginning in 1927, the Congress authorized the Secretary of War to begin a series of studies looking toward the full control and use of the water resources in each of the

river systems of the United States. A comprehensive report covering the Columbia River and its tributaries with a plan for multiple use development was submitted by the Army Corps of Engineers in 1932. Further detailed studies covering the Willamette River basin and other drainages have since been completed. During the same period, the U.S. Forest Service has been at work on studies of the forest resources of the Region and on studies designed to bring about improvement in forest management. The Bureau of Reclamation has been making technical investigations of the possibilities for the expanding of irrigation and has worked out detailed engineering plans for a number of important projects in various parts of the Region.

With the establishment of the Soil Conservation Service, the Farm Security Administration, and the Agricultural Adjustment Administration in the Department of Agriculture, a broad and comprehensive program for the conservation and rehabilitation of farm lands began to take form. All three of these services operate on a decentralized regional or State basis, and each is engaged in working out a program designed to meet local conditions. In addition to these activities, which stem from Nation-wide statutory authorizations, the Department of Agriculture, through its Bureau of Agricultural Economics, Forest Service, and cooperating State Extension Service, has been sponsoring a localized program of agricultural and land-use planning. Committees, composed primarily of local farmers, are functioning in most of the counties of the Region, with the technical assistance of personnel made available by the bureau and its cooperating agencies. As a result of this activity, there is developing in each agricultural area a fairly concrete plan for the development and better use of the land.

The Grazing Service, Fish and Wildlife Service, the National Park Service, the Oregon and California Revested Lands Administration—all of the Interior Department—have been

<sup>1</sup> For some time there has been concrete evidence of this in organizations like the New England Council, the New York Regional Plan Association, and the Southern Regional Committee of the Social Science Research Council.

active in planning for the conservation and development of resources placed under their care. The Geological Survey and the Bureau of Mines, with State cooperation, have contributed a large amount of scientific information in the mineral resources field.

The establishment of the Bonneville Power Administration in 1937, and the recent executive order charging it with responsibility for the marketing of surplus power soon to become available at Grand Coulee Dam, gave the Region still another broad field in which public planning must function.

To follow this list of Federal agencies, and the equally important State agencies, to its end would consume more space than can be afforded here. Suffice it to say that the planning activity involved in the execution of this multitude of services that have been undertaken by Federal, State, and local government does involve a complicated maze of relationships—physical and economic. There is definite need at each level of government for central planning agencies, the chief function of which is to try to see the community as a whole, and to facilitate the harmonizing of plans and the inter-change of information among the many groups concerned.

The Pacific Northwest Regional Planning Commission, with the cooperation of the State planning boards, began to pursue this course in 1934. In 1935, it submitted a report on the future of the Region and on the regional organization for planning, construction, and operation of public works.<sup>2</sup> Currently, the commission has been engaged in a study of migration and other population trends, and of land and industry, as fundamental means for adding to economic opportunity in the Region.<sup>3</sup> Between these major studies, it has carried out others, for example: of the Region's balance of trade, to throw light on the essential economic position of the Region;<sup>4</sup> of the

forest resource on which the Region is economically dependent to a high degree.<sup>5</sup>

With a broad background of study, conference, and discussion concerning resource, conservation, and development problems and proposals, it has been possible to prepare, with a degree of confidence, this framework for a regional development plan for the Pacific Northwest.

It should be noted that a framework—and not a plan—is here presented. A complete plan for the Region is a concept not yet attainable in the Pacific Northwest. Such a plan would have to be a synthesis of a great many individual plans—of Federal departments, of States and their subdivisions, of civic, corporate, and private interests. Since many of these do not exist and all cannot be secured, much less compiled, in a single widely understandable plan, the endeavor has been to select only the broad essentials of the larger plans and weave them into a relatively simple statement of objectives for the Region, together with general analyses of the outstanding needs and the kinds of public policies, works, and organization that will further the broad and progressive development of the Region.

This kind of a skeleton plan is also more in harmony with the nature of subnational regions. While such regions are quite often fairly well defined physical, economic, and cultural entities, they are not units in which a unified political control may be exercised. The more detailed and specific plans are the concern of the States and other responsible political subdivisions. Yet these regions are units for which general directives and plans are extremely desirable, and in which the maximum degree of correlation of development policies and plans will be very profitable.

The regional development plan cannot be in common "blueprint" form—as might the physical plan for a small area or an individual project. Yet, considering the area and scope of the subnational region, it may be relatively realistic, even though set out in general terms. It must be over-all to be comprehensible. It should be related to a generally

<sup>2</sup> Pacific Northwest Regional Planning Commission, National Resources Committee: Regional Planning, Part I - Pacific Northwest, 1936.

<sup>3</sup> Pacific Northwest Regional Planning Commission: Migration and the Development of Economic Opportunity in the Pacific Northwest, 1939 (mimeo.).

<sup>4</sup> Pacific Northwest Regional Planning Commission: Balance of Trade of the Pacific Northwest, 1937 (mimeo.).

<sup>5</sup> Pacific Northwest Regional Planning Commission: Pacific Northwest Forest Resources, 1936.

ponderable period of time—to the ensuing decade as well as to the coming generations. It should emphasize the larger aims above those of more minor and transitory character. Yet it should be flexible—susceptible of being readily reshaped from time to time to meet new conditions and new knowledge. It

*National Resources Planning Board*

should, of course, be subjected to wide review and criticism.

To give a general conception of the regional development plan as a whole, a tabular outline of the framework of a development plan has been presented at the opening of this report.

ACKNOWLEDGMENT

This report represents, as stated in its foreword, a brief composite of the development programs and policies formulated by the people of the Region and the various agencies that serve them. No one group—least of all the Pacific Northwest Regional Planning Commission (which has reviewed and sponsored the report) or the National Resources Planning Board regional office staff (which has done the mechanical work of drafting it)—would presume to claim this framework of a plan as its own creation. The broad view intended to be presented could result only from a continuing contribution—on the part of the many Federal

and State agencies and public-minded bodies and individuals concerned—to the knowledge of the Region's resources and to clarification of its aims. Grateful acknowledgment is made of that long-term cooperation with the regional planning commission and its associated committees and advisors, as well as of immediate assistance of agencies and individuals in furnishing advice, information as to plans and projects and other data, and illustrations for the report. It is regretted that the great amount and wide range of assistance received precludes specific mention here of those to whom sincere thanks are due.

PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN  
P A C I F I C   N O R T H W E S T

**I. Basic Resources of the Region:  
Over-All View of the Possibilities and  
Problems of Regional Development**

Among all the regions of the United States, none is more strongly knit together by physiographic, economic, and cultural ties than the Pacific Northwest. Of all the cohesive factors, no one is more potent than the Columbia River and its tributaries. This drainage system, with closely related areas, embraces, roughly, the States of Washington, Oregon, Idaho, and the Rocky Mountain province of western Montana. Within this Region<sup>1</sup> there lie approximately 188 million acres of land—approximately one-tenth of the land area of continental United States. Thus far, the Region has accommodated less than 3 percent of the Nation's population.

Inventory of the Region's natural resources shows clearly that there are definite possibilities of further development which would provide a means of livelihood for a considerably larger population. In such development, the role of government will be especially important for several reasons: The Federal Government retains ownership of about half of the lands of the Region. The development and management of these publicly owned resources have a strategic influence upon the economy of the entire Region. The Federal Government alone is capable of planning and financing many of the basic projects that are required to unlock new resources. Many of these large projects involve multiple benefits, some of which have never been supplied on a direct-charge basis.<sup>2</sup>

<sup>1</sup> No precise boundaries have significance in defining a region. For statistical purposes, however, certain arbitrary limits must be adopted. The area included in the so-called Rocky Mountain province of western Montana includes the following 16 counties: Beaverhead, Broadwater, Deer Lodge, Flathead, Gallatin, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Powell, Ravalli, Sanders, and Silver Bow. Quite often it is impossible to obtain certain data on a county basis. In such cases, it has been necessary to include the entire State of Montana in the Region under discussion.

<sup>2</sup> Navigation improvements, for example.

In order to give perspective to the program outlined in this report, the following over-all view of basic resources is presented:

**Agriculture**

Of the 188 million acres in the Region, slightly less than one-third (51 million acres) is in farms. Of this farm land, less than one-third (16 million acres) is cultivated. Crop failure and the summer fallowing system practiced in much of the dry-farming area cut down the acreage normally harvested to about 10 million acres. In the final accounting, the Region's producing crop land is limited to about 5 percent of the total land area.

Within recent years, this crop land base has not kept pace with the increase of population. The ratio of improved land in farms to population has been on the decrease since 1880. In the 15 years, 1920-1935, there had been no net increase in the improved land acreage, but there had been a fairly rapid population growth. The notable lag in the bringing in of new crop lands has in part been offset by more intensive farming methods and a decrease in the proportion of the population directly dependent on agriculture. The more intensive use, however, has brought with it impairment of the productivity of the soil. Recent rough surveys made by the Soil Conservation Service indicate that about 3 million acres now under cultivation in the Pacific Northwest are unsuited for sustained cropping, and should ultimately be shifted to pasture and forest. Until new lands become available, however, the present heavy pressure of new farm population seeking settlement opportunities will not permit very much crop land retirement. The critical query, "Why bring in more agricultural land when there is a national problem of an agricultural surplus?" is readily answerable by considering the facts that have been cited. If farming is to retain its appropriate position in the economy of the Region and keep pace with the anticipated

FRAMEWORK OF A REGIONAL DEVELOPMENT PLAN FOR THE PACIFIC NORTHWEST  
T A B U L A R O U T L I N E

1. Land Use Stabilization, Soil Conservation

Retirement, uneconomic farming areas  
More economic farm units  
Improvement, land use practices and controls  
Water conservation  
Soil conservation and refertilization  
Mineral fertilizer industry

2. Land Development—Reclamation—Settlement

Irrigation—Columbia Basin  
Snake Basin  
Willamette Valley  
Other valleys  
Small projects

Land clearing—deforested areas, economic agricultural lands  
Drainage and diking  
Settlement programs and aids  
Range conservation and development, including water conservation  
Conservation, nonagricultural lands; forest, watershed, recreation, wildlife habitat, etc.

3. Sustained Yield—Forest Management

Cooperative sustained yield units  
Forest protection, against fire, insects, disease  
Improved forest practices, aids, and controls  
Forest land rehabilitation  
Public acquisition program  
Tax adjustment  
Technological development, manufacturing, waste elimination, etc.

4. Water Use; Drainage Basin Development

Multiple purpose projects—  
Columbia and other drainages, large and small projects  
Headwater storage development  
Interstate and international agreements for water use and control  
Upstream improvements for soil conservation, watershed improvement, range conservation, irrigation, flood control  
Flood protection; flood plain zoning  
Pollution abatement  
Fish and wildlife conservation

5. Hydroelectric Power Development

Continued power installation in multi-purpose projects to meet development and defense needs  
Continued development of grid system  
Power-use research and experiment program  
Regional (corporate) power agency  
Coordination of facilities in transmission, interchange and distribution of energy  
Rural electrification

6. Industrial Expansion and Diversification; Manufacturing

Improved management of essential resources  
Research and technological development  
Aids to capital investment  
Establishment of key basic industries—chemical, metallurgical, etc.  
Establishment of new fabricating, processing, manufacturing industries

7. Improved Distribution and Marketing

Market research and development—public, industrial, cooperative  
Improvement, standardization—processing, grading, packaging, etc.  
Waste eliminations  
Distribution—research and improvement of facilities

8. Transportation Development; Coordinated Transportation

Trunk waterway system improvement  
Rail consolidations  
Highway improvement, including limited ways for main routes  
Airway and airport system improvement  
Integration of transportation lines, terminals, equipment, for effective operation

9. Social, Economic, and Technological Betterment

Extended educational opportunities  
Community improvement and reconstruction  
Housing improvement, blighted urban and fringe areas  
Sanitary improvement  
Improved programs—Employment  
Migratory labor  
Health  
Welfare  
Social Security

10. Cultural Betterment; Outdoor Recreation

Educational system and curriculum improvement  
Community facilities and organization for educational, discussion, arts, recreational activities, etc.  
Protection of scenic assets. Development of recreational areas and facilities

11. Improvement of Governmental Machinery

School district reorganization  
Simplifications, consolidations  
Tax system simplification and improvement  
Improvements in administration and administrative techniques  
Coordination of public works and service—Federal-state—local, interdepartmental, etc.

12. Alaska Development

Promotion and acceleration of the utilization of resources and general development

expansion of industry, a rather extensive program for the development of new crop lands is fully justified. New lands are also needed to offset large acreages that are going out of production elsewhere in the Nation.

Careful inventory of the lands potentially available for agricultural use is now in progress. This work is being carried on through a joint project of the Bureau of Agricultural Economics and the National Resources Planning Board, in collaboration with other Federal and State agencies. Because of the lack of detailed engineering studies, which are necessary to determine the feasibility of many proposed projects, this inventory will not be conclusive in a great many cases, but it will provide a usable compendium of all existing information and a reasonably reliable measure of the "ceiling" for agricultural land development in the Region.

Preliminary estimates made by the Soil Conservation Service, based on its surveys and upon census data, indicate that there are, in Washington, Oregon, and Idaho, 5 million acres or more of land not now in cultivation that would be suitable for cropping if used under good soil conserving practices. Much of this land is already in farms, but, for one reason or another, it is not being used in ways that are commensurate with its real productive capacity. Of the 5 million acres tentatively estimated to be available, 1 million are now in pasture, another million are covered with stumps, brush, and timber, a quarter of a million or more are in need of drainage or flood protection, two and three-quarters million are suitable for irrigation. Further investigations may bring an upward revision of these tentative estimates, but they will probably not greatly change the general aspect of the picture. The best that can be done will probably not push the productive crop land in the Pacific Northwest above 7 or 8 percent of the total land area. The crop land harvested in the United States as a whole in 1934 was 19 percent of its total land area.

The problem of agricultural adjustment in the Pacific Northwest is likely to become even more critical than it has been in the past few years. Because of the relatively

small population in the Region, it has been necessary to concentrate on specialized products that could bear the high transportation cost involved in moving these commodities to distant markets. In the production figures, this situation is clearly evident: Between 1933 and 1937 the four States produced, on the average, 17 percent of the wheat grown in the United States, 20 percent of the apples, 31 percent of the pears, 26 percent of the cherries, 75 percent of the hops, 15 percent of the sugar beets, 11 percent of the potatoes, 14 percent of the dry edible beans, 12 percent of the strawberries, 12 percent of the onions, 17 percent of the peas produced for canning purposes, 20 percent of the wool shorn. It possessed, during the same period, 6 percent of the Nation's cattle and 18 percent of the sheep.

A considerable proportion of the wheat and fruits were marketed abroad, and with the loss of the foreign market, it has been extremely difficult to find domestic customers able to take the products at a price that would cover costs of production and transportation. If these marketing difficulties continue, and there is reason to expect that they will, it will be necessary to shift the pattern of Pacific Northwest agriculture farther away from specialized horticulture and toward an expansion of general farming. This implies a need for more acres to supplant the highly intensified cultivation of orchards and truck crops. If this shift is not to bring about the permanent displacement of part of the farming population now dependent upon small intensively cultivated acreages that have been devoted to orchards and truck crops, there is another implied need for additional farm lands.

#### Forest Resources and Forest Products Industry

The paramount importance of the forest resource and the forest products industry in the Pacific Northwest economy is attested by almost every measure that can be applied. The forested lands of the four States comprise 89 million acres, or 40 percent of the total area. On these lands there stand nearly 900 billion board feet of timber—over one-half



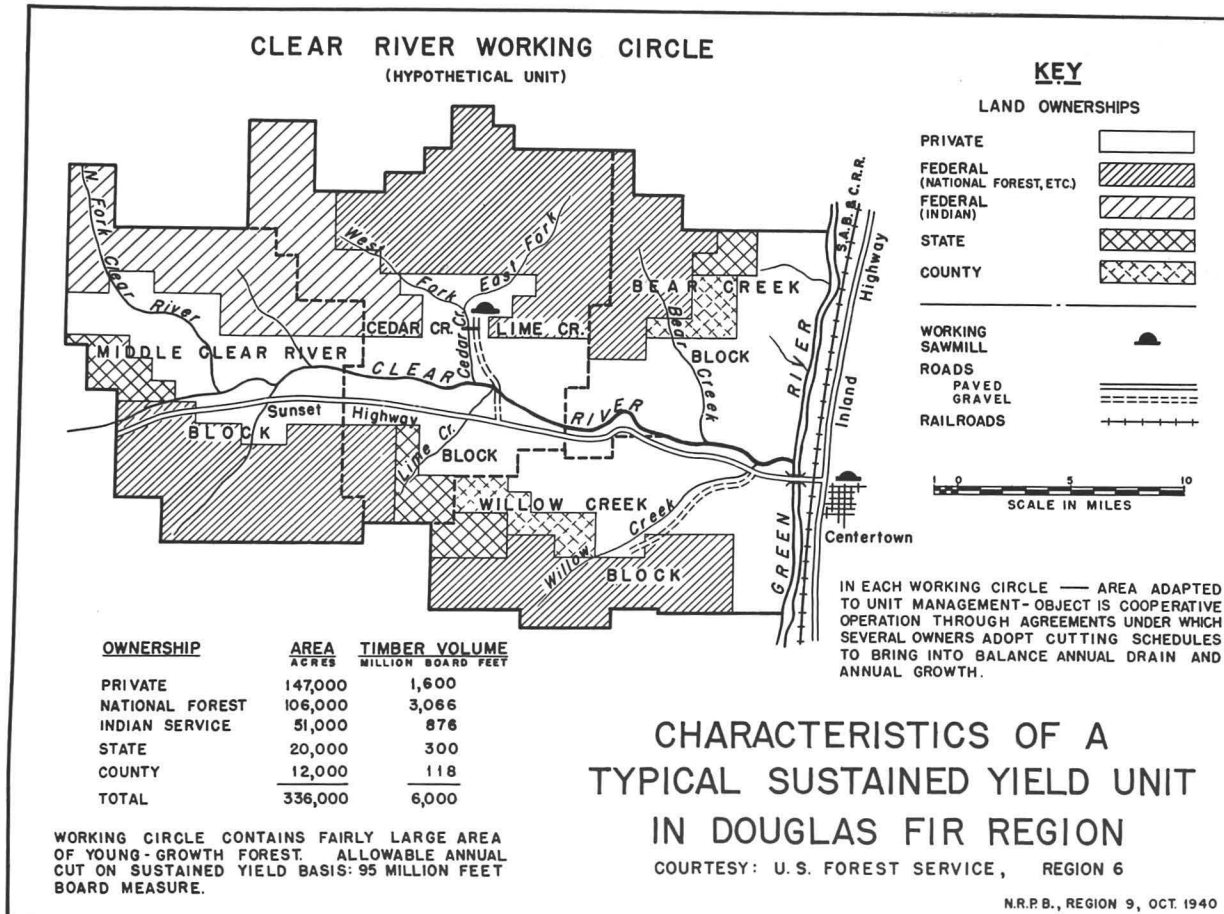


Figure 1. — Clear River Working Circle

of the total remaining stand in the United States. Over half of the Pacific Northwest timber volume consists of the species suitable for commercial utilization. Within the past decade or two, the Region has been supplying almost half of the softwood lumber produced in the Nation.

