

REPORT OF THE MIDDLE ATLANTIC
REGIONAL PLANNING OFFICE:
PRELIMINARY STATEMENT OF
REGIONAL DEVELOPMENT PLAN,
UNITED STATES.
NATIONAL RESOURCES PLANNING BOARD

1945

PRELIMINARY STATEMENT
REGIONAL DEVELOPMENT PLAN

MIDDLE ATLANTIC

REGION 2

BALTIMORE, MARYLAND

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Report of the
MIDDLE ATLANTIC REGIONAL PLANNING OFFICE

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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD

ASSEMBLING THE VIEWS, HOPES AND PLANS OF STATE AND REGIONAL PLANNING AGENCIES AND OF REPRESENTATIVE CITIZEN GROUPS FOR REGIONAL DEVELOPMENT OF THE AREAS THEY SERVE. REPRODUCED AS SUBMITTED FROM THE FIELD AND UPON THE RESPONSIBILITY OF THE AUTHORS INDICATED AT THE BEGINNING OF EACH REGIONAL STATEMENT

REPRINT FROM PART II - REGIONAL DEVELOPMENT PLANS
DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES

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.

PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN
MIDDLE ATLANTIC STATES

FOONAA

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 36,000,000. 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	8 million acres
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 delinquent¹ 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 6,000,000 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

¹ Rural Tax Delinquency in New Jersey 1928-1934.



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	4	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:

- Age, obsolescence, poor construction or maintenance of building.
- Inadequate services such as transit, utilities, or schools.
- Excessive taxes or special assessments.
- Encroachment or infiltration of harmful commercial or industrial activities, or shifting population groups.
- 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.²

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

² 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 1938, and Bulletin 42, June, 1939.
- (3) Drainage Basin Committee Reports, December 1937 - National Resources Committee.

as economically possible. Ultimate plan is for 16 reservoirs with capacity of 1,839,000 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:³

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.⁴

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,

³ 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.

⁴ 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 transcontinental 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 programs 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

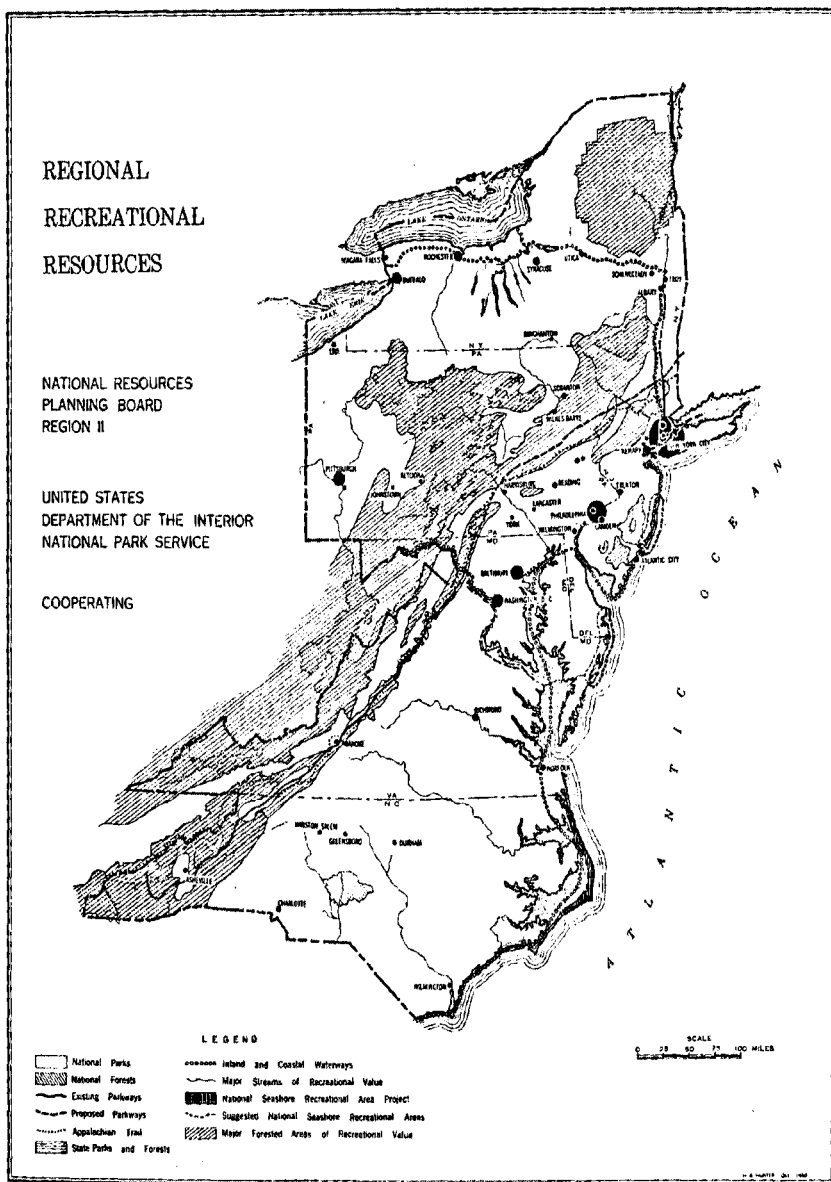


Figure 2.—Regional Recreational Resources

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 waterfront 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 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 Jervis.

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.⁵

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	67 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

⁵ 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

LAKE STATES AND OHIO VALLEY

REGION 4

INDIANAPOLIS, INDIANA

1940

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Report of the
LAKE STATES AND OHIO VALLEY REGIONAL PLANNING OFFICE

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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD
ASSEMBLING THE VIEWS, HOPES AND PLANS OF STATE AND REGIONAL PLANNING AGENCIES AND OF REPRESENTATIVE
CITIZEN GROUPS FOR REGIONAL DEVELOPMENT OF THE AREAS THEY SERVE. REPRODUCED AS SUBMITTED FROM THE FIELD
AND UPON THE RESPONSIBILITY OF THE AUTHORS INDICATED AT THE BEGINNING OF EACH REGIONAL STATEMENT

REPRINT FROM PART II - REGIONAL DEVELOPMENT PLANS
DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES

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.

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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 conservation 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.