The forest products industries directly employ at least 10 percent of all persons gainfully employed in the Region. In 1937, these industries accounted for 68 percent of the total wage earners employed in manufacturing industries. The new wealth created by forest products manufacture, or as the Bureau of the Census defines it, the "value added by manufacture," in 1937 amounted to approximately 300 million dollars. Gross farm income in the four States in the same year, as estimated by the Bureau of Agricultural Economics, amounted to 522 million dollars.<sup>3</sup>

Of the total out-of-the-Region net shipments of commodities in 1929, forest products comprised 70 percent of the tonnage and 40 percent of the value. It has been estimated that the revenue derived from forest products amounts to about 40 percent of the railroad revenues earned on freight originating within the Region.<sup>4</sup>

The facts reviewed will serve to show that stability and permanence of the forest products industries are a necessity if the economic life of the Region is to remain at present levels. The prospects, under current forest management policies and practices, are not too bright. The need for a comprehensive and vigorous regional forest program is all too evident when we review the present and prospective discrepancies between the drain upon the resources and its growth replacement.

The current rate of depletion for the four States is in the neighborhood of 15 billion board feet per year. Of this amount, saw-log production accounts for about 10 to 12 billion board feet; minor forest products account for another 1.1 billion board feet; normal losses<sup>5</sup>

from fire, insects, windthrow and tree diseases account for 2.3 billion board feet. The prevailing losses, which could in large part be prevented by a more adequate fire, insect, and disease control, amount to 15 percent of the annual depletion.

Estimates of forest growth are subject to contention because of the fact that the large stands of mature timber will not put on more volume until the old stands are removed to make way for young growing stands. It is also true that there are considerable areas of very young growth not yet old enough to show favorably in the growth estimates. Taking these factors into consideration, it is necessary to cite estimates based on various conditions. On the basis of the present situation and granting the validity of the qualifying factors noted above, the current annual growth increment is only about 5 billion board feet—3 in the fir region and 2 in the pine region. In the course of time, even under present conditions of cutting and fire protection and rehabilitation, the annual growth increment may ultimately exceed present drain and finally reach about 16 billion board feet—10.3 in the fir region and 5.7 in the pine region. The difficulty with this picture, however, is that the 5 billion of present growth will not accelerate to the 16 billion anticipated for many decades—of course, not in time to avert a marked decline of the industry one or two decades hence. The urgent need for seeking ways and means to overcome this lag is dramatically illustrated in a recent study made by the Pacific Northwest Forest and Range Experiment Station. It was found that in the ponderosa pine region of Washington and Oregon, the net annual growth by 1965, without change in the past forest practice, would be about 600 million board feet. The quality of such increment, according to the Station's findings, would be inferior to the timber now being cut. The study then points out:

Growth can be more quickly increased in volume and also materially increased in value only by improved forestry practice. For example, if cutting practice throughout the region were shifted now to a lighter selection basis, leaving the younger, more thrifty 50 percent of the original stand to increase in volume after logging, it is

<sup>3</sup> Bureau of Agricultural Economics: Release dated January 5, 1939. This figure includes benefit payments.

<sup>4</sup> Pacific Northwest Regional Planning Committee: Forest Resources of the Pacific Northwest, National Resources Committee, 1938.

<sup>5</sup> This does not include the catastrophic losses that have occurred every decade or two.

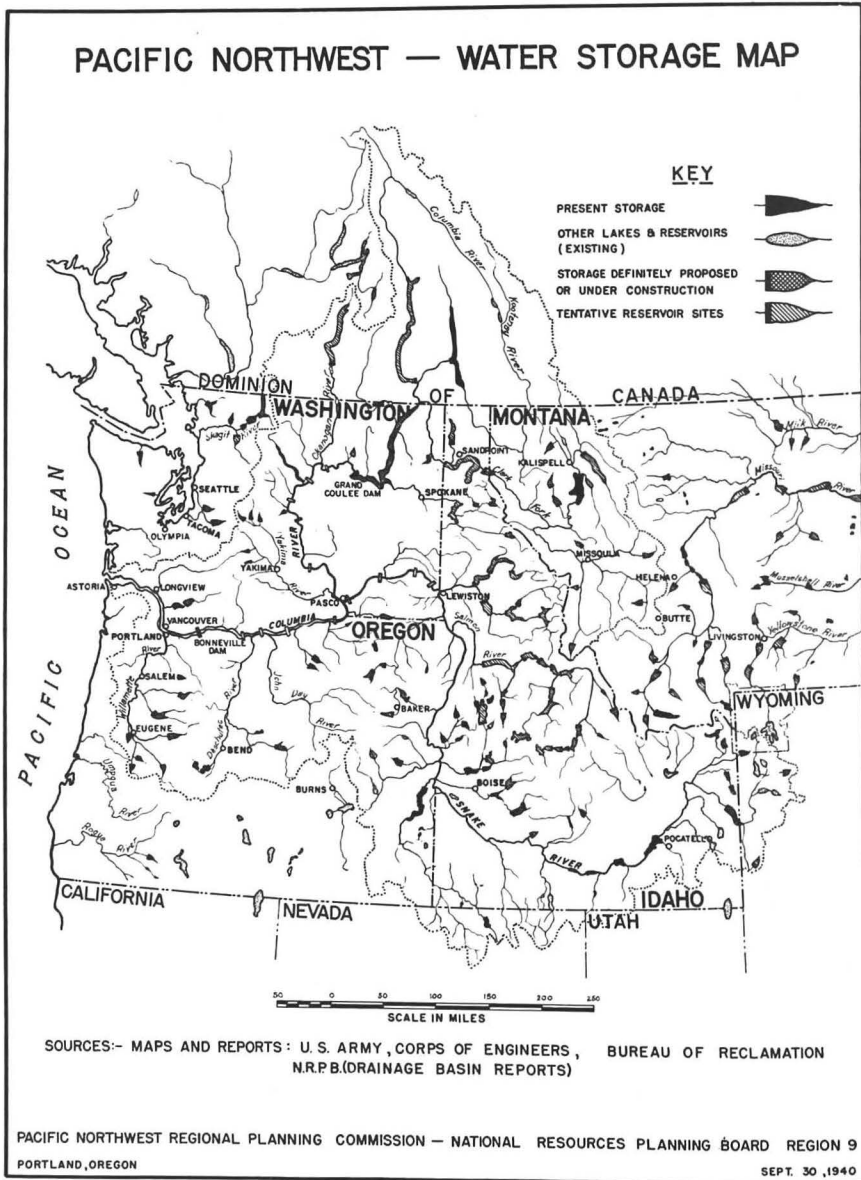


Figure 2. — Pacific Northwest Water Storage Map

estimated that annual net growth would approximate 830 million board feet in the year 1965.<sup>6</sup>

While this particular remedy for cutting down the lag in forest growth (selective logging) is not likely to be feasible in the fir region, the basic problem of stimulating the growth of trees that will be available for harvesting at the end of the next 20 to 30 years is essentially the same.

The regional picture that has been presented with reference to depletion and replacement of the forest resource is not entirely relevant for the reason that a large supply of virgin timber in the upper Willamette Valley of Oregon, for example, will not directly benefit the stricken communities of Grays Harbor, Washington, where depletion has reached an advanced stage. If this problem of forest industry permanence and stability is satisfactorily solved, it will not be through the balancing of drain and growth on the basis of large sub-national regions alone—much less on a solely national basis. The only satisfactory pattern, and the one that the Region should set about attaining, is one in which well-located centers of forest products manufacturing become the hubs of forest land areas, each of which can be managed on a continuous-yield basis. If such a pattern can be established within a reasonable time, the forest industries of the Pacific Northwest might not only partially avert the decline that looms ahead but in time, increase their present vital contribution to the Region's means of livelihood.

#### Hydroelectric Power

Concentrated within the four Pacific Northwest States (three-fourths in the Columbia River drainage) there is approximately 28 million horse power of undeveloped water power—40 percent of the national total.<sup>7</sup> The capacity of installed water wheels in 1937 amounted to 2.3 million horsepower or 14 percent of the United States total. Completion of the Bonneville and Grand Coulee projects on the

Columbia River will boost the installed capacity of the Region to over 5 million horsepower. About 25 million horsepower will still remain undeveloped. A glance at the national map of potential water power shows that no region of the country has such a large water power resource concentrated within a radius of 500 miles.<sup>8</sup>

The conversion of water power into electrical energy and the transmission of that energy to points of demand have opened vast possibilities for the use of power in industrial development. There was a time when electrical energy was used principally for mechanical purposes and for lighting. When so used, the cost of power is an important but not a determining factor in the location of industry. Within the past quarter century, however, a new type of industry has arisen based on the use of electricity as the principal factor in the manufacturing process. A whole new technology involving the treatment of metallic and chemical substances by electrolytic and electrothermal methods has given birth to a group of lusty new industries that are prepared to go to any part of the country where a large, dependable supply of low-cost electric power may be available.<sup>9</sup> The concurrent development of hydroelectric power with other economic uses of the water resource—irrigation, navigation, flood control, etc.—opens up the way for scaling down power cost to the point at which it will attract this special type of industry.

Rapid development along this line can doubtless be stimulated by completing the regional power transmission grid now under way, thus providing interconnection of all the principal generating stations and making dependable power available in all the important load areas where demand is likely to grow. Installation of additional generating capacity in the multi-purpose projects should proceed safely in advance of demand. Research and experimentation in power uses can also render valuable aid in advancing the program.

<sup>6</sup> Pacific Northwest Forest and Range Experiment Station Forest Growth in the Ponderosa Pine Region of Washington and Oregon, 1940, pp. 28-29.

<sup>7</sup> National Resources Committee: Energy Resources and National Policy, pp. 300-309, 1939.

<sup>8</sup> *Ibid.* p. 240.

<sup>9</sup> See Federal Power Commission: Power Requirements in Electro-Chemical, Electro-Metallurgical and Allied Industries, 1936.

In promoting this type of industrial growth, it is neither desirable nor necessary to strive for the establishment of great industrial centers comparable to those of the eastern United States. The prevailing pattern, in the interest of good living conditions and national security, should rather be based on the idea of a balanced distribution, which would avoid undue concentration of population in crowded urban areas. The establishment of a few of the key metallurgical and chemical industries should gradually open the way for the expansion of satellite industries which would fabricate and otherwise utilize the basic products.

The need for such expansion grows out of three conditions: (1) the general lack of adequate employment opportunities; (2) the influx into the Region of large numbers of people who are in need of some permanent base of support; (3) the anticipated shrinkage of employment in forest products industries one or two decades hence when important supplies of virgin timber are approaching depletion and the new growth timber is not yet available.

#### Water Resources

No region of the United States has such marked geographic variations in mean annual precipitation.<sup>10</sup> A large area of the Cascade Mountains, Olympic Mountains, and of the Coast Range has mean annual precipitation of 80 to 100 inches or more. This is well above the rainfall in even the most humid regions of the east and south. The Willamette Valley, which lies between the Cascades and the Coast Range, receives from 30 to 40 inches, but more than half of this ordinarily falls during January and February. East of the Cascade Range, the areas of heavy precipitation are confined almost entirely to the rugged mountain regions. The areas suited for agricultural use, with the exception of certain intermountain valleys, receive from 5 to 15 inches. In the great fertile Snake River basin of southern Idaho, the mean annual precipitation is less than 15 inches, and more than half of this falls in January, February, and March.

<sup>10</sup> California comes nearest to the Northwest in this respect.

A similar general condition prevails in the plateau regions of eastern and central Oregon and in the Inland Empire of eastern Washington.

These peculiar conditions, not found to the same degree in other parts of the country, make the problems of water use and water conservation a matter of vital importance. In general, it is true for the region east of the Cascade Range that economically available water supplies are the limiting factors in the expansion of agricultural land use. To bring the most fertile and suitable lands into production, it has been necessary to divert water from whatever streams were available, to construct canal systems, to build storage reservoirs, and to divert water from one drainage basin to another. The fact that one-third of the total acreage harvested in 1934 was under irrigation emphasizes the importance of water to Pacific Northwest agriculture. Even west of the Cascades Range, supplemental, summer irrigation is getting increasing recognition as essential to most effective use of lands.

In many parts of the Region, these "water lifelines" are inadequate to serve the areas now under the irrigation ditches. Losses amounting into millions of dollars due to water shortage are periodic occurrences in the Snake River basin and elsewhere. In these areas, there is an urgent need for the development of supplemental water supplies.

While irrigation is the major consideration in water use and control throughout most of the area lying east of the Cascade Range, it is not the only factor that merits attention. The vast potentiality of water power has already been described. In most cases, the development of this power can be nicely harmonized with irrigation developments. Flood control, likewise, often can be made to fit into the coordinated water plan. The main stem of the Columbia has a flow that will be ample for all conceivable uses. There is every reason to develop to the full its potentialities as an inland waterway. The same holds true for the Willamette River, where all of these uses will be harmonized in a multiple-purpose development. Here, in addition, the increase in stream flow during summer and autumn months will aid in the abatement

of a critical pollution nuisance pending the carrying out of a comprehensive plan of sewage disposal for the valley.

The pattern of regional water resources planning should provide for a careful integration of all water uses, each in its proper balance. This will require increasing collaboration of Federal and local planning and construction agencies in the technical investigations that precede the initiation of projects. No insuperable difficulties exist at the present time, and none will be likely to arise if provision is continually made for the joint consideration of projects on a regional and on a drainage basin basis.

#### Mineral Resources and Mining

The total value of minerals extracted in the four States in 1937 was 156 million dollars<sup>11</sup>—an amount equivalent to 30 percent of the estimated gross farm income of these States.

Of this regional production, Montana contributed 82 million dollars—of which 35 million were in copper, 9 million in silver, 7 million in petroleum, 7 million in gold, 6 million in natural gas, 5 million in zinc, and 4 million in coal.

Idaho production amounted to 41 million dollars—of which 15 million were in silver, 12 million in lead, 7 million in zinc, and 3 million in gold.

Washington production totaled 26 million dollars. The chief minerals were: 9 million dollars' worth of sand, gravel, and stone; 6 million of coal; 1 million of gold; and another million dollars in clay. With the opening of a new mill in Chelan County (Howe Sound) in 1938, the State in that year produced 5.5 million dollars' worth of copper, lead, zinc, gold, and silver. If this type of mining continues to expand, Washington may become an important producer of the mixed types of ore so important in Montana and Idaho.

Oregon mineral production in 1937 was valued at slightly less than 7 million dollars. Of this, 1.8 million dollars were in gold. Sand, gravel, and stone accounted for 2.5 million dollars.

Among the States of the Union, Montana in 1937 ranked 15th in value of minerals produced, Idaho 24th, Washington 30th, and Oregon 40th. Idaho led all the States in the production of silver and antimony; it ranked fourth in the production of zinc. Montana led all other States in the production of manganese, arsenous oxide and vermiculite; it ranked third in the production of copper. Washington led in the production of magnesite and ranked third in the production of diatomite. Oregon ranked second in the production of mercury, chromite, and diatomite; third in the production of platinum and allied metals.

The present hostilities in Europe, Asia, and Africa and the American national defense program bring to the forefront the problem of procurement of essential, strategic and critical minerals. Deposits of low-grade manganese have been mined for some time in Montana, but production has normally not exceeded 2 or 3 percent of the United States' requirements. Chromite has also been mined, but the total output thus far has been small in comparison with the country's needs. The aircraft and other industries have created a large demand for aluminum, magnesium, and their alloys. Within recent months, a plant has been established at Vancouver, Washington, to utilize Columbia River power in the reduction of aluminum ore shipped in from South America and southeastern United States. If new processes could be developed to the commercially feasible stage, it might be possible to produce aluminum from the alunite clays found in Utah, Washington, and elsewhere. Magnesium might likewise be produced from the magnesites and dolomites of Washington or from brines. Tungsten is an essential in the making of certain alloy steels, but Idaho, Montana, and Washington produce only a small amount in comparison with the Nation's requirement. Mercury is also important from the defense standpoint; domestic production is comparatively small and limited to California and Oregon. The mineral resources of Alaska also have high present and potential importance in the national security.

To what extent the Pacific Northwest and Alaska can contribute in the production of these essential and strategic materials is

<sup>11</sup> U. S. Bureau of Mines: *Minerals Yearbook 1938*.

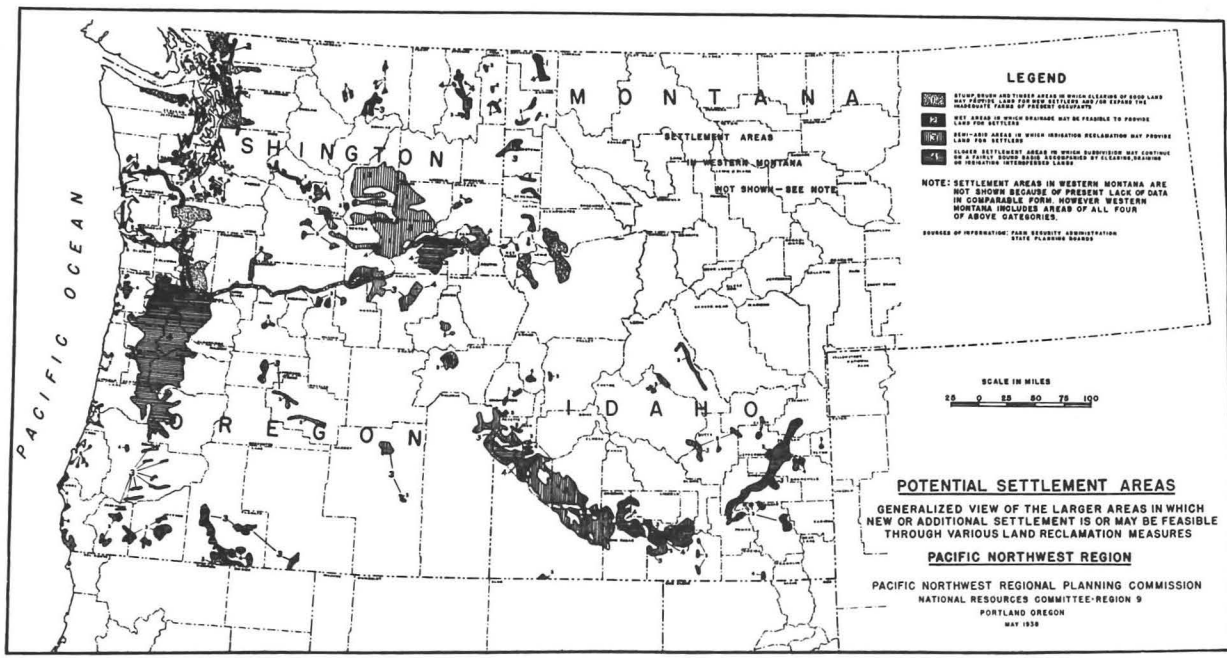


Figure 3. — Potential Settlement Areas

still a matter of some uncertainty. Better judgments should be possible with the completion of technical investigations now being carried out under authority of the Strategic Minerals Act.<sup>12</sup>

The problem of developing the mining and metallurgical industries of the Pacific Northwest is closely bound up with the need for more extensive geological and mineral exploration work. The mineralized areas of the Region possess many known occurrences of important metallics and nonmetallics not yet commercially utilized. When the magnitude and quality of these deposits are more definitely known, it will be possible to give more adequate attention to the problem of developing suitable metallurgical and processing technology. Because of the possibility of utilizing the large supply of low-cost electric power, the processes most economical in this Region may deviate radically from past standard American practice.