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

REGIONAL DEVELOPMENT POLICIES

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-

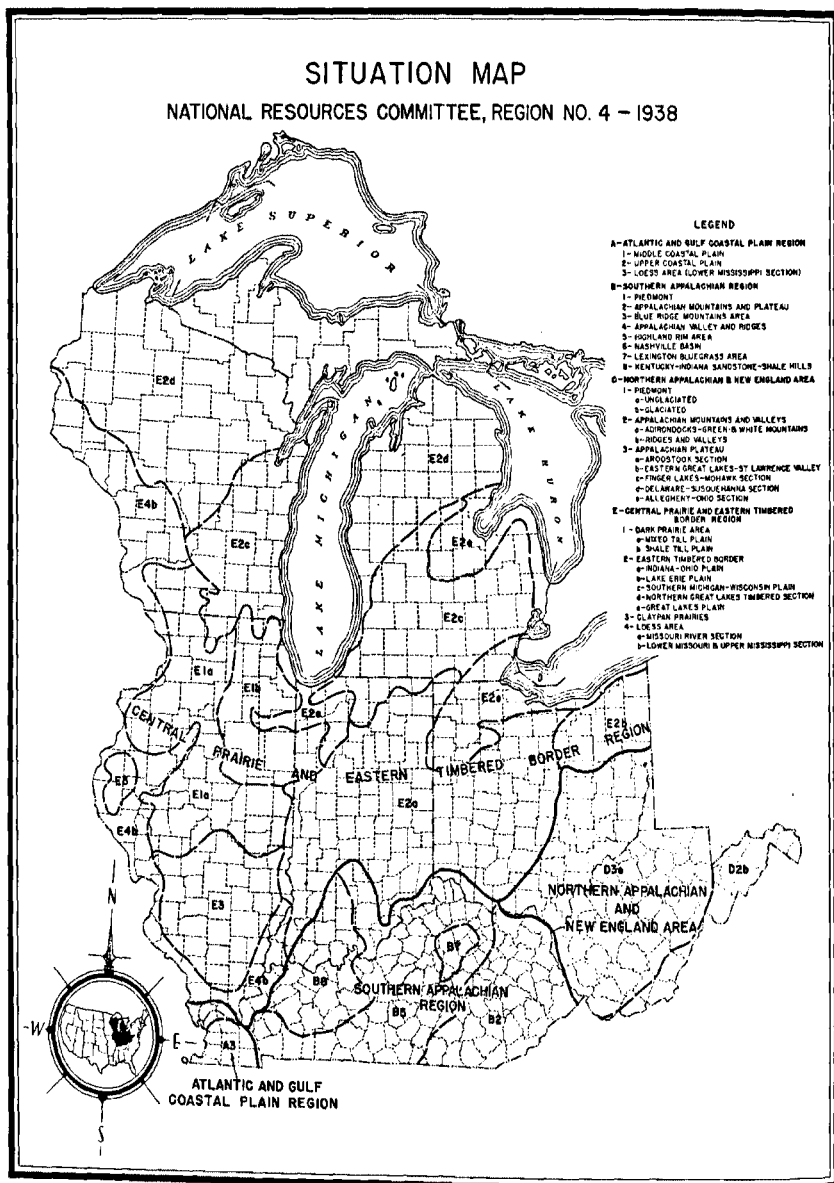


Figure 1.—Situation Map, 1938

nated by H. H. 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-

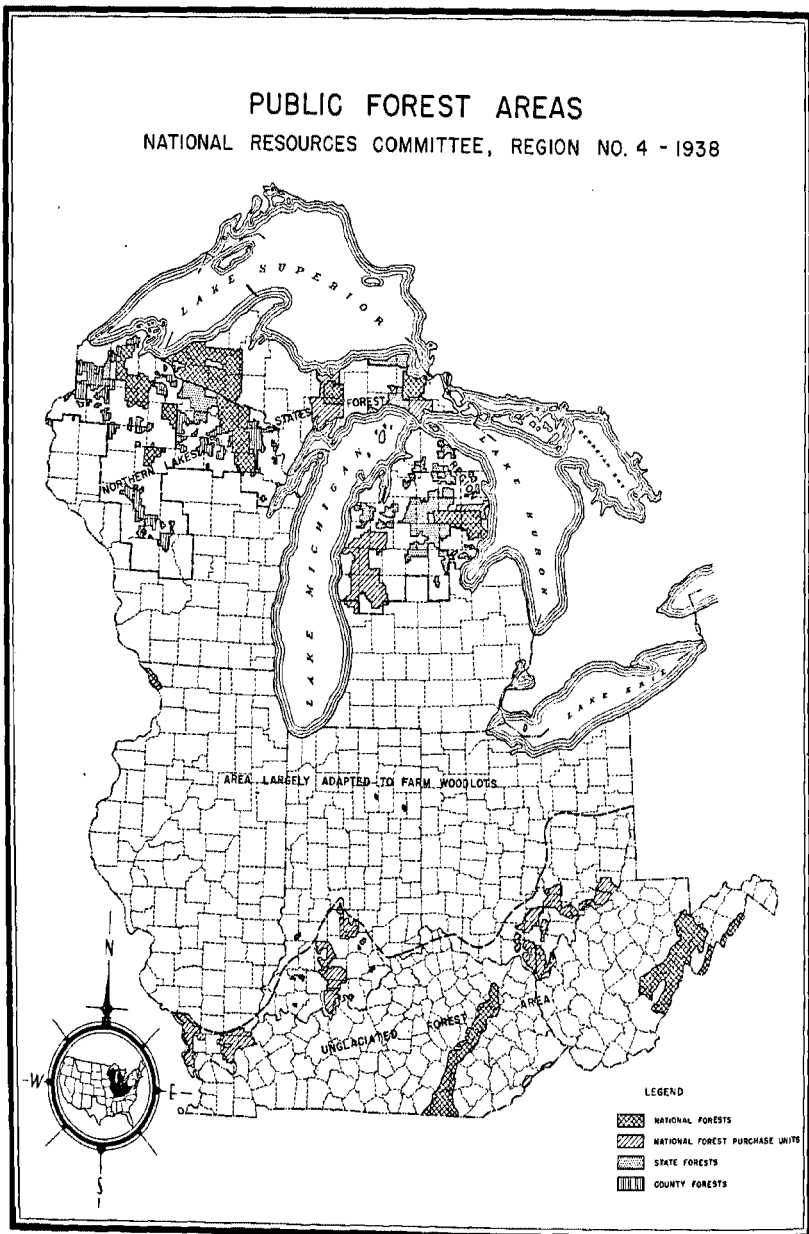


Figure 2.—Public Forest Areas

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	880,622
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