Ideally, the mineral investigations of this Region should be closely coordinated with a parallel program of research and experimentation in power use. In addition, the planning of the future power system should take into account the requirements of the mining and metallurgical industries.<sup>13</sup>

#### Manufacturing Industry

The new wealth created in the four States in 1937 by manufacturing industries amounted to 544 million dollars<sup>14</sup>—a sum slightly exceeding the estimated gross farm income.

Of this regional total, Washington contributed 54 percent (\$295 million), Oregon 31 percent (\$169 million), Montana 8 percent (\$42 million), and Idaho 7 percent (\$38 million). The distribution of wage earners employed coincides almost exactly with these

proportions. The two coast States (largely those portions lying west of the Cascade Range) have about 80 percent of the Region's manufacturing. This is offset in part, of course, by the concentration of the greater part of the mining activities in Montana and Idaho.

No available data are entirely satisfactory as an accurate indicator of the Region's present stage of industrial growth. However, on the basis of the new wealth per capita of population annually produced by manufacturing activity, the Region shows, in comparison with the national average, a deficiency of 25 percent in 1937. Manufacturing industry in the Nation at large produced new wealth, equivalent to \$195 per capita; the corresponding figure for the four Pacific Northwest States was \$146. In a few special lines—forest products, food products, pulp and paper—the regional per capita production exceeded the national by a very substantial margin. In all other lines, the regional per capita output was but a small fraction of the national figure. (See Table I.)

Table I.—Value Added by Manufacture Per Capita of the Population in the Four Pacific Northwest States and United States

1937			
Industry groups	Region	United States	Ratio of region to U. S. (percent)
All industries <sup>1</sup> — — —	\$146.44	\$194.75	75.2
Food and kindred products — — —	26.89	25.95	109.6
Textiles and their products — —	1.41	22.99	6.1
Forest products — — — — —	63.12	9.79	648.7
Paper and allied products — — —	15.55	6.60	236.6
Printing, publishing <sup>2</sup> — — — —	8.39	13.87	60.5
Chemicals and allied products — —	1.21	13.88	8.7
Products of petroleum and coal —	.86	4.55	18.9
Leather and its manufactures — —	.21	4.58	4.6
Stone, clay and glass products —	1.84	6.75	27.3
Iron, steel, and their products <sup>3</sup> —	2.81	26.56	10.6
Nonferrous metals and products —	.87	6.63	13.1
Machinery <sup>4</sup> — — — — —	4.08	26.82	15.2
Transportation equipment — — —	1.18	14.59	8.1

Source: U. S. Census of Manufactures and Census Bureau Estimates of 1937 (Population).

<sup>1</sup> Includes rubber products and miscellaneous industries.

<sup>2</sup> And allied industries.

<sup>3</sup> Not including machinery.

<sup>4</sup> Not including transportation equipment.

If, through continued depletion of the timber supply, the wood-using industries should fade away and no additional economic underpinning should have been developed in the Pacific Northwest industrial structure, the

<sup>12</sup> For an up-to-date study of potential defense industry in the Pacific Northwest see, Bonneville Power Administration: Industries Important to National Defense. Possible Location of Establishment in the Pacific Northwest, July 1940.

<sup>13</sup> The vital relationship between power supply and mineral production is illustrated by the situation in Montana during 1937 thus described by the U. S. Bureau of Mines: "Mining of zinc-lead ore at Butte was far below capacity because of the continued shortage of electric power which prevented capacity operations of the electrolytic zinc reduction plants." — Minerals Yearbook 1938, p. 320.

<sup>14</sup> This is the total value added by manufacture as reported by the Census Bureau.



results would be extremely serious. Removal of these industries from the 1937 pattern would have left the Region at a level 65 percent below that of the Nation.

Industrial development stimulated by catch-as-catch-can promotion, tax concessions, and other forms of community subsidy is legitimately suspected by a great many people. This, however, should not blind the Pacific Northwest to the urgent need for an orderly and economic development of every feasible new type of manufacturing that will strengthen the industrial base of the Region's economy.<sup>15</sup>

## II. Objectives of the Regional Development Program

The central objective of the action programs, briefly touched upon in the foreword, may be stated in a single phrase: the full use of human and physical resources to augment the welfare and security of the people now and in the generations to come.

While the developmental activities are dispersed over a wide front and are entrusted to a great many agencies, it is possible to draw the whole program into focus and present it in a fairly simple statement. This may serve as general guide and criterion for the consideration of specific program proposals—public, civic, and private—and supply a view of the general framework into which the various subsidiary programs should fit.

It should be emphasized that the twelve-point program here outlined is not an artificial creation of the Regional Planning Commission or a planning staff. It is a synthesis, in simplified form, of the aspirations of the Region itself. It represents a concentration of official, technical, and citizen views gathered through a democratic process engendered by a continuous merging of departmental, State and local plans. This has been fostered through a long series of large and small conferences attended by both laymen and technicians, by the meetings of regional and State planning agencies and their technical committees, and by the general pooling of insight and experience.

<sup>15</sup> Migration and the Development of Economic Opportunity in the Pacific Northwest, Part II, Sections 2 and 3; also The Balance of Trade of the Pacific Northwest, Pacific Northwest Regional Planning Commission.

## National Resources Planning Board

Each of the twelve major points in the regional program is compressed into a single statement. Brief amplifications are given in the subsidiary notes. Although stated in broad terms, these objectives are intended to emphasize the more realistic and immediate aspects of development that may be hoped for in the readily ponderable period of ten years.

### The Major Objectives

1. To stabilize agricultural land use and to preserve irreplaceable soil, the Pacific Northwest should carry forward a broad program for the improvement of land management.

- a. Retire from cultivation those areas in which soil depletion cannot be arrested by economically feasible changes in cultivation method and cropping system.
- b. Increase the size, in a number of areas, of farm operating units now too small to permit conservative use of the land.
- c. Make full use of soil conservation districts, grazing districts, rural land zoning, and other public and cooperative devices for improving land-use practice.
- d. Continue and expand soil conservation programs in order to maintain the productive power of good croplands now in use.
- e. Foster the establishment of a mineral fertilizer industry (phosphate, potash, etc.) adequate at least to supply these elements in quantities and at a price that will meet the need for maintaining the productivity of the western croplands.

2. To provide, within the decade, economically adequate settlement opportunities for at least 20,000 or 25,000 farm families and to permit agricultural production in the Region to keep pace with other forms of development, the Pacific Northwest should reclaim by irrigation, clearing, drainage, diking, and flood control at least 1,000,000 acres of fertile croplands.

- a. The larger units in this program should be: the Columbia basin area of Washington, the Snake River basin area of Idaho, the Willamette Valley of Oregon, some of the cut-over area of western Washington and the intermountain valleys of central and western Montana and northern Idaho. Smaller projects for irrigation, clearing, and drainage of suitable land should be distributed throughout many parts of the Region. Range improvement work should be applied in the grazing areas.

- b. To accomplish this, there would be required a continuing systematic land inventory based on reliable soil and land

classification surveys covering the most favorable areas. Public aids should be devised to promote and control land clearing and especially to insure that farm units so created shall be large enough to support a family at an acceptable standard of living. For the larger irrigation projects, there should be in operation a settlement program that will assure the development of well-balanced modern communities designed to give the maximum economic and cultural opportunities at lowest feasible cost.

c. Definite provision should be made, through suitable long-term financing, to accommodate a substantial number of the farm families who have been forced off their lands elsewhere and who are now financially unable to acquire new foothold in the Pacific Northwest.

d. In certain areas, like the Willamette Valley, where soil and climatic conditions are highly favorable, some additional settlement opportunities should be provided through a more intensive use of lands.

e. In conjunction with this cropland development, there would be required a well-rounded program for the conservation of nonagricultural lands and full development of their multiple uses—forestry, watershed protection, recreation, and wildlife habitat.

3. To assure a permanent supply of timber for the Region's wood-using industries and thereby to maintain the many communities economically dependent upon them, as well as to continue to supply a substantial part of the Nation's needs, there should be established a system of sustained-yield forest operating units embracing all, or at least a major part, of the commercial forest lands.

a. Each unit should be established by appropriate agreements, which would bind the cooperating private and public forest land owners to participate in a management arrangement that would finally assure a continuous supply of timber to the dependent mills. Appropriate Federal and State legislation should be provided to induce private forest land owners either to participate in such management arrangements or to dispose of their lands to some authorized agency prepared to adhere to these agreements. Concurrent with the establishment of these sustained-yield operating units there should be substantial increases in Federal and State appropriations and programs for fire protection of privately owned forest land and for the control of destructive insects and tree diseases, and for the rehabilitation of denuded areas. The ad valorem property tax should be modified and adjusted in ways that would encourage improved forest management. Public acquisition, both Federal and State, should be extended to assist in setting up workable management units, to prevent untimely

cutting of second growth forests, and to take off the market timber now held by weak ownerships. Steps should also be taken to keep to a minimum the area of tax-delinquent and abandoned lands. Research and experimentation should be further developed to aid in the solution of technical problems of forest management including logging, silviculture, manufacturing, waste elimination, and forest economics.

4. To provide water for all uses where and when it is most needed, the Region should advance its construction program to provide fullest practicable control and use of stream flow in all the major drainage basins.

a. The Corps of Engineers, in collaboration with the Department of Agriculture, the Bureau of Reclamation and a permanent Columbia River power agency, should determine the locations and capacities of storages required for a more effective regulation of the Columbia River and its major tributaries. The necessary international and State agreements should be negotiated with terms agreeable to Canada and the upper basin States.

b. The major elements of the Columbia, Willamette, and Snake basin projects should be completed, under way, or fully planned within 10 years. A program of smaller projects, widely distributed throughout the Region, should also be well advanced. Supplemental water supplies should have been developed to meet the needs of irrigated areas now inadequately served.

c. The upstream area of each drainage basin should be carefully surveyed, and plans should be in operation to provide for the practicable maximum of flood control, runoff retardation, and soil stabilization. In the lower sectors of each drainage, flood protection works and flood plain zoning should be developed wherever necessary.

d. Pollution abatement measure should be in operation on the streams where waste and sewage disposal create a menace. Every practicable effort should be taken to build up and conserve fish and wildlife resources.

e. Techniques for drainage basin project planning, including the objective measurement of costs and benefits of multiple-purpose projects and the determination of priority ratings, should be perfected.

5. To derive the fullest possible benefits from its hydroelectric power resources, the Region should have in operation a comprehensive and fully integrated, high-capacity power system providing adequate interconnection of all principal generating plants and load centers.

a. The physical means by which to accomplish this end lie in a well-balanced program of construction of multiple-purpose

projects in which generator installations are kept safely ahead of the growing power demand, and in completing the essential framework of the Federal regional grid system of transmission lines. The grid system should be administered by a Federal corporate agency charged with full financial responsibility for making the enterprise stand on its own feet. The agency should have sufficient access, either directly or through the Federal Treasury, to the capital market to enable it to carry forward its construction and power market development program on the most orderly and economical basis. With regard to taxation, personnel selection, accounting procedure, and general financial responsibility, it should have a status similar to that of a private corporation organized to render this kind of economic service.

b. The power agency, in collaboration with the appropriate technical services of the Federal Government and the States, should be operating a power utilization research laboratory equipped with the necessary engineering development (pilot plant) facilities. Research and demonstration should be recognized as one of the vital functions of its administrative responsibility.

c. Rural electrification should be further extended into all areas where such service is at all feasible. Rates and rate policies should be designed to encourage the maximum use of electrical energy on farms.

d. Insofar as technical improvements in power transmission shall have made them feasible, suitable arrangements for advantageous interregional interchanges of energy should also be worked out.

6. To attain greater economic security and more stable employment, the Pacific Northwest should expand and diversify its commodity-producing industry—especially that based on the manufacture of its raw material resources.

a. This implies less direct economic dependency upon those activities that involve the extraction and liquidation of raw natural resources and more dependency upon the creation of wealth through application of labor, skill, and technological processes. The steps by which the Region may attain this desired end are: (1) discovery and development of new technology related specifically to low-cost hydro-electric power, to use of low-grade and waste materials from forest and farm, to the mineral resources existing in the Region or capable of being economically imported; and (2) the stimulation of the necessary capital investment in plant and equipment through a national program appropriately designed for such purpose.

b. With the investigations of electrochemical and electrometallurgical processes, there should be an intensified exploration of the mineral deposits having greatest commercial promise. Practicable means for

cooperation of public agencies and private interests in carrying on this work should be devised.

c. With such a program in operation, there should be established within ten years a number of economically sound basic industries—metallurgical, chemical, etc. This should provide the basis for the growth of other new fabricating and processing industries.

7. To extend the markets for Pacific Northwest agricultural and industrial products, to reduce the unit cost of marketing services, and to make marketing facilities available to the majority of producers, there should be established a better organized system of marketing services and practices, trade connections, and distributing outlets.

a. Some of the ways to accomplish this objective would include: further development of cooperatives to serve in certain fields where this form of organization is adaptable; further pooling of trade promotion funds expended by independent producers; increased market reporting services by public trade information agencies; more rigorous standardization of products through improved grading and inspection; removal of price-depressing influence of low-grade, cull and waste materials through increased industrial utilization of such materials in chemurgic and by-product specialties.

8. To improve further the efficiency of the transport services and reduce transportation costs, there should be made effective a greater coordination of water, rail, highway, and air facilities.

a. This calls for definite progress toward a coordinated system of transportation, in which the most efficient means and modes are developed and maintained—not in haphazard fashion with overlapping facilities and wasteful competition, but in an integrated pattern of complementary facilities in which water, rail, highway, and air transport each performs the services for which it is best adapted. Among means of progressing toward this objective are: (1) a correlation of the work of public agencies (planning, regulatory, and administrative), viewing the problem as a whole, determining essential conditions and needs, objective standards for measuring true costs of transportation by various modes, development and administrative plans, and other methods and means of procedure; (2) development and execution of a program to provide for the essential integration of lines, equipment, terminals, and interchange facilities—both public and private—as to design, construction, maintenance, operation, and management.

b. In the Pacific Northwest, a modern regional trunk waterway system, parts of which are now completed, should be gradually

improved and extended, within economically feasible limits, as one element in the multiple-use development of the rivers and in the coordinated transportation system of the Region.

c. Railroad consolidations and extended joint use of trackage should be accomplished wherever conditions warrant.

d. Numerous highway improvements, including the development of limited ways on some of the main routes, should be carried out.

e. The intense stimulus now being provided to aviation through the national defense effort will doubtless result in a very rapid expansion of civil air transport. The Pacific Northwest should keep pace with this movement by planning and constructing an airport and airways system adequate to meet the requirements of safe and economical air transportation in this extended area.

9. To aid the maintaining and improving standards of living and standards of labor efficiency, there should be in effect throughout the Region comprehensive, continuing programs for social, economic, and technological betterment, in which the essential public and private efforts are well correlated.

a. Included should be such measures as: extension of educational opportunities adapted especially to meet the needs of inexperienced youth and of adults who have no special skills; encourage the elimination of substandard housing by private and government-aided enterprise, together with demolition and reconstruction of urban blighted areas suited to low-cost public housing projects; further development of the Federal-State system of social security to minimize the social and economic costs of unemployment, sickness, and old age; continued employment of able-bodied unemployed on socially constructive projects, governmental policy and programs which would induce stabilization of employment through better planning of production.

b. Special efforts should be made to raise the annual income and living standards of seasonal and migratory agricultural labor. This would require cooperation of public agencies and private interests in providing decent and sanitary housing facilities at the sites of the seasonal work. Improved facilities for medical service, especially immunization and child care, should be developed. The public employment agencies should perfect procedures for accurately forecasting the labor requirements of each area that requires migratory labor and for keeping in constant touch with those seeking such work. In this way, much of the needless wandering would be eliminated. In many localities, it should be possible to establish a "home base" for the worker's family, consisting of a small tract of land and a low-cost house, which the family might own or rent. Insofar as practicable,

these people should be aided and encouraged to use these tracts for the production of part of their own food supply. Educational and other community facilities should be made available to this now homeless group through such settlement programs.

10. To stimulate greater appreciation and creative effort in behalf of cultural values and to bring greater cultural, recreational, and related benefits to the people of the Region, there should be an expansion of public and private programs to foster those activities and institutions which may serve this end.

a. The means for realizing these objectives lie very largely in further improvements and extensions of free public education, especially at the adult level, and in the fostering of community organizations for dramatic, literary, musical, and art productions. Opportunities for training in a wide variety of handicrafts should be greatly extended, and efforts should be made to develop original designs that express the qualities inherent in the Region and its people. School curricula should be so organized that they can accommodate materials relating to regional problems and accomplishments. Library services should be improved and extended.

b. Special attention should be given to the further development of outdoor recreation, to the preservation of the Region's outstanding scenic assets, to the improvement of State park systems, to the preservation of roadside timber, and to the problems of making scenic and recreational resources accessible to both visitor and resident at costs that are attractive to people of modest means.

11. To reduce cost and to make services more effective and efficient, the machinery of State and local government should be modernized and simplified.

a. Some of the major accomplishments that should be realized within a decade are: systematic reorganization of school districts into patterns that will equalize educational opportunity and equitably spread the burden of school costs; adaptation of units of local government to the use capabilities of the lands each may embrace; adjustment of the property tax to conform to the long-term productive power of agricultural and forest lands; establishment of systems for the recruitment and selection of non-policy-making State and county employees on a merit basis; limited experimentation with the manager form of county government.

b. Federal and State governments should make marked improvements in the machinery and techniques of administration, especially in procedures for planning, budgeting, financing, and coordinating projects

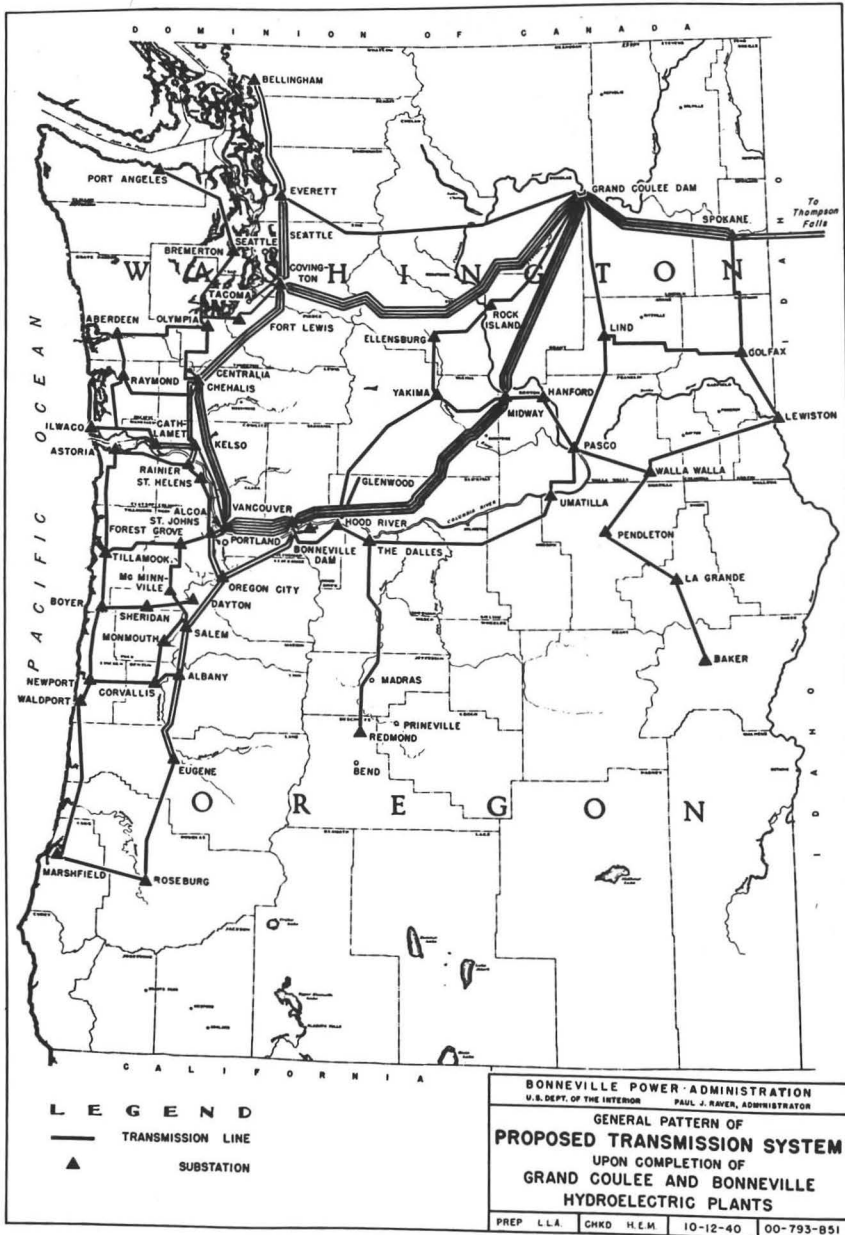


Figure 4. — Proposed Transmission System, Grand Coulee and Bonneville Hydroelectric Plants

and programs for resource conservation, for public aids and controls in economic development, and for public services and public works.

12. To promote and accelerate the utilization of resources and general development in the Territory of Alaska.

III. The Region One or Two Decades Hence—Influence of Current and Future Programs

What should be the appearance of the Pacific Northwest one or two decades from now? To attempt an answer to such a question in detail would hardly be a profitable exercise because too many imponderable factors are involved. Nevertheless, it may be useful in clarifying objectives to present some tentative sketches of the new features that should emerge as the direct result of such a program. The following section attempts more tangibly to visualize some of the more prominent changes that should be sought in the period immediately ahead.

Grand Coulee—Columbia Basin Area

This project, certainly the most far reaching, will ultimately transform a district with a total area of some two and one-half million acres, now semi-desert, into a highly developed agricultural community, accommodating perhaps a third of a million people. With the assured water supply that the project works will provide, the hazard of crop failure will be practically eliminated. Definite steps are now being taken toward insuring that the lands shall be operated in adequate family-sized units; that the towns, utilities, and transportation services shall be laid out in the most economic patterns; that suitable areas shall be developed for recreational purposes; that a substantial number of farm families now without homes shall be rehabilitated on the project lands; that the types of farming adopted shall be those that will sustain soil fertility and produce commodities that can be marketed. Improved types of housing and of farm buildings should be much in evidence throughout the area.

The Fertile Crescent of Southern Idaho—Snake River Basin

This broad crescent of fertile lands extends from the Wyoming border through southern Idaho into eastern Oregon and constitutes one of the major assets of the Region. Some two million acres lying in its eastern and western sectors are already developed. In both areas, however, supplemental water supplies are urgently needed and should be made available. This should give greater stability to the whole economy of the basin and enhance the standard of living. The mid-section, still in sagebrush and containing a million or more acres of potentially irrigable lands, should within ten or twenty years have been placed under irrigation. In this large new area, the opportunity to provide the basis for an improved security on the land is similar to that under the Grand Coulee project. Development of needed new water supplies will require some diversions from one tributary to another and a unified plan of water control. The end result will be an agricultural subregion in which farming, grazing, and industry can develop in a nicely balanced relationship.

The great deposits of phosphate rock, situated in the eastern part of the basin, should become the basis of a mineral fertilizer industry adequate at least to supply the needs of western croplands.

The Willamette Valley of Oregon

This valley is the oldest agricultural area of the Region, but for various reasons it has experienced little new development in the last few decades. The coordinated water-control project partially authorized by Congress and involving construction of seven dams on head-water streams will afford needed protection to many communities and to some 270,000 acres that now suffer frequently from damaging floods. It will provide a water supply for summer-months' irrigation of 350,000 or more acres. This will greatly enhance the productivity of lands that normally become too dry before the crops reach maturity. The flood protection features will also make feasible the drainage of large areas whose productivity is now impaired by an excess of water. Improved inland navigation on the Willamette River,

now confined almost entirely to the movement of log rafts, will be extended to Albany, some 70 miles above Portland. With these improvements under way, the aspect of the valley should quickly change from one of arrested growth to one of expanding opportunity.

#### Upper Columbia Drainage—Intermountain Areas of Montana and Idaho

The intermountain region of Montana and Idaho has received, in relation to its available farm lands, a very heavy quota of Great Plains migrants. The pressure resulting from such an influx of new population should hasten certain types of development that ordinarily might not occur within the near future. It seems very likely now that the next ten years will have brought about the utilization of almost every available acre of economically cultivable cropland in that area. Some of this will be in blocks of several thousand or more acres—like the Rathdrum Prairie tract in northern Idaho and a similar area in the vicinity of Missoula. One or more large storage reservoirs, probably including the Flathead River, to provide flood control and power should be in the picture ten years hence. The whole economy of this region should then be based on a well-integrated use of its farm lands, forests, minerals, and scenic attractions. It seems most likely that the people will be drawing their incomes about equally from all four sources.

The water conservation and irrigation work in Montana is considered especially significant. Here the State-Federal cooperative program has done a great deal to check disastrous trends and to make the land economy more secure in many parts of this great agricultural State. A series of planned projects of various degrees of magnitude has provided water for new and supplementary irrigation purposes, permitting more intensive development in valleys, shift of outlying lands from uneconomic dry farming to more extensive use, and putting into effect for large areas a more secure land-use pattern, in which the irrigated valley and surrounding range complement each other.

The strategy of inland locations for certain industries important in the national

defense should lead to an industrial growth in these areas to balance that in agriculture.

#### Puget Sound—Lower Columbia

This area now contains about half of the Region's manufacturing capacity. Within a decade or two, there should be a considerable change in the type of manufactures. Depletion of the virgin stands of old-growth Douglas fir timber will inevitably result in a decline of lumber output. This should be offset, at least in part, by an increase in the output of pulp and paper, alpha cellulose (wood pulp used for rayon), wood plastics, and other chemical products. Increased shipbuilding brought on by the present world war may conceivably lead to the permanent establishment of this industry in the area. There are also good possibilities for the establishment of new metallurgical industries—iron and steel, alloys, aluminum, magnesium, chromium, etc. Incidentally, this increase in the volume of heavy manufacture, and the need of lowest cost transportation (for bulk materials particularly) may ultimately lead to the interconnection of the inland waters of Puget Sound with those of the Columbia River—providing an inland waterway system extending southward and eastward to the heart of the Pacific Northwest hinterland, as well as northward and westward to Alaska. The further growth of secondary industries should, of course, follow closely on the heels of the heavy industries.

Agriculture will also expand considerably in this area through the clearing of suitable lands now covered with stumps, brush, and timber. It is important that this extension of agricultural land be confined to the good soils and to locations where roads, schools, and other public services can be provided at reasonable cost. Rural land zoning and other forms of public and cooperative land-use control should be developed throughout the entire Region; they are particularly applicable in this area with its diversified, metropolitan-industrial-agricultural-forest-recreational uses of land and water. As in the Willamette Valley, there should be an extension of supplemental irrigation of crops and dairy pastures.

Other Projects

Outside of the more compact areas mentioned above, there will be in use a large number of smaller projects, all designed to conserve and control water, improve land use, and thus help to stabilize the economy of various areas of the Region. While the current programs of small projects have been locally effective, they represent little more than a beginning toward the desired stabilization of land use.

The range lands, within ten years, should be well on the way toward full rehabilitation under private and public management systems fully cognizant of their responsibilities for maintaining conditions that permit sustained production of forage for livestock and wild-life.

Progress has been made in various localities in the reclamation of land through stump clearing. Costs have been lowered and the work accelerated largely through use of heavy tractors and bulldozers, but there is need of more rapid classification of lands and of development of more comprehensive projects and aids in economically desirable clearing.

Flood control, diking, and drainage projects have also made available, to a relatively limited extent, desirable new lands in several parts of the Region. More areas and projects remain to be investigated. The promise of reclamation through these means, however, does not seem to be nearly as great as through irrigation and clearing.

If an action program can be derived from the extensive investigations of mineral fertilizer resources and uses by the Congressional Joint Committee on Phosphates, it should have far-reaching effect on agriculture, land use, and the maintenance of soil fertility, as well as on industrial development, in the Pacific Northwest.

The agricultural land-use planning program of the Department of Agriculture, States, and counties should also result in important adjustments and improvements in agriculture and land use, as well as in the assembly of vital information for land-development programming.

Still another research program of potentially great importance to Pacific Northwest agricultural development is that of the regional research laboratories of the Department

of Agriculture. Beneficial results should be felt not only in agricultural market development, but in farm production and in industries related to agriculture.

The Generalized View of Future Land Development

The precise location and the limits of feasible development of new agricultural lands cannot be determined at the present time. As indicated previously, better information is now being collected by the Bureau of Agricultural Economics and the National Resources Planning Board. Studies now available as the result of work done by the Farm Security Administration and the State planning boards do give a rough indication of the location and extent of potential settlement areas. Figure 3 shows this generalized and tentative picture.

Forest Areas

The need for organizing forest operations on a sustained-yield basis is commonly admitted at the present time. Within ten years, most of the commercial forest lands should have been definitely tied into a system of operating units to serve as the basis for ultimate stability of the industry. Such units cannot be plotted on a map at the present time, because each will be subject to detailed study and negotiations. It is possible to delineate a typical area that has already been studied. Figure 2 illustrates the general scheme that should be worked out by cooperative action of private forest owners and the Federal and State forest services.

Current forest programs have accomplished much toward conservation of a substantial part of the Pacific Northwest Region's outstanding forest resource. Some notable advances are being made: in the field of protection from fire, toward improved forest practices, and in a few working circles toward sustained-yield operations. The exhaustive investigation of the Congressional Joint Committee on Forestry will, it is hoped, clarify public policy and bring into effect an action program commensurate with the magnitude of the regional resource and the values at stake, both directly and indirectly.



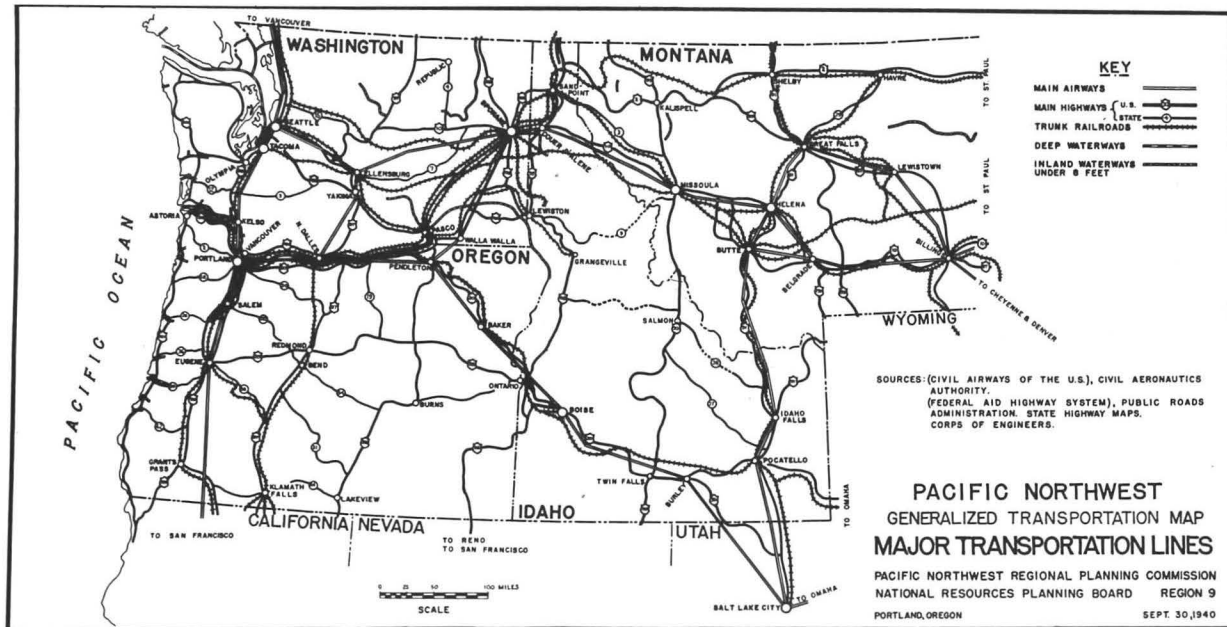


Figure 5. — Major Transportation Lines

There are at present about 7 million acres of nonstocked cutover and burns in the four States. These nonproducing areas comprise 17 percent of the forest land of western Washington and 13 percent of that of western Oregon. The proportion elsewhere is less, but the lands are potentially much less productive than those of the Western Douglas fir region. A large part of this nonstocked land is of a quality that would justify rehabilitation by planting or by some other method. Within ten years, this area should have been placed under stable ownership, and definite work should be under way to restore it to productive use.

In addition to this work of restoration, there should be in operation some system to prevent abandoned forest lands from lying derelict for years as they now do. Action by the States in taking over the management of such critical areas should be quick and automatic.

#### Regional System for Transmission and Interchange of Power

The foundation lines for a Pacific Northwest power grid system are already under construction. A recent Executive Order has placed the marketing of energy from both Bonneville and Grand Coulee under a single administration. This step should be supplemented by a Congressional Act which would provide the Columbia River power agency with a more flexible, corporate structure, better adapted to business operations, and supply it with well-defined policy and with financial, research, and other powers essential to the marketing of power on an energetic and progressive basis.

If the regional power program proceeds with reasonable speed, the main features of the grid system should be well advanced within ten years. The exact location of extensions and interconnections will be determined by demand growth and other factors that cannot entirely be foreseen. The type of general layout, however, that seems most probable is indicated by Figure 4.

The Federal power program is unquestionably having a penetrating and vital effect on the regional economy. The production of Bonneville's first six (of ten) units is coming

in during the next few years to meet the normal growth in power use in its area. It is also serving as a stimulus in the establishment of new basic industries of a kind hitherto lacking in the Pacific Northwest. The first three of Grand Coulee's eighteen units are also coming in during the next two years to serve similar purposes. These units, plus others to follow at both plants, represent vital additions to the energy available to the Nation to meet defence needs. The power-using industries and the energy resources should be brought together as promptly and effectively as possible.

The Bonneville organization has made significant progress in power system planning and construction, in interconnection with the view of stabilization of production and use, in interchange of energy, and in marketing and sale of available and prospective output. Prospective accomplishments for well integrated operation, far greater in magnitude, lie ahead.

Important private programs, based directly on the Federal power program, may have progressively expanding effects. The recent establishment of a large aluminum metal plant should be the forerunner of a number of fabricating, processing, and alloy industries. The small iron and carbide industries, in course of establishment, should prove to be advance guards, respectively, of other basic and secondary metal and chemical industries. The chain-like relationships of products and by-products of such industries are well known.

#### Transportation

Progressive improvements rather than dramatic new features are likely to be the chief characteristics of transportation development within the next ten years. The Region is already well crisscrossed with a network of railways, highways, and airways (Figure 5).

Completion of the navigation features of the Bonneville project has been followed by a new upsurge of inland water traffic on the Columbia River. Further deepwater and inland navigation improvements, under way and proposed, including the Columbia-Lower Snake trunk, should aid in bringing new resource and industrial developments within economic limits.

The great distances between the more highly developed areas of the west (Puget Sound, lower Willamette, San Francisco Bay, Spokane-Inland Empire, Boise-Snake, Butte-Anaconda-Helena-Great Falls, Salt Lake, for example), as well as current national and world trends in aviation, will, no doubt, be a very powerful stimulus to the growth of air transportation and facilities therefor in the Region.

The development of Alaska and the establishment of closer relations with Canada and Latin America will stimulate transportation developments of interest to the Pacific Northwest; overseas and coastal navigation; international highway links; and more extensive air services, particularly to the farther northwest. Because of all of these factors, it is safe to expect a considerable expansion of airport and airway facilities and some expansion of other port and terminal facilities in the Region.

#### National Defense

Of the Nation-wide programs, that for national defense should have special and far-reaching effects on this and other regions. Beyond a short-run need of increasing production at present plants, located largely in the Northeast, there should be decentralized location of new and branch plants in various regions on the basis of strategic, resource, material, labor, market, and other considerations. In the Pacific Northwest, strategic, energy, and material factors are particularly favorable to certain groups of industries.