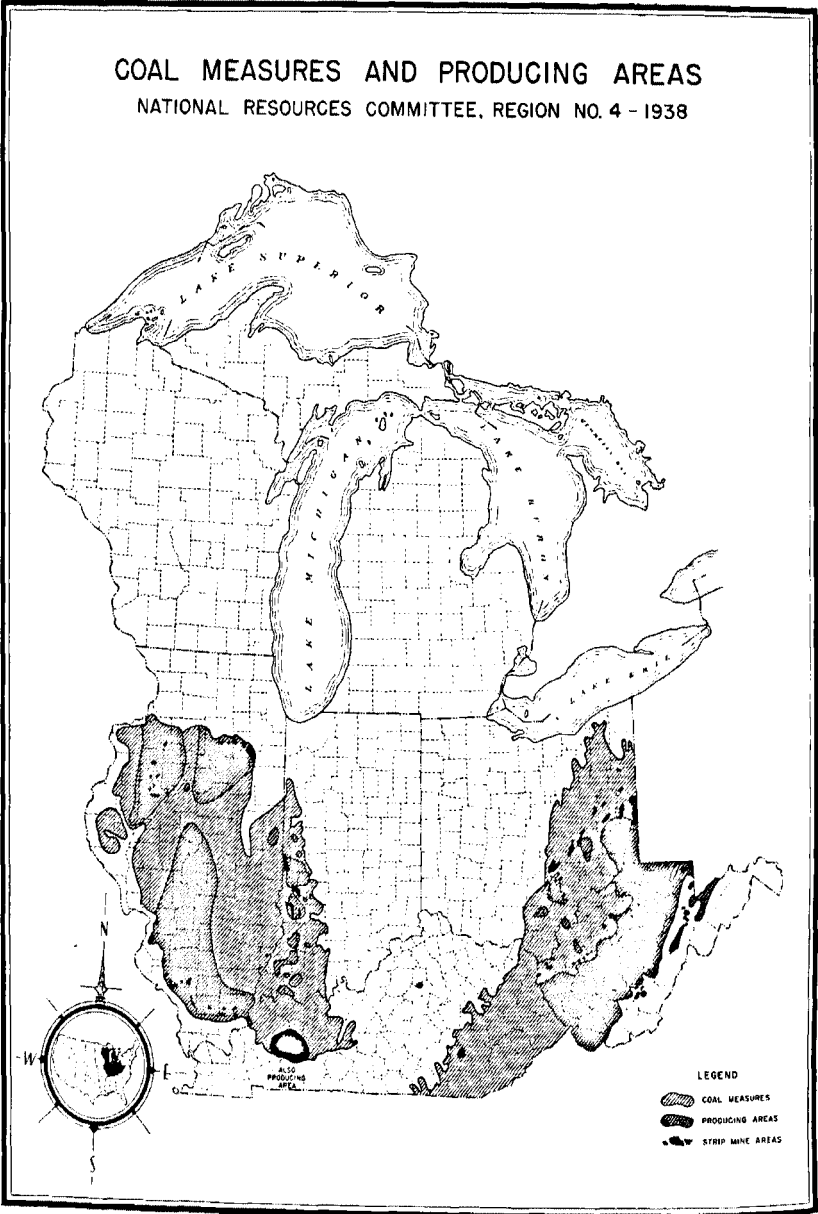


Figure 3.—Coal Measures and Producing Areas

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 clays" of Illinois.