The national defense does not represent an entirely new or separate problem from the standpoint of regional development. Defense considerations must permeate plans and programs in nearly all resource and development fields. The immediate importance of defense and the urgency of defense measures will change emphases and priorities in development programs rather than the development aims and programs themselves. There lies in the defense program some promise and opportunity for more rapid development of certain resources needed both for peaceful progress and national security—the Region's great hydroelectric power, or essential minerals, for example. The defense activity also carries the threat of dislocation

upon its ultimate cessation or slackening: it is essential that development plans and programs cover the readjustment to more normal activities and progress.

In considering development in the interest of national defense, it is necessary to keep in mind the concept of total defense. The less military items in the list of needs for national security cannot be lightly considered. Maintenance of resources in land, agriculture, forests, and in human health and morale, as well as in energy, labor, and industry, is a vital part of the total scheme.

#### Industrial Location Pattern

Since the heavy power-using industries are likely to be the most important factor in the Region's industrial growth and a policy of uniform wholesale rate has already been adopted for the sale of power from the Federal system, there is no need for these to concentrate at or near the generating plants. Transportation, raw material availability, water supply and utility services, climatic conditions, labor supply, and other factors are likely to be most important in determining the location of industries. For certain types important to national defense, relative security from air attack may be a deciding factor. In order to make all relevant information readily available and to help overcome the inertia which has led in other regions to extreme concentration, plant site surveys and location studies covering the entire Region are being initiated by the Bonneville Power Administration, the National Resources Planning Board, and cooperating agencies. These and other related investigations are pointed toward the widest practicable decentralization of industrial activity in the interest of a well-distributed regional growth, and the maintenance of good living conditions for workers. Marked effects on the geographical pattern of industrial activity should be apparent in ten years.

#### The Pattern of Urban Growth

In common with all other cities of the country, the urban communities of the Pacific Northwest have central areas that are blighted and a sprawling fringe that keeps pushing out

in haphazard fashion beyond the city limits. This movement creates extremely serious problems for municipal government and for the owners of downtown property. The people who move to the fringe are likewise handicapped by inadequate school and utility services.

The urban picture ten years hence should not show the effects of another decade of this destructive movement. The remedy to be obtained through replacement of blighted central areas with low-rent public housing projects should be in evidence in every city. Fringe settlement may also have been improved by the application of controls and planning, which would concentrate it in a reasonable number of greenbelt communities.

#### Cultural and Social Programs

In the Pacific Northwest, outstanding progress has been made along certain educational lines closely related to regional development. Through the Northwest Regional Council, notable work has been done in the stimulation of regional research, and in the preparation and use of regional and resource materials for educational use. In the latter activity, the (national) Commission on Resources and Education has selected the Pacific Northwest as a demonstration area and has cooperated in the establishment of "resources and education workshops" for teachers. Continuation of such activities should bring about substantial progress in understanding of and adjustment to the regional environment.

A number of programs of great importance in human advancement are vital in the Region, but should more properly be covered in a national rather than a regional summary. These include such national programs as agricultural adjustment, land-use planning, soil conservation, farm security, works projects, reemployment, social security, youth, housing, and national defense.

#### Recreational Development

Beyond its cultural aspects, recreation is highly important in the Region from an economic standpoint. The scenic and outdoor recreational resources—forests, mountains, plains, deserts, lakes, rivers, beaches, and primitive wildernesses—are of national as

well as local significance; their use is a material factor in maintenance of a balance of payments with the more populous and industrialized parts of the country.

Therefore, it is essential that the coming decades show marked progress in the use and enjoyment of these resources. Policies and programs should be perfected or materially advanced for the preservation of outstanding scenic and primitive areas, and also for the further provision of well designed facilities for the use of those resources—roads, trails, shelters, for example. Special effort should be made to see that each type of area is accessible at the season in which people wish to go there—mountains in both summer and winter, desert in early spring, alpine areas in later summer, etc.

Progress should be made toward harmonious multiple use of land resources for various purposes—including those of recreation. In most of the areas of the Region, including many of considerable scenic worth, it is necessary to have policies and plans that will permit simultaneous, non-destructive usage for a number of purposes: timber growing and harvesting, agriculture and grazing, mining, industrial, commercial, and community development, as well as recreation. The degree of success attained in harmonious multiple use will be a measure of the ability of the people of the Region to adjust themselves to their environment.

#### Need of Public Planning

Many programs and projects, large and small, are influencing the progress of the Pacific Northwest. The more significant of these from the viewpoint of regional development are those that have, or promise to have, the deepest effects on the regional economy—those that react on the foundations of that economy, primarily on resources and their effective management and use. If the basic, wealth-producing activities are stimulated or built up, the erection of the superstructure of subsidiary and service activities is practically assured. Programs in the basic fields are quite generally too broad to come within the purview of individual enterprise and are the concern of the people as a whole.

Here, as well as in the supporting framework of essential public services in the superstructure, public planning and programming are most urgently required.

#### IV. The Role of Public Policy and Public Works; Problems, Programs, and Methods of Coordination

In both national and regional development, it is essential to recognize the importance of effective use of all available resources, also to see the key place of public policy and public works in this connection. If we are to go ahead—if we are to add constantly to our income, and to improve and broaden our standards of living, and to reduce our unemployment of capital and labor—we must make best use of our resources. This will involve continuing capital outlay in public and quasi-public works as well as in private industry. The growth of industry is not only highly dependent upon market expansion but to a considerable extent upon the parallel development of creative and regenerative public works, utilities, and services. The full employment of resources—men, science, technology, money, plant, machinery, materials—is not possible without construction and reconstruction of public works and quasi-public works.

Recognition of what the Region has, where it is, and where it should go, and of the gaps in past progress and the barriers to future advancement is essential to a realistic determination of its major deficiencies and needs in policies, works, industries, and services and of the possible ways of meeting them.

It should also be understood, however, that it is not only these more or less special conditions and objectives for the Region that are vital but also the common conditions, trends, and goals of the whole country. A large share of the progress of the Region depends upon national movements and rates, rather than upon conditions within the control of the people of the Region in themselves. But regional resources must be used, regional deficiencies filled, and regional barriers lowered, if the Region is to move ahead, in mesh with other regions and in harmony with

#### *National Resources Planning Board*

national progress, toward a higher and more secure position.

#### Uses of the Design Concept

In all of these planning and programming efforts—from those for simple projects, through large multiple-use projects, to large regions—there is need for a constantly widening use of the principles of design. In planning for the single, one-purpose project, and even for the smaller area, design involves more completely physical factors and consequently is more concrete, more tangible. For a building, for example, the purpose of design is to adapt it to the functions it will have to perform—living or working quarters, handling or storage of materials, etc.—and to enable it to withstand physical forces—gravity, wind, and various loads. For the small community, design is primarily a matter of arrangement of physical facilities—living, industrial, commercial, transportation, educational, recreational, etc.—to suit community functions; but the importance of social and economic design should be more generally recognized even in this instance. For the large, multiple-purpose project, all of the factors mentioned must play their part. But additional important factors must enter into the design: the relations of function to function and unit to unit; the relations to other projects in a system; the relations to auxiliary projects; the relations to markets for output; the relations to economic return on investment; the relations to social and economic benefits, and so on.

For example, in connection with the Pacific Northwest's largest project, Grand Coulee, the complete plan is becoming recognized as involving the design of many things beyond the primary irrigation, power, and water control features: of land use; of farm subdivision and farm economy; of a system of communities and facilities for transportation and distribution; of individual communities and community additions; of basic facilities for local industries; of recreational facilities; of public works of various kinds; and of governmental organization and machinery to meet new needs. Such design goes far beyond a single designing organization to perhaps two score

agencies that must share in the effort and whose work must be correlated toward an effective over-all design for the area.

It is not a great step from such a concept of project and area design to one for a State or a subnational region. The fundamental criteria are not different. Good design must still be based on the functional considerations. Simply stated, the region should be designed as the home and environment in which a proper proportion of the Nation's people may live and produce. It should be designed as an economy—without rigid limits, not too sharply set out, not too self-sufficient, but in effective, complementary, and flexible relationship to the other regional economies and to the whole national economy.

In design for the regional development, the economic and social factors will predominate. Design must also be applied in the field of public administration to facilitate coordination in the development and execution of over-all programs. But selected, generalized physical features are also subject to design on a regional basis: land and water and their development and use; the sustaining material resources; the production of energy; the circulatory systems of transportation, energy transmission, and distribution. Improved patterns of population, community, and industrial location are also susceptible at least to indirect influences of rational design—through such measures as land-use planning, resource development, transportation and transmission line locations, governmental aids and services, and educational work.

If democracy is to avoid breakdown under the sheer weight of unsolved economic problems in this technical age, it must be made increasingly practicable for the citizenry clearly to understand their basic problems. A rational design for utilization of resources—provided its fundamentals can be set out in simple yet fair and realistic terms—will, in most cases, sell itself to the majority and thereby obviate the need of any more than the minimum of governmental intervention or compulsion. The full benefits to be realized from the broad application of principles and procedures of planning, design, and programming, on a decentralized basis and with the

collaboration of all interests concerned, are vital enough to warrant far greater use than has yet been attempted.

#### Interrelation of Public and Private Programs

It should be borne in mind that the regional program, to be realistic and effective, should not only include public projects, but should take cognizance of significant private projects as well. The public programs are, as previously intimated, essential to regional development, either directly or as part of the basis of private development. Private programs—financial, industrial, commercial, service—and private attitudes and cooperation will also have much to do with ultimate results in regional development. Since there is no centralized control of public programs in the region, and since private programs are subject only to partial public controls (which, furthermore, are generally negative rather than positive), cooperation is of the essence in the development and acceptance of the major elements of a regional program.

It does seem feasible for both public and private interests to cooperate, increasingly, in program planning and design. It can happen; cooperation of this kind has been had in certain fields: The Pacific Northwest Drainage Basin Committee (in common with other such committees throughout the country) in 1937 submitted a comprehensive program for drainage basin development. A broadly representative Pacific Northwest Land Advisory Committee likewise agreed on a number of recommendations covering, substantially, the range of a general land program. In a forest resources study, sponsored by the regional planning commission in 1938, departmental, State, industry, and public representatives substantially agreed upon a statement of the situation and a minimum program of Federal, State, and industry action toward solution of the regional forest problem. This type of cooperative effort might be broadened and extended to cover other individual fields and to consideration of the over-all regional program.

It is realized that the next steps—the follow-through—after the formulation of a program are the more difficult ones. The

initial step of planning and programming must be taken in any case. It is necessary, then, to look to improvements in governmental and economic processes that will facilitate action on generally accepted programs and further the exercise of some degree of unified management and coordination in the further design, expansion, and actual effectuation of such programs.

#### The Six-Year Program of Public Works

An all-inclusive six-year public works program would, of necessity, embrace the programs of every governmental entity—Federal, State, county, district, municipal—within the Region. Such a complete program is not practicable of attainment, but it is desirable to have as a base the programs of the Federal development agencies, the States, the more important development districts, and the more important (or at least typical) counties and municipalities.

A six-year public works program, for any governmental agency, consists primarily of: (1) an inventory of desirable and feasible projects, arranged to show preferential priority, and proposed construction cost for each of the six years; (2) a narrative justification for each project; (3) a financial analysis, showing relative financial feasibility of each project, capital cost, annual maintenance and operating costs and their effect on tax rates, also the effect of the program as a whole on indebtedness and taxation.

For the Pacific Northwest Region, it is anticipated that the six-year program will consist primarily of a consolidated inventory of the construction projects of regional significance of the various Federal and State agencies within the Region. It may include also local projects or groups of projects of like significance. Beyond the inventory, a series of narrative sections may cover: background of program and projects; interrelationships of projects; justification of major projects; means of effectuating the program; relationship of the program to regional needs and progress—to resources, employment, industry, economic opportunity, and so on.

#### Progress in State and Local Programming

At the present time, definite progress is being made in the long-range programming of State public works. In three of the four Northwest States—Idaho, Montana, and Oregon—six-year programs are in the course of preparation and reports are expected to be available before legislative assemblies open at the beginning of 1941. In Idaho, work on the programming project follows a general State-wide study and report on public works plans and programs. The Montana State water conservation and planning boards have made substantial progress toward fundamental and realistic public works planning and programming, particularly in the fields of land and water use, through the State water conservation program and through a State-wide study of opportunities and needs for land settlement and land-use adjustment (based quite largely on the county agricultural land-use planning project). In the fourth State, Washington, a similar activity is under consideration.

The City of Spokane has recently completed and published a six-year program of public works, which, together with several other demonstration projects carried out by various municipalities throughout the country, should provide a valuable guide to other cities.

On the basis of these State Programs, the plans and programs of Federal developmental agencies, of drainage basin and other general regional plans and programs, and other available data, it is intended to pursue the preparation of a regional program along general lines discussed hereinbefore.

#### Administrative Correlation of Plans and Programs

Progressive, orderly, and well balanced and distributed development of the Region calls for very careful attention to certain aspects of public administration. It calls less for new administrative agencies or machinery than for improved machinery for the correlation of development work—for the improvement of procedures and habits for the interchange or clearing of important information, investigations, and plans; for bringing and holding together the vital parts of broad development programs throughout the complex

procedures of planning, programming, budgeting, approval, and execution. Without such clearing and correlating work on a well established and recognized basis at State, regional, and national levels, the most needed and worthy of development programs tend to deviate from objectives, to lose essential elements or relationships, or even completely to dissolve.

The administrative factor has long been recognized as a most important one in the problem of regional development, both by the National Resources Planning Board and its predecessors and by the regional planning commission. The National Resources Committee's study of regional factors in national planning and development<sup>1</sup> gave a considerable amount of attention to this problem. In its 1935 study, the regional planning commission was asked not only to report on the future prospects of the Pacific Northwest but upon types of organization that should be set up for the planning, construction, and operation of certain public works in that area.<sup>2</sup>

At that time--after recommending continuation of planning organization on a State and regional basis, continuation of development construction activities by the specialized technical bureaus, and a special corporate organization for power system operation--it suggested establishment of a coordinating committee in the Region. Suggestion was made that this committee should be representative of the Federal departments concerned with regional development; that it and the regional planning commission<sup>3</sup> be closely interlocked or associated; and that it should aid in coordination of major features and priorities of plans, programs, and projects for conservation and development in the Region.<sup>4</sup>

The same administrative problem with respect to development has been recognized also

in the regional planning commission's current study of migration and economic opportunity in the Pacific Northwest. In connection with this study, the regional planning commission was asked to arrange for a study of the land and migration problems of the Region and also to assume leadership in carrying on the survey and in providing a channel or clearing house for the more effective coordination of Federal and State activities relating to those interlocked problems that have a bearing upon migration, settlement, employment, land and water conservation, and public works.<sup>5</sup>

In this study, the regional planning commission sought the assistance of advisory groups--particularly that of a land advisory committee and a subcommittee on population problems. Members of an executive or steering committee of this advisory group--composed of representatives of the Federal departments or agencies concerned with land and general development--have sat with the State planning representatives on the commission in the consideration of the problems, the study, and the report. In general, this arrangement resembles that suggested for coordination by the earlier report. It provides, informally, for a certain amount of clearing of general aims, programs, and projects, between representatives of the departments and of the States.

Recognizing the difficulty of coordination of plans and programs for regional development, the regional planning commission has been loath to recommend or to attempt to set up any elaborate machinery for the purpose. It has believed it desirable that procedures, techniques, and habits of cooperation be developed and expanded on the basis of experience in general planning, and in the development of plans and programs in such fields as land development, drainage basins, forest resources, public works, and so on. The experience of the Bureau of Reclamation in connection with the cooperative Joint Investigations for the Columbia Basin Irrigation Project should also prove valuable in the formulation of procedures for coordination of development programs.

<sup>1</sup> Regional Factors in National Planning and Development, National Resources Committee, 1935.

<sup>2</sup> Regional Planning, Part I -- Pacific Northwest, National Resources Committee, 1936.

<sup>3</sup> The Pacific Northwest Regional Planning Commission, organized in 1936 as an association of the State planning boards and the National Planning Board for regional planning purposes, includes in its present membership representatives of the Washington, Idaho and Montana planning boards, Oregon Economic Council, and National Resources Planning Board.

<sup>4</sup> Op. cit. pp. 12-14.

<sup>5</sup> Migration and the Development of Economic Opportunity in the Pacific Northwest, Pacific Northwest Regional Planning Commission, 1939.



Accordingly, the regional planning commission has suggested in its latest report on the general subject of regional development<sup>6</sup> the need of establishing more intimate working relationships between agencies and of coordination of administrative action relating to development, both in the Region and in the National Capital. To move toward these ends, it suggested the participation of Federal

<sup>6</sup> *Ibid.*

*National Resources Planning Board*

development agency representatives with the State planning members of the regional planning commission in consideration of regional development programs, and that devices and staff for intradepartmental coordination of policies and programs be developed as rapidly as possible by those departments entrusted with resource management functions in the Region.<sup>7</sup>

<sup>7</sup> *Ibid.*, pp. 63-67, 80.

PRELIMINARY STATEMENT  
REGIONAL DEVELOPMENT PLAN

REGION 10

ALASKA

JUNEAU, ALASKA

1940

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Report of the  
ALASKA PLANNING COUNCIL

Dr. Hubert A. Bauer  
Consultant, Region 10  
National Resources Planning Board

## F O R E W O R D

Since no Field Office has yet been established in Region X, Alaska, Dr. Hubert A. Bauer, Consultant to the National Resources Planning Board in Alaska was given the assignment of preparing a Regional Development Plan for Alaska. In carrying out this assignment, Dr. Bauer had the benefit of the data at hand in the office of the Alaska Planning Council, and the various Federal and Territorial offices located in Juneau.

Due to the limited time for preparation of the Development Plan, during which no meeting of the Alaska Planning Council was scheduled, the approval of the whole Council was not obtainable, but the Plan was submitted to the majority of the members of the Council, residing in Juneau, and their suggestions and revisions were incorporated in the Development Plan.

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## PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN

### A L A S K A

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#### INTRODUCTION

##### The Alaska Scene

Numerous elements are combined to make up the complex background of the Alaskan scene, against which developments of every kind are taking place in Alaska.

For the purpose of planning, the most essential of these elements may be briefly enumerated as follows:

1. A variegated physical background, far from being fully explored.
2. A population too small in numbers and too weak in capital resources to cope with the problems of the vast area it occupies.
3. An unbalanced stage of economic use of resources.
4. Major industries largely controlled by non-resident interests.
5. A weak Territorial status.
6. Complex, long-distance administration.

Clear recognition of this complex setting is a first requirement for efficient, coordinated planning.

The Orientation Chart following this page attempts to illustrate this necessity by showing the relationships existing between the Territory's major resources, the present uses made of these resources, and the various agencies engaged in promoting or regulating these uses. The chart serves a second purpose. It indicates the organization of the material used in presenting this development plan, namely the approach through basic resources, leading on to industries

(users of resources), then to the Governmental agencies concerned with both, resources and industries, and finally to the general objectives and plans pursued by these agencies.

Striving for simplicity, the chart does not claim to include all the aspects and details of a development plan. It is, at best, a skeleton around which the details of the report have been draped.

While the chosen approach by resources (Part One) covers all phases of resource development, it cannot embrace all the functions of Governmental agencies. It has, therefore, been found expedient to review most development projects by selected functional fields (Part Two). This recapitulation, in summarizing scattered plans under one head, has the advantage that the need for coordination of development work planned by the various agencies and groups can be shown more clearly.

In Part Three, an attempt is made to circumscribe briefly the modest role that the Territorial Government plays in the development process.

The timely and unusual significance of military development as a stimulus to economic development has received general treatment in Part Four.

Objectives, plans, and projects were obtained from authoritative sources. These contributions, made by numerous Federal and Territorial agencies, are herewith acknowledged.

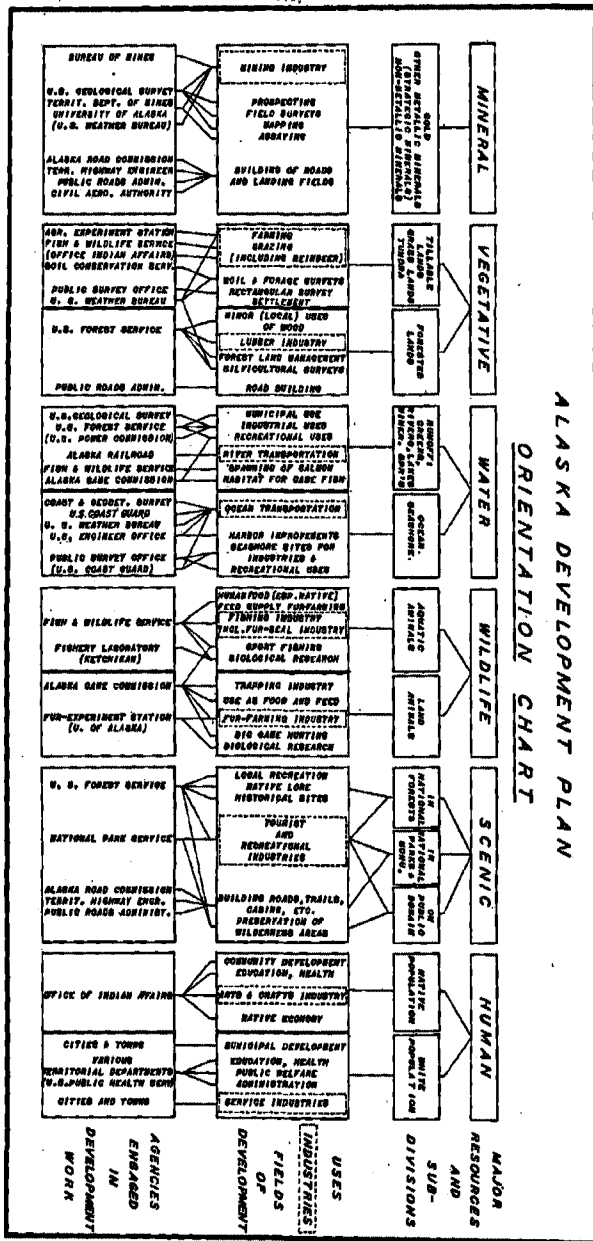


Figure 1. -- Alaska Development Plan.

## PART ONE -- RESOURCE DEVELOPMENT

### Vegetative Resources

Approximately two-thirds of Alaska's total area of 581,000 square miles is covered by forests, grassland, or tundra. This huge area thus constitutes a far-flung resource of timber and range, practically all in Federal ownership. Very little of this vegetative resource has so far been put to direct human use.

### Forest Lands

While Alaska forest lands serve multiple purposes, namely (a) timber supply, (b) support of wildlife, (c) storage of water, (d) recreation, and (e) settlement, only plans and projects referring to their vegetative aspects are discussed here.

### Timber Resources

*State of Development.*—Only the national forest area, primarily the Tongass National Forest, yields commercial timber, most of which is used locally for common lumber and piling. Only clears produced from selected timber can compete in the United States and foreign markets; spruce uppers are shipped out of the Territory in increasing volume. At present about 50 million broad feet are cut annually. Two large lumber mills, three middle-sized ones, and a number of small mills, most of which operate intermittently, constitute the present modest lumber industry of Alaska.

Although the forest resources of southeastern Alaska offer excellent raw material and manufacturing conditions for pulp and newsprint, economic conditions have not yet permitted the use of the resource for this purpose.

*Objectives.*—Wider utilization of commercial timber resources includes the following objectives:

(a) Lands most suitable for the growing of timber to be dedicated to the continuous production of wood.

(b) A permanent and convenient supply of timber to be furnished for local consumption, with such additional supply to the local sawmills for the general lumber markets as may be needed to justify suf-

ficient milling facilities and provide year-round operations.

(c) Promotion of a pulp and paper manufacturing industry commensurate with the available timber and water power resources to be developed and maintained.

(d) Encouragement of minor wood-working industries, for the manufacture of specialized products from spruce, hemlock, cedar, and birch, such as

Small-dimension stock for furniture making

Cedar shakes and shingles

Spruce for airplane parts

Various specialities: cedar chests, venetian blinds, barrel staves, battery separators, draftingboards, oars, handles, toys, etc.

(e) Greater use of local lumber for building and construction purposes, for which imported fir lumber is now preferred.

*Plans and Projects.*—(a) Careful segregation of all forest lands into pulp timber allotments, and general use areas, including local use allotments.

(b) Comprehensive studies and field surveys by competent specialists of all problems involved in the extension of the Pacific Northwest and British Columbia pulp industry into southeastern Alaska, in connection with timber and water power surveys.

(c) A comprehensive survey of the possibilities of minor forest product industries in Alaska.

(d) Establishment of a wood-treating plant within the national forest area for use by Federal construction agencies as well as by private firms; a plant large enough to handle dock pilings and structural timber.<sup>1</sup>

### Agricultural and Grazing Lands

#### *Farm Lands and Adjacent Grazing Lands*

Only rough estimates are available of the total area of tillable lands in Alaska. If

<sup>1</sup> Reference is made to earlier examination of this project made for the Alaska Railroad by Mr. Geo. H. Hunt of the U. S. Forest Products Laboratory, Madison, Wisconsin, 1922, also to reports on engineering details submitted by Mr. Keweenaw, Engineer, Yoon Building, Portland, Oregon.

limiting criteria be applied to the definition of the terms "agricultural" or "tillable", namely soil quality, climate, drainage, topography, or accessibility, the frequently quoted total tillable area of 65,000 square miles appears to be open to considerable revision. Only sub-regional land-use surveys will - in time to come - determine which areas can and should be assigned to use by future farmers. The need for exact knowledge of all potential farm land is, however, not imperative, as occupancy of farm lands at this time is not a matter of mere choice, but rather one of extremely careful selection.

On the other hand, it is imperative to have full information on those restricted areas within which farm settlement has already been given an impetus, or within which settlement is likely to occur during the next decade or so, in accord with such other economic development as can be reasonably expected. These areas are necessarily in the vicinity of or within easy access to existing centers of population. Plans for agricultural development would, therefore, focus upon the following subregions recognized as being the most suitable and most logical for early occupancy:

(a) Within the Cook Inlet area,

The broad open Susitna Valley, including the lower Yentna Valley, with in easy access from the Alaska Railroad,

The "Homer Country" at the southwestern tip of Kenai Peninsula,

Selected areas on the west side of Kenai Peninsula.

(b) The Tanana Valley in the vicinity of Fairbanks.

*Objectives.*--The agronomic phase of the agricultural problem has been well covered by the agricultural experiment stations of Matanuska and Fairbanks. Three years of practical farming in the Matanuska colony have been a valuable additional experience in agronomy, to say nothing of other experiences gained from the colonization experiment.

Future development plans must be based on comprehensive, cooperative land-use surveys and studies, to be undertaken in all the subregions listed above, along the lines of the now completed Matanuska land-use survey. In the Matanuska land-use survey, many component parts of the picture had already been explored or were known from three years'

farming; a road system had been built, and social improvements had been developed. This is not true of the other regions, where only rudiments of such future development are in existence.

*Grazing Lands Outside of the Agricultural Areas*

*Grasslands for Cattle and Sheep.*--The vegetative resources of Alaska include considerable areas of excellent grasslands, many of which can in the future be used for large-scale raising and breeding of meat-producing animals, especially cattle and sheep, with hides and wool a welcome by-product. Developments in bleak, wind-swept Patagonia, or on the Falkland Islands may serve as precedents for such possibilities.

These potential range lands are scattered over a wide area, including parts of the Alaska Range, the Chugach Range, the Alaska Peninsula, Kodiak Islands, and the Aleutian Islands. Development plans for the proper future use of this resource would call for definite range surveys, especially determination of forage conditions and carrying capacities, also a study of possible conflicts with wildlife in those areas.

*Tundra Lands for Reindeer.*--With the passing of all reindeer into native ownership, a new perspective has opened for sound, well-managed use of the huge expanse of tundra, which covers most of northwestern Alaska. Proper use of this resource will involve clear recognition of past mistakes made in the management of range as well as of herds; it will be associated with plans for the establishment of a new order for the Eskimo population, which may well be termed a "reindeer economy". While close adjustment to a meager natural background has always been a necessity and a life saver to the individual Eskimo, correct adjustment to the tundra through the medium of reindeer may be the ultimate economic salvation of the entire Eskimo race.

The problems of correct and sustained use of the natural tundra vegetation are manifold. They are not confined to the natural resource, but concern also the native human resources of the reindeer country. Even the welfare of the white population is to no small degree linked with the welfare of the Eskimos.

General Plans. The necessary steps that will lead to proper use of the resources referred to as "tundra lands", may be listed

as follows:

- (a) Range studies to determine forage conditions and carrying capacities of the various reindeer ranges.
- (b) Mapping of the reindeer country.<sup>2</sup>
- (c) Training of reindeer herders and general education of the native in the proper use of the reindeer resources.

Reference is made to a later section: "Planning for a Native Economy", of this Part.

#### Water Resources

The term water, as used here, does not include aquatic life. It includes the element water only, the sea, rivers, creeks, and lakes, as a medium of transportation, and as a resource used for domestic, municipal, and industrial purposes. Plans for the diligent use, care and control of this ubiquitous resource cover a large field of development. They include all harbor and river works, aids to navigation, and flood control projects, and concern storage of water for hydroelectric and other industrial uses. The objectives aiming at an increasingly beneficial use of these water resources cover, therefore, a wide range.

#### Harbors

Alaska's population is largely a sea coast population. Most of its major towns are sea ports, and the sites of seashore industries. Non-contiguity with continental United States makes proper access from the sea an economic and strategic necessity, and improvement of harbor facilities a vital need.

In recognition of this need, the Federal Government, through the Corps of Engineers has cooperated with the various cities in a Territory-wide program of small-boat harbor projects. The benefits accruing from these constructions to the fishing population, to the fishing industry, and to commercial life, in general, are essential contributions to Alaskan development, too obvious not to warrant a vigorous continuation of this building program. Eight small harbor projects are under consideration at this time, four of which have been authorized, while two have been recommended by the Chief of Engineers. One (Wrangell) has been reported on and is pending, and for one (Petersburg) a preliminary survey has been authorized.

<sup>2</sup> This coincides with the necessity of mapping most of this same area for mining purposes.

#### Waterways and Aids to Navigation

Three agencies are engaged in providing safety to navigation:

(a) *The Coast and Geodetic Survey:* The Survey is spending each year a substantial part of its appropriation for completing the survey and charting of the yet uncharted remote sections of Alaskan waters. In addition to routine surveys of all kinds, the Survey plans to expand aeronautical charting and tidal current survey, and to establish primary tide stations at Seldovia, Anchorage, Nuashagak Bay, and St. Michael.

(b) *The Coast Guard:* In fulfillment of its chief objective, namely the safety of marine and aerial navigation within the navigable waters of Alaska, the Office of the Commander of the Juneau District has prepared an extensive building program. The importance of this program for national defense is obvious.

(c) *The Corps of Engineers:* This agency is chiefly concerned with making and keeping the waterways navigable by removing obstructions and by widening and deepening narrow channels. National defense as well as commercial maritime interests fully justify this undertaking.

#### River Improvements

While Alaskan rivers are not better behaved than other rivers of the world, - in fact, climatic conditions point to the contrary - the need for hydraulic control has not yet become urgent at this early stage of the Territory's economic development, except in a few cases. So far, only three flood-control projects have been completed or are under construction.

Another project for which a survey has been authorized is river-channel improvement for navigation purposes in the Tanana River near its confluence with the Yukon River.

#### Supply and Storage of Water

The importance of water supply has been keenly felt in the mining industry, where all phases of operation, sluicing, washing, hydraulicking, and dredging of placers, as well as milling of lode ores, call for the utmost utilization of the available water supply. Nothing can better illustrate the dependency of mining on water supply than the fact that in 1908, due to an unusually dry season, gold production on Seward Peninsula alone fell off by \$2,000,000 or 30 percent. In gold mining areas of scant rainfall, hundreds of miles of ditches have to



be built and extensive pumping plants installed to secure a sufficient supply of this precious resource. This demand for a safe water supply will increase with the expected expansion of mining operations. Other present uses of water supply are confined to local, domestic, and municipal consumption and to a dozen small hydroelectric plants.

It is obvious that a development plan must anticipate a water demand of many times the present volume, in accord with expected growth of industries and cities. There must also be anticipated certain conflicts arising from the use of water in regions where a scant supply is shared by and must be apportioned to different users.

#### Water Power

A happy combination of heavy runoff, good natural storage sites, high heads, and nearness to navigable waters makes the forest areas of southeastern and south-central Alaska an ideal region for the development of low-cost hydroelectric power, wherever and whenever needed. While the present use made of this natural asset is limited, it is obvious that the availability of low-cost power will in the future act as a stimulus to further industrial development.

Reconnaissance surveys of projects involving over 800,000 horsepower have been made in the past, but more detailed surveys, including systematic stream measurements and storage capacities of suitable sites, are needed to promote the establishment of industries based upon the use of both timber and water resources. Foremost among these potential users is the pulp and paper industry, second, the mining industry, and third, the electro-chemical industry. Water supply investigations in the most important mining regions of Alaska were carried out by the Geological Survey from 1906 to 1921. Within the national forest area, stream measurements and examinations of potential storage and power sites have been undertaken by the Forest Service.

#### General Plans

- (a) Continued systematic stream measurements in those regions in which development is either under way or is likely to occur in the near future.
- (b) Systematic examination of potential sites for hydroelectric development in those regions where utilization of timber, pulp, and minerals is most likely to call for the use of

water power.

- (c) Establishment of a hydrological branch office of the Geological Survey in Alaska for the purpose of carrying out this program.

#### Mineral Resources and Mining Industry

##### Stage of Development

It is very difficult to determine the exact life stage of an industry based upon an exhaustible resource such as minerals. Even if more adequate quantitative data were on hand, any estimate of the Territory's mineral reserves would be just another guess. Known facts about past mineral production permit, however, a fair appraisal of the future significance of the use of this widespread resource for the Territory and its resident population. One may deplore the fact that most of the gold produced in Alaska mines benefits non-resident operators and countless others living outside the Territory, but one should not overlook the fact that a modest portion of the mining profits revert to the Territory in form of taxes on production and royalties, wages, and through the numerous channels of an extensive service industry. In planning future development it is, therefore, not so much a matter of how to increase the output, as of how to increase the Alaskan share of that output, so that the gradual loss of the resource may be somewhat balanced by more substantial returns.

Analysis of the past mineral production reveals the preponderance of gold, especially since the decline of the copper mining industry. Approximately 80 percent of the mineral production of Alaska is gold. But in spite of a 69 percent boost of the gold price in 1933 and in spite of various technical improvements such as large-scale dredge operations, and the opening of new fields, the total annual output in recent years has remained below that of the steadiest gold-mining period, 1906-1916. Long-range planning must anticipate - in these coming years of unusual world-wide unrest - that an adjustment of values which depend upon world demand will eventually take place. It must anticipate immediate reactions of the gold mining industry to possible fluctuations in the demand for, and therewith, in the price of gold.

The mining of minerals other than gold was until recently discouraged by a general downward price trend of many important metals, especially of silver, copper, lead,

antimony, tin, and platinum. Other mineral commodities, including chromite, marble, and oil, have always been produced intermittently. In spite of market fluctuations, platinum and tin have, however, come to the fore and are being produced in increasing volume. Coal production for local purposes is yet small but shows a steady upward trend.

#### Objectives

In view of this present uncertain and unbalanced status of Alaska's mining industry, the objectives for further development aim at broadening the field of mining, by

- (a) prolonging the life of the gold mining industry,
- (b) expanding the mining of metallic minerals other than gold,
- (c) increasing the mining of non-metallic minerals such as coal, limestone, marble, gypsum, graphite, barite, sulphur, asbestos,
- (d) exploring and subsequent mining of strategic mineral commodities, especially tin, chromium, tungsten, and oil.

While credit must be given to government agencies for the efforts and funds spent in the past for the purpose of opening mining areas by mapping and road building, and while due acknowledgement must be accorded to the many excellent reconnaissance surveys undertaken by the Geological Survey during the past 40 years, it is obvious that the objectives stated above can only be accomplished after intensive exploration of the hitherto unknown or only vaguely known mineral resources of the Territory.

#### General Plans

Such a program will include:

- (a) Systematic and complete aerial mapping of mineral lands.
- (b) Detailed geologic mapping based upon aerial base maps.

This program should be augmented or followed up by:

- (c) A flexible road and airfield building program, designed to serve active mining areas as well as to open potential fields.
- (d) Stimulation of further capital investment in mining by clearing the legal tangle of mining claims, and by devising an equitable system of mining taxation. Reference is made here to the proposed Trunk Road System for Alaska, outlined in Part Two, (Transportation). Under this plan, a number of important potential mining

fields would be opened, in particular:

- (a) The "Valdez Creek" area between Denali and the Mt. McKinley National Park, which has numerous gold lode and placer prospects.
- (b) The Goodpaster area, which is considered rich in gold, silver-lead, copper, antimony, tungsten, and coal.
- (c) The area between Nabesna and the Canadian Boundary, which includes the Western extension of the mineralized belt surrounding the Coast Range Batholith, with prospects of gold lode, also copper and silver-lead.