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

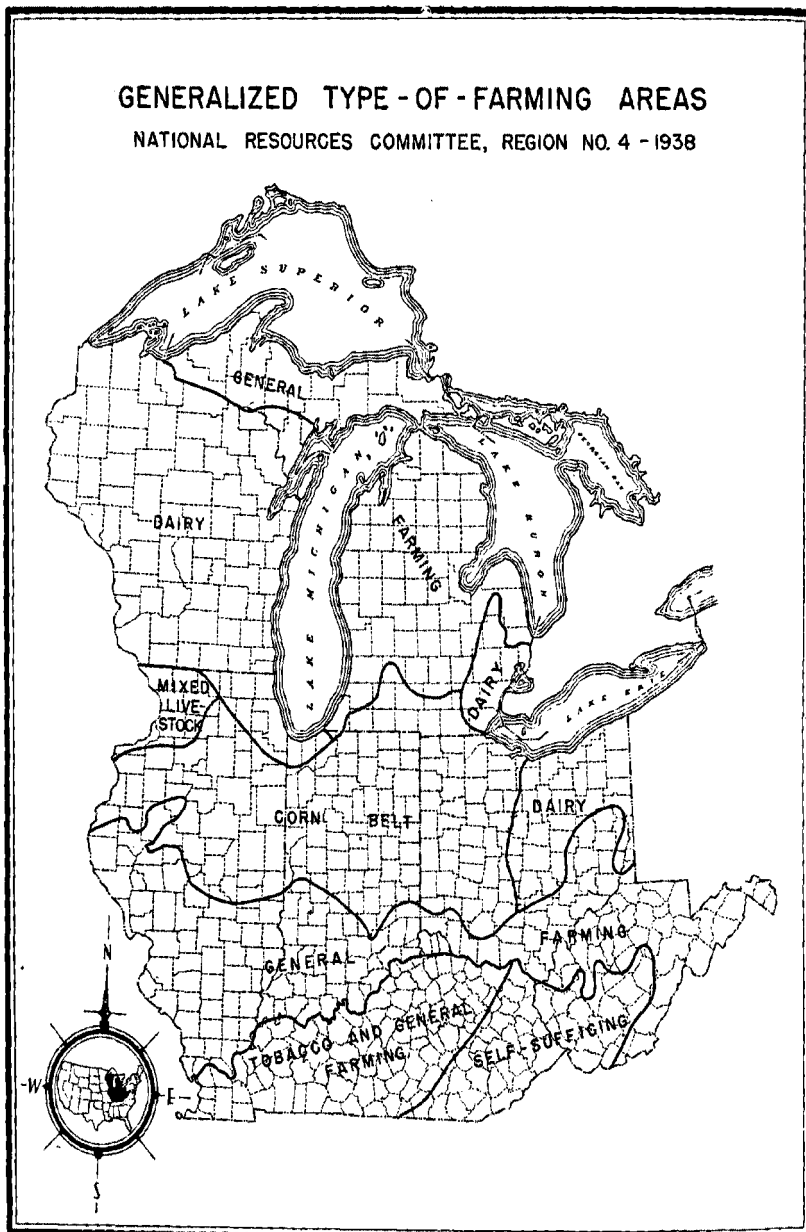


Figure 4.—Generalized Type-of-Farming Areas

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 wilderness. 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 co-operate 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 firm, 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 Weikle, 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 seaboard.

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

SOUTH CENTRAL

REGION 5

DALLAS, TEXAS

1940

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Report of the
SOUTH CENTRAL REGIONAL PLANNING OFFICE

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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD
ASSEMBLING THE VIEWS, HOPES AND PLANS OF STATE AND REGIONAL PLANNING AGENCIES AND OF REPRESENTATIVE
CITIZEN GROUPS FOR REGIONAL DEVELOPMENT OF THE AREAS THEY SERVE. REPRODUCED AS SUBMITTED FROM THE FIELD
AND UPON THE RESPONSIBILITY OF THE AUTHORS INDICATED AT THE BEGINNING OF EACH REGIONAL STATEMENT

REPRINT FROM PART II - REGIONAL DEVELOPMENT PLANS
DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES

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.

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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.