#### Wildlife Resources

##### Land Animals and Fur Industry

While at the present time the wildlife resources of Alaska, with few exceptions, are practically intact, potential decrease in volume and potential conflicts in the use of the resource are too apparent to be disregarded. Likewise apparent is the fact that wildlife holds a very distinct place among Alaska's basic economic assets, and that its perpetuation and proper use is, therefore, of the utmost significance to the future economic development of the Territory.

Omitting purely sentimental considerations, the field of wildlife has two distinct economic phases: First, as an attraction to an increasing number of tourist visitors, especially big-game hunters, naturalists, and photographers; second, - due to the preponderance of furbearers - as raw material for the pelt and fur industry, which ranks third in value of output among Alaska's basic industries, including trapping as well as fur farming.

The need for better protection of wildlife, growing out of past experiences in the States, led in 1925 to the enactment of the Alaska Game Law, the administration of which was placed in the hands of the Alaska Game Commission, largely as a law enforcement agency. Wildlife research is conducted by the Fish and Wildlife Service in cooperation with the Commission. Both efforts, enforcement and research, have apparently suffered from the lack of adequate funds to cover the vast geographic range of wildlife. The problems faced by both agencies are, therefore, growing in volume and complexity, and the need for more complete and more systematic studies of the resource, and of the problems connected with it, is gaining in recognition.

While the Alaska Game Commission is chiefly concerned with the maintenance of a safe breeding stock of all animals, few efforts have been made toward solving the problems of the fur-farming industry. The scientific phase of it, especially the problem of proper diet, is now being studied by the Fur Experiment Station at Petersburg. But other problems, including those of feed supply, feed storage, island-farming, marketing, and fur-processing have not received much attention.

#### Objectives

The primary objectives for the protection and development of terrestrial wildlife resources and of the fur industry are,

- (a) Maintenance of sufficient breeding stock through proper regulation and enforcement, and by restocking.
- (b) Improvement of the quality of furs by proper handling.
- (c) Building up of a more stable fur-farming industry.

#### General Plans

- (a) Extension of the research facilities of the Alaska Game Commission.
- (b) Ample restocking program.
- (c) Educational campaign for fur trappers and fur dealers.
- (d) Improvement of predator control by replacement of the bounty system by a paid-hunter system.
- (e) A comprehensive survey of the fur-farming industry, including feed supply and storage problems.
- (f) Participation by the Alaska Game Commission in subregional land-use studies.

#### Aquatic Resources and Fishing Industry

Early recognition of the potential danger of depletion, followed by regulatory Federal legislation, has made most of the Territory's aquatic resources practically permanent. This is particularly true of salmon, halibut, shellfish and fur seal. Only one animal, the sea otter, has become actually depleted, by ruthless exploitation during the Russian occupancy; and in spite of complete protection by laws since 1911, no appreciable restoration has been recorded.

#### State of Development

*Salmon.*—Among the commercial fish resources, salmon occupies an increasingly important place. Continued study of the life

habits of the various species of salmon has led to a number of protective measures, essentially consisting in the limitation of fishing areas, types of gear, take, and the establishment of closed seasons. The high salmon packs of recent years, although subject to minor fluctuations, are sufficient evidence of the general success of the regulations now in force. In fact, the danger of declining abundance of salmon is now completely eliminated, provided present restricting policies are continued. The annual supply is now restored to such magnitude that it supports one of the largest fish-canning industries of the United States, valued at \$40,000,000 in a normal year. Salmon products other than canned salmon amount to \$2,500,000 a year.

*Halibut.*—Unrestricted taking of halibut to supply a fast-growing market had, by 1923, led to serious depletion of the resource, not only on the inshore banks but also on the offshore banks adjacent to the South-eastern Archipelago. This situation, in turn, led to the establishment by treaty, of the International Fisheries Commission, a regulatory body which, through strict control measures based upon research of the life habits of the Pacific halibut, is succeeding in gradually restoring the halibut resource to a moderate volume of abundance, and this resource now supports a small industry of approximately \$1,000,000 worth of annual production.

*Herring.*—Investigation of the herring supply in Alaskan waters is still in progress. After the take had increased under the stimulus of world war prices, decrease in the abundance soon became evident. Restrictive measures have been applied ever since. With the exact status of the resource itself still somewhat in doubt, the herring fishery faces problems of a complex nature. The chief problem hinges on the best use of the resource, whether for reduction (to meal and oil) or for direct human consumption in form of mild-cured herring. In recent years, only about seven to ten percent of the herring catch has been used for immediate consumption as human food, the remainder was used for meal and oil. The issue is, therefore, one of quality versus quantity, involving also questions of the use of proper gear.

*Cod.*—Comparatively little is known of this resource, except that it appears to be confined to offshore banks in the vicinity

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of the Alaska Peninsula and the Bering Sea. The take of cod is limited because of a limited market.

**Shellfish.**—The known occurrence of clams, crabs, and shrimps is confined to limited areas of southeastern and south-central Alaska, where labor is available. Search made for shellfish in more remote potential areas has been limited simply because under present methods of production, factories must be close to an established community. The industry has enjoyed a moderate but steady growth, without having endangered the present supply. This is due to mild restrictions, including a reasonable limitation of the annual take. The shellfish industry is not strictly seasonal as the other fisheries are. The value of the present annual output is about \$500,000.

**Whales.**—No information is available on the volume of this resource. The industry, employing only one or two shore stations in Alaska, one in the Kodiak area, and the other at Adutan in the Aleutians, is at present confined to a non-Alaskan corporation, and its continuance is problematic. Operations are controlled by the International Whaling Treaty. The 1938 gross output in oil and meat was valued at \$180,000.

**Fur Seal.**—Within the past decade, the fur-seal herd, which uses the Pribilof Islands as breeding grounds, has doubled, and the returns from sealing operations under Federal management have steadily increased. This is sufficient proof of the sound condition of the resource. Annual sales of fur-seal skins have now reached the sizeable amount of \$1,000,000. At the present time, the Territorial treasury does not share in the revenues accruing from this important resource. In fact, this is the only natural resource for which the Territory neither spends money nor receives revenue.

#### **Deficiencies and Problems**

The present status of Alaska's aquatic resources, and of the various types of fisheries engaged in utilizing them, reveals the following deficiencies:

- (a) Lack of complete knowledge of the occurrence and volume of herring, halibut, cod, shellfish, and whales.
- (b) Unbalanced use of the entire range and variety of the fish resources.
- (c) Inadequate returns to the resident population of Alaska from fisheries largely controlled by outside interests.

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(d) Excessive migratory labor which consumes only a fraction of its earnings within the Territory.

(e) Difficulty of reconciling maximum of use with sound conservation.

(f) Uncertainty of the economic merits of fish traps used by the salmon canning industry.

#### **Objectives**

Further growth of the fishing industry is not merely a matter of technical expansion or of increased conservation. Primary objectives for sound development are:

(a) Stabilization of the salmon fishing industry at its present high level.

(b) New uses for species that are not now marketed at all or only in limited volume.

#### **Plans and Projects**

(a) Continued field research by qualified investigators, involving the construction of at least four additional salmon counting weirs.

(b) Examination of all possibilities for new and better fishery by-products by the Ketchikan fish laboratory.

(c) Continued enforcement of regulations based upon sound conservation policies. This involves construction of a storehouse and shop for six speedboats in southeast Alaska.

#### **Scenic and Recreational Resources**

If one would trace on a map the actual range of scenery taken in by the mere sight-seeing visitors to Alaska, who make up the bulk of Alaska's tourist traffic, it would be a surprisingly narrow strip on both sides of the steamship lines, of the Alaska Railroad, and possibly of the Richardson Highway. The number of tourists who have the means and can afford the time to see more of Alaskan scenery than the shipboard and railway car glimpses along the conventional round-trip arteries is yet small.

The problem illustrated by this statement is not so much a problem of the tourist than a problem of Alaska. In other words, Alaska has not yet been able to develop its variegated scenic resources to a point where a maximum of scenery and other attractions can be made available to a maximum of people at a minimum of cost. The country still lacks most of the facilities for opening its real scenic beauties not only to the eye of the round-tripper but to a more direct enjoyment and use by vacationists of all sorts. The

objectives of developing this inexhaustible economic asset appear to be simple and clear, but the road to their realization is studded with difficulties, problems, and conflicts.

Mt. McKinley National Park is the only part of Alaskan scenery where the Federal Government has followed the policy so successfully employed in the States for the promotion of tourist travel. The Government can hardly be expected to invest speculatively in the less accessible regions of scenic interest, such as Glacier Bay and Katmai National Monument. But for the same reason, private enterprise cannot be expected to venture headlong into the virgin field of recreational development. The problem, therefore, hinges about the gradual opening of more recreational sub-areas with avoidance of risky investments by either Federal, Territorial or private interests. The chief beneficiaries of expanded tourist travel via the stop-over method would be those cities which by their geographic location are suited to serve as subregional centers for recreational and tourist development. Local initiative, paired with a regional viewpoint, will, therefore, be the key to such desirable progress. The Federal Government, however, must at least provide stimulus and aid to private or municipal enterprises entering this field of business by improving access to and transportation within potential tourist regions.

The attractions to the tourist and recreation seeker are not confined to scenery, nor should they be allowed to be confined to the spectacular and unusual features the Northland has to offer. Emphasis upon spectacular attractions may well be used in advertising the Territory as a tourist land, but plans for making Alaska a national vacation and recreation ground must not stop at this emphasis. Indeed, a well-developed vacation land of the future will cater to all tastes and to all sizes of pocket book.

The Forest Service has long recognized the recreational value of the national forest area as one of the leading resources of Alaska. It has embarked on a development program that aims at making all recreational features within the national forests accessible for the purpose of promoting the stop-over tourist business. The forest development roads, which are tributary to the forest highway system, are especially instrumental in developing this great vacation land.

The National Park policy is one of conservation as well as of recreation. Conservation of forests, water storage, range, and wildlife are important objectives of the National Park Service; once established, these national reservations, incidentally, become national playgrounds.

In Alaska, the problem of recreation is likewise associated with problems of sound conservation, especially of wildlife. Plans for a better utilization of scenic resources must, therefore, be coordinated with plans for the maintenance and protection of wildlife in the Territory.

Other plans that will have to be integrated into a comprehensive recreation program include easier means of access to and of transportation within recreational areas.

#### *Objectives*

The objectives for the development of Alaska's recreational resources may be summarized as follows:

- (a) Development of stop-over tourist facilities on a subregional - or unit - basis.
- (b) Encouragement of private enterprises through a definite government program of initial development.
- (c) Improvement of travel facilities within the Territory.
- (d) Harmonizing Territorial development with national development of recreational resources. (The type of scenery and recreational attractions offered by Alaska is a valuable supplement to those found in continental United States).

While the realization of these objectives is necessarily a gradual process, it is obvious that final success will depend largely upon coordinated planning by all agencies concerned, particularly the Forest Service, National Park Service, Alaska Railroad, Alaska Game Commission, and all road building agencies.

#### *General Plans*

- (a) A comprehensive inventory of Alaska's scenic and recreational resources consisting of field studies to be undertaken in each regional unit under active participation of all interested agencies.
- (b) Systematic expansion of the work being done by the Forest Service, namely providing better access to the present wilderness, and promoting attractions to tourists by preserving historical sites

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(c) Initiation of a development program for the national monument areas, especially the Glacier Bay National Monument, by the National Park Service.

(d) Subregional, cooperative land-use studies for the purpose of exploring the full possibilities of recreational use of certain areas, and for the purpose of recognizing and eliminating possible conflicts between recreational and other economic uses.

(e) Improvement of existing legislation wherever the sound use of land for recreational purposes seems to be prevented or impaired.

#### Human Resources

The various plans outlined above concern the development and prudent use of natural resources only. Benefits from physical planning are not confined to those directly engaged in using Alaska's resources, but reach a large number of people, residents and non-residents, who derive advantages of various kinds, through a myriad of channels, from this use.

While, therefore, physical planning promotes the welfare of the people of Alaska only indirectly, it is obvious that social planning, i.e. direct planning for the human resources of the Territory, is a phase of no less importance in the process of Alaskan development. In view of the administrative segregation of native and white problems, one exclusively Federal, the other Territorial, Federal, and municipal, plans and projects concerning the white population are treated apart from those concerning the natives.

#### The White Population

Approximately 70 percent of the Territory's annual income is spent for purposes of education, health, and public assistance. To these Territorial moneys appropriated by the Territorial Legislature for the care of Alaska's white human resources must be added certain earmarked funds annually accruing to the Territory from the U. S. Treasury, the Forest Service, and the Alaska Game Commission.

#### Education

High cost of school operation and limited, uncertain funds keep the biennial building program confined to the most necessary projects. For the same reasons, no long-range building program has been proposed by the

#### Territorial Board of Education.

#### Health

The Territorial Department of Health has submitted very definite objectives and plans:

(a) Legalization of the Territorial Department of Health, including provisions for a full-time Commissioner.

(b) Closer cooperation between a legalized Health Department, the Territorial Department of Public Welfare, and the Office of Indian Affairs, for purposes of planning more effectively health and welfare programs throughout the Territory.

(c) Construction, by the Federal Government, of a hospital to care for Alaska's tuberculosis cases, crippled children, and cases of mental disease.

(d) A number of special studies and survey projects in the fields of social medicine and public health.

#### Public Welfare

Territorial administration of public welfare, which dispenses about 25 percent of Territorial appropriations, calls for more centralization and for carefully coordinated planning based upon more reliable statistics of population and living conditions than have been available in the past.

The need for a more equitable dispensation of public welfare funds calls for a comprehensive survey of the Territory's (white) human resources, particularly for a determination of standards of living and of cost of living in various parts of the Territory.

#### The Native Population

Somewhat less than one-half of the Territory's population of about 73,000 consists of native Indians, Aleuts, and Eskimos. They are wards of the Federal Government, and their economic and social welfare problems are the problems of the Office of Indian Affairs. In 1938, the various branches of this service were consolidated into the "Alaska Indian Service" under a General Superintendent, for the purpose of better coordination of its three main functions which serve the educational, sanitary, and economic improvement of native life.

Mere guardianship has ceased to be the aim of the Indian Service; the ultimate objective is the establishment of a native economy based upon better use of natural resources, the development or promotion of native skill, the betterment of health, and the improvement of native attitudes. The problem, therefore, is largely one of edu-

cation and training, paired with such economic support as is deemed necessary for the accomplishment of the principle objective within reasonable time.

#### Education

To appraise correctly the rather large tentative school budget of the Alaska Indian Service for the next six years, it is necessary to consider that an Indian teacher is more than just a teacher; that he or she or both are playing a vital part in the total native program designed to lead toward an economic status that will gradually free the natives from Federal guardianship and thus gradually lessen the scope and cost of the Indian Service.

The functions of Indian teachers are manifold; they include, beside teaching, guidance in community affairs, cooperative store management, reindeer supervision, supervision of arts and crafts, home making, welfare work, relief work, and the operation of radio communication stations. Buildings for schools and living quarters must be adequate if these multiple functions are to be efficiently performed.

#### Health

Considering the wide geographic range of Alaska's 30,000 natives, the difficulties of transportation, and, finally, the unfortunate low stage of health of the natives, the present medical staff and equipment maintained by the Alaska Indian Service, including only eight hospitals with a total capacity of 190 beds, appears inadequate. Recent surveys revealed about 1500 cases of tuberculosis, half of which call for hospitalization. The death rate from tuberculosis alone is over ten times the rate for the States as a whole. Improvement of native health conditions through expansion of medical facilities is a prerequisite for the successful operation of the economic plans to be discussed in the succeeding section.

#### Native Economy

With few exceptions the natives of Alaska have received in the past too much direct aid from the Federal Government and not enough stimulus and aid towards establishing an economy of their own. The problem of how native economic life can be made more independent is largely one of proper education. The practical approach to its solution is regional, because each major native region has a different natural background to which a future economy must be adjusted.

It is suggested that this can be accomplished chiefly through the following three instruments:

- (a) A native reorganization program, consisting essentially of: Organization of native groups, communities as well as cooperative associations. Supplying of credit to these organizations for various purposes, but especially for industrial equipment.
- (b) A native arts and crafts program. Initiated in 1937, this program provides clearing-house and marketing facilities for native products, and encourages the development of sporadic native craftsmanship into a safe industry, based upon a more intensive use of natural resources and native skill.
- (c) Reorganization of reindeer ownership and reindeer management in the Eskimo-inhabited tundra region, and in scattered other regions where reindeer husbandry can be successfully practiced.

#### Reindeer Economy

While the projects mentioned under (a) and (b) have been in active operation for several years, and are satisfactorily regulated by Acts of Congress, the transfer of all white-owned reindeer herds to native ownership has only recently been undertaken. Following this first step, plans are now being prepared for the purpose of securing the maintenance and proper management of the existing herds, totaling some 250,000 deer and occupying 61 ranges within an area the size of the State of California.

The welfare of 13,000 to 15,000 natives, to whom reindeer is the most vital source of food and clothing, depends upon the success of these plans, the essential features of which are:

- (a) Distribution of some 82,000 deer, purchased from white owners and now government-owned, to suitable native applicants.
- (b) Training of reindeer herders through herd assistants and unit managers.
- (c) Vocational education of the natives through the schools existing at each reindeer station.
- (d) Supervision and improvement of the processing of marketable reindeer products.
- (e) Range surveys, including: inventories of forage plants, determination of grazing capacities, fixing of range boundaries, and complete mapping of the reindeer ranges.

## PART TWO -- PROJECT REVIEW BY FUNCTIONAL FIELDS

### Introduction

Not all the plans and projects that combine to make up a comprehensive development plan bear such definite relation to a major resource that they could logically be placed under the headings of Part One. Other sets of projects serve the development of more than one resource and have to be segregated to suit their various objectives.

It therefore appears desirable now to review these plans and projects as integral parts of four functional groups, which summarily cover the most important phases of planning in Alaska. Checking existing project groups against each field has the advantage of discovering gaps and inadequacies, and of showing more emphatically the need for coordination of individual plans proposed by the various governmental agencies.

### Land Use

#### General Land-Use Program

The fundamental approach to development planning of an area as virginal as Alaska, is through subregional land-use surveys. Alaska, much too large and diversified an area to be a regional unit, lends itself ideally to subregional division and study. In Part One of this Alaska report suggestions for land-use surveys were confined to only two regions, the Cook Inlet Area and the Tanana Valley, but the suggested itemized scope of such cooperative survey projects is applicable to any natural or economic region of Alaska.

Only in two subregions, the Matanuska Valley and the Seward Peninsula, studies approaching a land-use survey have been undertaken. While at the present time, no projects of cooperative scope are proposed, many of the study projects planned by governmental agencies must be rated as valuable preparatory work for future subregional surveys, although they may be of a less definite and detailed nature than careful subregional surveys require.

It is important that each agency engaged in resource control or development in Alaska make ample budgetary provisions for participation in future cooperative land-use stud-

ies to be sponsored and organized by a proper coordinating authority.

#### Land Use Within National Forests

The coastal and island regions of southeastern and south-central Alaska coincide with the national forest area. In this area, the Forest Service has established a definite land-use program, whose general objectives are threefold:

1. Classification of forest lands for the uses to which they are best adapted.
2. The building and maintenance of permanent communities, farms, homes, and industries.
3. Retention in public ownership of lands needed for public purposes such as rights of way for timber removal, roads and trails, water power sites, terminal grounds, and public camping areas.

#### Industrial Development

This field covers all those natural resources of the Territory that serve as basic material for industrial production, in particular: minerals, timber, fish, and wildlife resources. It is, therefore, one of the broadest and most important fields of planning. Deficiencies, as well as potentialities, of the existing industries have been pointed out in connection with their respective resources (Part One), and definite sound development policies have been advanced for each major industry.

Common to practically all industrial development in Alaska are the following adverse features:

1. Seasonal nature of most industries.
2. Dependency upon outside capital.
3. Lack of balance in the present use of resources.
4. Excess of migratory labor.
5. Handicap of distance and of excessive cost of transportation.
6. Insufficient direct returns from outside controlled industries (effect of (2) and (4)) to the people of Alaska.
7. Private interest of fast exploitation versus national interest of conservation of resources.



### Transportation and Communication

Alaska's vast geographic dimensions have, in the past, acted as a considerable handicap to economic penetration and are still a major obstacle to a normal rate of development.

Plans for the improvement of Alaska's transportation and communication system had no definite place in Part One of this report, simply because they are not directly related to individual resources. Lines and means of transportation and communication are instruments of development and as such serve all resources and all industries.

#### Roads

Past policies in road building were largely dictated by local or subregional demands. Although this is still true today, the need for connecting the scattered subregional road systems is now beginning to be felt more keenly than before.

In preparing a long-range program, the road builder is faced first with the problem of anticipating the most urgent local needs, and second, with the task of adjusting this program to whatever funds he may reasonably expect for new road projects. It is obvious that this necessity for close departmental budgeting, or planning within an uncertain budget, is a weak member in a general development plan. The two sets of road building programs proposed by the two road construction agencies, the Alaska Road Commission for the public domain, and the Public Roads Administration for the national forests, are both calculated on uncertain, limited budgets, and are therefore, tentative. Their soundness is, however, warranted by many years of experience in planning and building.

The office of the Territorial Highway Engineer, which is not strictly a construction agency but cooperates with the Alaska Road Commission by apportioning Territorial funds to the latter's program, has contributed a plan which is herewith presented in original under the appropriate title:

#### A TRUNK ROAD SYSTEM FOR ALASKA

(By Wm. A. Hesse, Territorial Highway Engineer)

"The needs for roads within the Territory are so great and so wide-spread and road building activities in the past have been so difficult that any approach to the question henceforth should be based

upon some definite plan.

"Whether the plan should contemplate a completed program within six years or within any other period is not a matter of great importance but the question of facing each season with no assurance that any roads at all can be built or even the existing roads properly maintained is highly important.

"Road work in Alaska is naturally seasonal and since the maximum length of the season for field operations is six months, it follows that in order to perform such work advantageously to the full extent of the season, the necessary equipment and supplies must be in readiness on the ground at the beginning and not in the process of ordering from Seattle after the season has already begun. Planning to this extent at least is essential.

"Rather than to cover the whole field of roads within the Territory consisting as it does of numerous disconnected and widely separated projects this office feels that to concentrate upon a single trunk road piercing the Territory from the beautiful sheltered inland waters of the southeastern coast and linking the existing major highways with this project and with one another would perhaps serve a more generally useful purpose and give the sightseeing visitors an opportunity to make the most spectacular journey anywhere to be found at their own convenience and with the utmost comfort.

"It would enable the traveler to take his car aboard the steamer in Seattle, pass through a thousand miles of incomparable inland waterways, disembark at Haines and drive his own car over more than a thousand miles of Alaskan highways that would afford a complete cross section of Alaska, its majestic mountains, its glaciers and its industries. The inland waters not only afford an ocean voyage as calm as a mill pond but afford restful diversion from long auto trips and these waters can be seen no other way.

"The proposed 'Alaska Highway' would traverse a region, the scenic grandeur of which is unsurpassed anywhere though it would be necessary to construct about 260 miles through Canadian territory, and it is believed that if in consideration of concessions made to Canada in the matter of extending to it free port facilities at Skagway, Canada would likewise extend

similar privileges to the United States for the purpose of building this road, such an arrangement would be mutually beneficial.

"The proposed highway would leave tidewater at Haines, Alaska, where the U. S. Army Chilkoot Barracks is situated, and would follow the existing Haines-Pleasant Camp road for a distance of twenty-four miles and thence by new construction ascending the Chilkat valley to the Canadian border which is forty miles from Haines. The highway would then pass through Canadian territory by way of the Dezadeash and Kluane Lakes passing a galaxy of mountain peaks ranging to 19,850 feet in elevation and of surpassing scenic beauty; thence across the Donjek and White Rivers to the Canadian-Alaskan border, a distance of 260 miles. From this point there would be 90 miles of construction to connect it with the Richardson and Steese Highway system. This would constitute the first link of the project.

"The second link of the project would leave the Richardson Highway at a point near Copper Center 108 miles from Valdez and 263 miles from Fairbanks and 25 miles from the junction of the Haines link with the Richardson Highway and would run westerly a distance of 135 miles to Palmer in the Matanuska Valley, thus connecting Anchorage and the Matanuska Valley with this same trunk system and giving the Matanuska farmer a larger potential market than he now enjoys.

"The writer is reluctant to consider Alaska road development purely in the light of defense measures though it can be seen at a glance at the accompanying map that the Army airbases at Anchorage and Fairbanks are at once connected with one another and with the Army post at Chilkoot Barracks, that the interior airbases would be served independently of the Alaska Railroad by a route that uniquely passes behind the great coastal mountain barrier and stays behind it, and that it traverses an area of the least annual snow fall with the possible exception of the first twenty-four miles out of Haines.

"Apart from any consideration of highway development this project would afford the opportunity for the construction of sorely needed aviation fields and which may only be built after there is a highway over which to transport the necessary

mechanical equipment.

"While this trunk road would provide a direct overland connection with all of the existing Army activities in Alaska, it is significant that the tidewater terminal at Haines is but 180 miles in an airline from the Naval airbase at Sitka.

"Work on the project could be advantageously undertaken with four major construction camps operating simultaneously. No insuperable or even difficult problems are to be expected and while surveys have not yet been made a foot traverse of the entire project has been made and a tentative estimate would indicate that there would be 501 miles of new construction involving an expenditure of about \$5,000,000."

This proposed trunk road system would, besides providing connection between Haines and Nabesna and between Copper Center and Palmer (first priority roads), also connect the Richardson Highway with the Mt. McKinley National Park on the west, and with Eagle and Jack Wade on the east. It further proposes to connect Anchorage and Homer with the Seward Road system and to extend the Chitina road to McCarthy. The entire mileage of these proposed roads is:

First priority roads	477 miles
Second priority roads	476 miles
Altogether	953 miles

The construction costs of these roads are estimated at \$12,000,000 or at \$2,000,000 per year on a six-year schedule. The significance of such a road system cannot be overestimated as it will serve three major purposes, namely, (a) defense, (b) tourist trade, and (c) mining development. Reference is made to supplementary notations under these heads.

#### The Alaska Railroad

The Government-operated Alaska Railroad has a strictly pioneering function, namely to provide access from the coast to the interior, and thus to contribute to the industrial development of that vast area. Incidentally, the road has also become instrumental in opening some of the most scenic parts of the interior to an ever-growing tourist traffic. Serving as a means to an end, the Alaska Railroad should not be expected to yield business returns, and its now moderate deficits may be looked upon as a justifiable contribution to Alaskan development.

This attitude should also govern any future plans for the improvement of its ser-

vice, replacement of equipment, and all necessary construction projects, especially since the road will, no doubt, assume an additional function, namely, to serve as an important link in Alaska's defense line.

#### Airways<sup>2</sup>

It is an obvious truth that while Alaska may not be ideally suited for aviation, aviation is ideally adaptable to Alaska's needs. Savings in time more than balance the yet high cost of flying. Although airways will not replace highways, their advantage over a fixed highway system, namely flexibility and speed, is too evident to need further support. The problem is not one of replacement, but rather of supplementation and coordination. Landing fields without surface road connection would be of little value.

The benefits from increased and improved aviation facilities spread over all phases of development, and may conveniently be grouped as follows:

- (a) Carrying of freight, passengers, and mail;
- (b) Providing access to otherwise inaccessible regions.
- (c) Facilitating health service, law enforcement, game protection, and fire control.
- (d) Expediting mapping and prospecting.
- (e) Serving national defense.

These potential benefits are sufficient justification for all plans and projects listed hereunder or appended in tabulated form, which may be considered as an approach to an Alaska aviation program. A perfect program, not available at this time, would have to include the military plans being worked out by the Army and Navy for defense purposes.

#### Communication

The complex network of communication facilities, which spreads over the vast expanse of the Territory, serves a large number of purposes, governmental, industrial, military, and private. It also includes the communication system for commercial aviation and weather reporting, plans for which were outlined in preceding sections. The backbone of communication is the Alaska Communi-

<sup>2</sup> Due to the early stage of Alaska's defense program, it is not possible to present at this time a comprehensive plan for the future development of a desirable system of airways and landing fields. Future aviation facilities will serve military and economic purposes, and planning will have to be done in conjunction with military authorities.

cation System, operated by the Signal Corps, U. S. Army. Jurisdiction over the technical phase of operation is vested in the Federal Communications Commission. Both Federal agencies have submitted plans and proposals that involve construction projects.

#### Steamship Transportation

##### Oversea Transportation

Plans for the development of Alaska, as reflected in the numerous objectives presented in this report, must include the question of adequate water transportation as a vital feature.

Even under the most optimistic assumptions, Alaska will always be dependant upon the import of 90 percent of its necessities from continental United States, and the volume of exports can also reasonably be expected to increase in years to come. Seasonal commuting of residents and non-residents and a growing stream of tourists make improvements in water transportation imperative. Speedier service, better schedules, and modernization of steamer accommodations are a crying need at this very time, and will be more so in the near future. No plans have been advanced for such improvement, and the only present policy is one of laissez-faire. As has been suggested by the "Alaska Resources Committee"<sup>4</sup> in 1937, the United States Maritime Commission may well include in its studies of the American merchant marine a critical survey of the service to Alaska.

#### Local Water Transportation -

##### Star Routes

The need for a more adequate and more efficient coastal and star route service to connect and serve the far-spread shore and island population of Alaska is apparent. This is an important phase of subregional development, and plans for it should be included in the suggested land-use surveys and also in the study of recreation by regional units.

#### Recreation and Tourist Trade

A most significant project for the development of tourist trade is embodied in the Trunk Road System for Alaska, outlined in the preceding chapter on transportation. A completed trunk road system will act as a tremendous incentive to automobile travel. Besides, the proposed connecting roads will

<sup>4</sup> National Resources Committee, Regional Planning, Part VII, (Alaska) pp. 25 and 26.

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open hitherto untapped resources of most fascinating scenery, vying in uniqueness with anything the continental United States has to offer.

In lieu of a yet lacking comprehensive program, the following summary of preliminary work considered essential for the promotion of recreational and tourist development is offered:

- (a) Initiation of development work in Glacier Bay National Monument by the National Park Service.
- (b) Expansion of development work within the national forests for the purpose of stimulating stop-over tourist trade.
- (c) Exploration of recreational needs and possibilities as part of subregional land-use surveys.

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- (d) Reconciliation of wildlife protection (refuges) with recreational development.
- (e) Careful determination of the recreational values to be expected from the suggested Trunk Road System for Alaska.
- (f) Improvement of steamship connection between continental United States and Alaska.
- (g) Encouragement of star-route service in the coastal recreational areas.
- (h) Encouragement of private initiative in the establishment of better tourist accommodations, in the form of privately operated tourist lodges in the more accessible areas of scenic interest.
- (i) Effective advertising campaign by Federal and Territorial governments and by communities and private interests.

## PART THREE -- TERRITORIAL CONTRIBUTIONS TO ECONOMIC DEVELOPMENT

### The Territorial Government as A Development Agency

Compared with the role played by the Federal Government in development planning, the present role of the Territorial Government as a development agency appears very modest. Its limitations are fundamental, namely an effect of the territorial status, of the smallness of the population, and of the limited, uncertain funds available. Approximately 15-20 percent of the annual appropriations are spent for physical development purposes:

*For Transportation and Communication.* Substantial contributions to the road-building program of the Alaska Road Commission, and maintenance of shelter cabins and telephone lines.

*For Development of Mining.* Maintenance of three assay offices; field work by Territorial Department of Mines; and extension of service conducted by University of Alaska.

*For Conservation of Wildlife.* Bounties on wolves, coyotes, and eagles. Operation of Fur Experiment Station by University of Alaska.

*For Conservation of Aquatic Resources and Development of Fisheries.* Bounties on hair seals. Clearing of salmon streams. Cooperation in Ketchikan Fishery Laboratory.

*For Development of Agriculture.* Operation of agricultural experiment stations by University of Alaska.

*For General Development (Economic and Social).* Through research and studies undertaken by the Alaska Planning Council, and through participation in cooperative Federal surveys.

Most of the remainder of the Territorial income is spent for purposes of social development, namely for education, public health, and public welfare. This uneven ratio of expenditures for physical development to those for social development does, however, not imply a lack of balance in Territorial planning. It may reasonably be assumed that the Territorial Legislature appropriates the available funds for whatever purposes will best serve the interests of the electorate.

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The Territory's educational needs include rather large items for the construction, maintenance, and improvement of school buildings, including isolated rural schools as well as city schools and the University of Alaska. The building program submitted by the Commissioner of Education for the next six years involves anticipated expenditures of some \$600,000, or approximately \$133,000 per annum. The six-year building program of the University likewise involves sizeable annual expenditures.

### Aims of Municipal Development

Speaking in terms of development, Alaskan communities are in the process of emerging from the pioneer stage. But they are emerging at an increasingly fast rate, chiefly as an effect of subregional industrial development. The determining factor in their steady rise from frontier beginnings has been regional, i.e. towns either prospered or became stagnant as did the dominant regional industries.

In the light of this dependency, being effects rather than causes, communities cannot be expected to make such direct contributions to resource development as do Federal or Territorial agencies. They contribute, however, indirectly by providing service facilities to the industries that use the regional resources, and social facilities to the service population, of which they largely consist. Viewed in the light of a General Development Plan, the situation calls not only for more purposeful city planning but for an extension of city planning over the subregions upon which the cities economically depend.

In general, it can be maintained that the much desired growth of population must necessarily take its start from the existing nuclei, the communities. Isolated developments are doomed to failure and, therefore, weak members in the Territorial economy. Initiative must reach out from the cities into the untouched subregions to tap hitherto undeveloped resources of scenery, hunting grounds, mineral springs, farmlands, or other potential objects and places of devel-

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opment. Another aim of city planning bodies would be the exploration of all possibilities for the establishment of such minor in-

dustries as will offset the handicap of seasonal employment under which all Alaskan communities suffer.

## PART FOUR -- MILITARY DEVELOPMENT AS A STIMULUS TO ECONOMIC DEVELOPMENT

### Introduction

Original plans for the establishment of military bases in the Territory date back several years. Construction of Navy bases had actually started before the European conflict assumed its present menacing aspects. Recently, however, the original scope of construction work was considerably expanded and its execution accelerated by ample appropriations following the passing of the National Defense Bill. The speed with which Alaska's military bases are now being pushed has not allowed sufficient time to study in detail the potential effects of these developments upon the Territory's economic future, or to plan for the necessary adjustments that the affected localities and subregions will have to make.

The present, short-lived period of construction, with its boom of employment and soaring cost of living, will soon be followed by a period of normal adjustment, and emergency planning will give space to long-range planning. Necessarily, the lack of detailed information on the plans under preparation by the Army and Navy precludes at this time a definite analysis of the mutual needs and benefits that this sudden superposition of military developments upon a youthful economic background will cause. Only the principles can here be stated, to serve as a preamble to future planning.

### Mutuality of Interests

In general, military interests and economic interests are diverging. In the case of Alaska, both developments are, however, taking place in an under-developed region, and the satisfaction of certain military needs is bound to fulfill at the same time certain economic aims, and vice versa.

This mutuality of objectives and interests is best illustrated by looking at the same set of objectives from two angles.

### The Military Point of View (Defense Needs)

From the military viewpoint the following major objectives are necessary or desirable:

1. A broad economic development of strategic subregions, i.e. economic key regions in which military bases are being established. Such development includes:

(a) Production of foodstuff.

(b) Exploration and production of strategic mineral commodities.

(c) Facilities for processing certain basic products.

(d) Increase of population.

2. Thorough survey, by aerial and ground mapping, of those uncharted sections of Alaska that are of military importance.

3. Establishment of a perfect network of landing fields, communication stations, and weather reporting stations.

4. Completion of a strategic network of ground-transportation lines, including improvement of the Alaska Railroad.

5. Establishment of minor manufacturing industries designed to supplement the military plant.

6. Increase and improvement of local service facilities for the accommodation and social convenience of the troops to which Alaska is host.

### The Non-Military (Economic) Point of View

It is obvious that the realization of the defense needs listed under 1, above, will greatly stimulate the general economic development of the Territory, but especially of its strategic subregions. These potential benefits may be enumerated as follows:

1. (a) Greater market for local food products, especially potatoes, vegetables, hay, dairy products, and meat (including reindeer).

(b) Increased mining activity, through greater demand for hitherto less used minerals, including coal and oil.

(c) Possible processing plants and basic Alaska products, especially local timber (wood treating plants) and ores (smelters).

(d) Influx of population, when controlled, will lead to sound settlement within restricted areas.

2. Mapping for military purposes will

benefit all civil objectives of development, especially mining, road-building, soil surveys, and land-use surveys.

3. Airfield development with concomitant improvement of communication service, when undertaken with a view to civil needs, will aid all types of economic development.

4. A completed ground transportation system will aid especially the mining and tourist industries, and will open new markets for agricultural products.

5. Minor manufacturing industries are especially needed for taking up the slack of seasonal employment. Examples are can-

neries, minor wood-using industries, tanneries, etc.

6. Increase of service facilities will also provide more off-season employment and improve the living standards of the civil population.

It is only logical to assume that this potential chain of developments will pour new blood, new stimulus, and a new spirit of enterprise into the economic life of Alaska. The "vicious circle" of Alaskan economy was waiting to be broken by developments such as national defense requires.