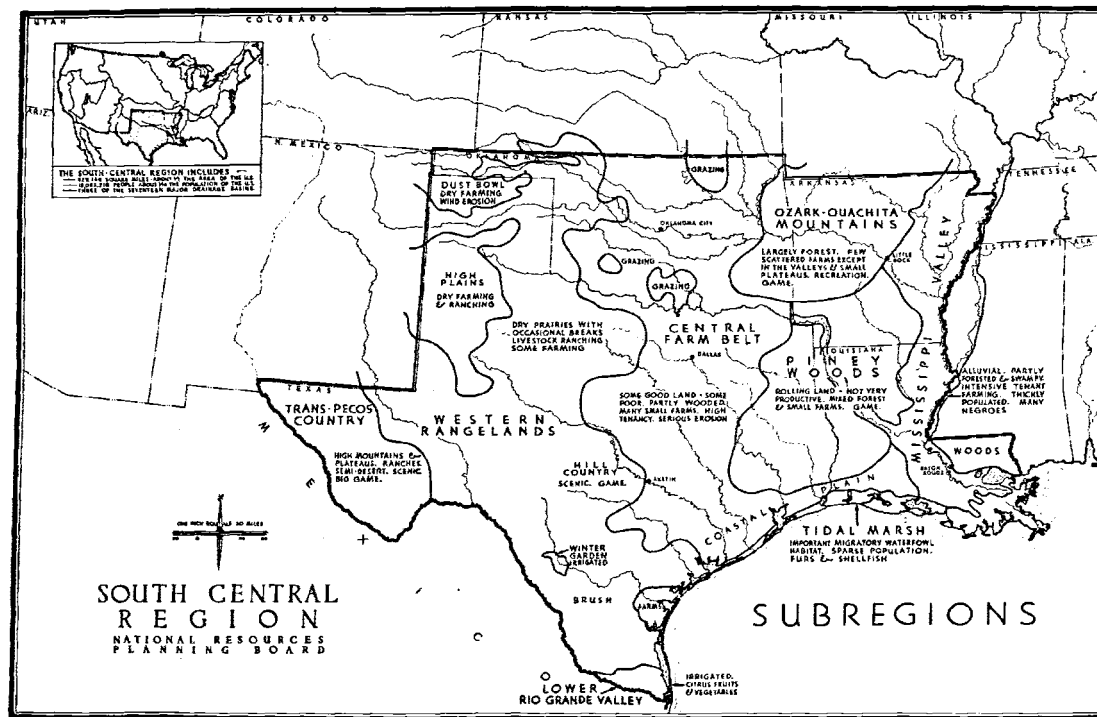


Figure 1.—Subregions of the South Central Region

PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN

S O U T H C E N T R A L

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, of 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 6½ 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 5.4 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 2.6 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 98th 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 19th 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 over-development 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 co-ordination, 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 18 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-Ouachita 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 is 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,¹ 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 Eudora, 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

¹ Act No. 331 - Statutes of 1939

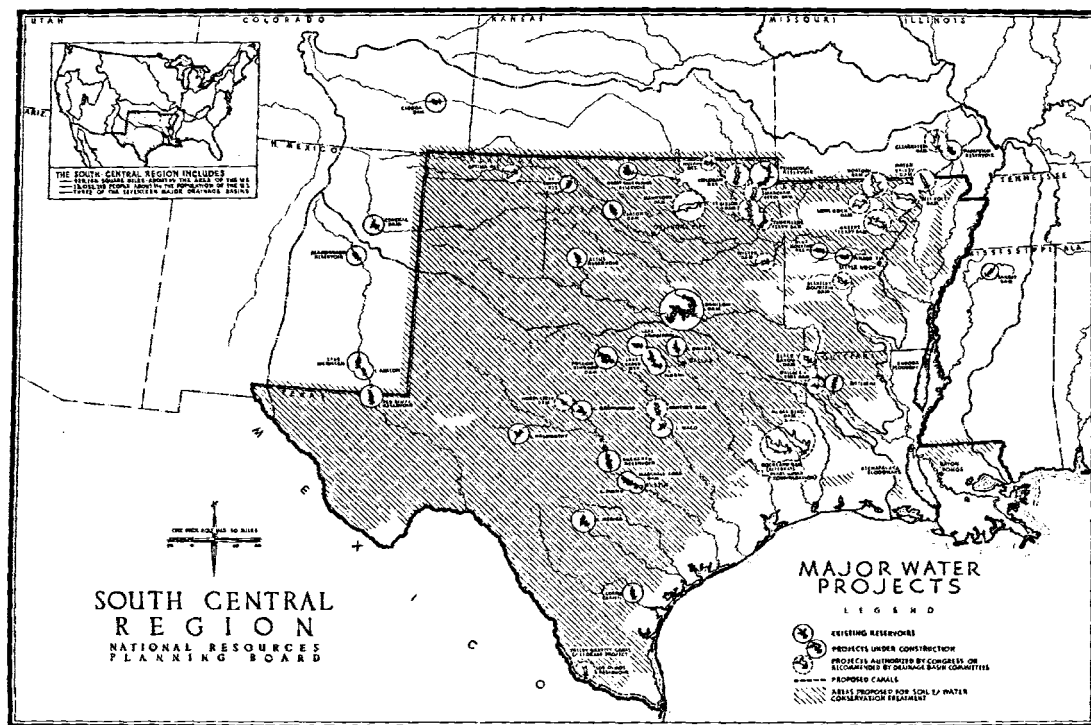


Figure 2.—Major Water Projects

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 Balmorea 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

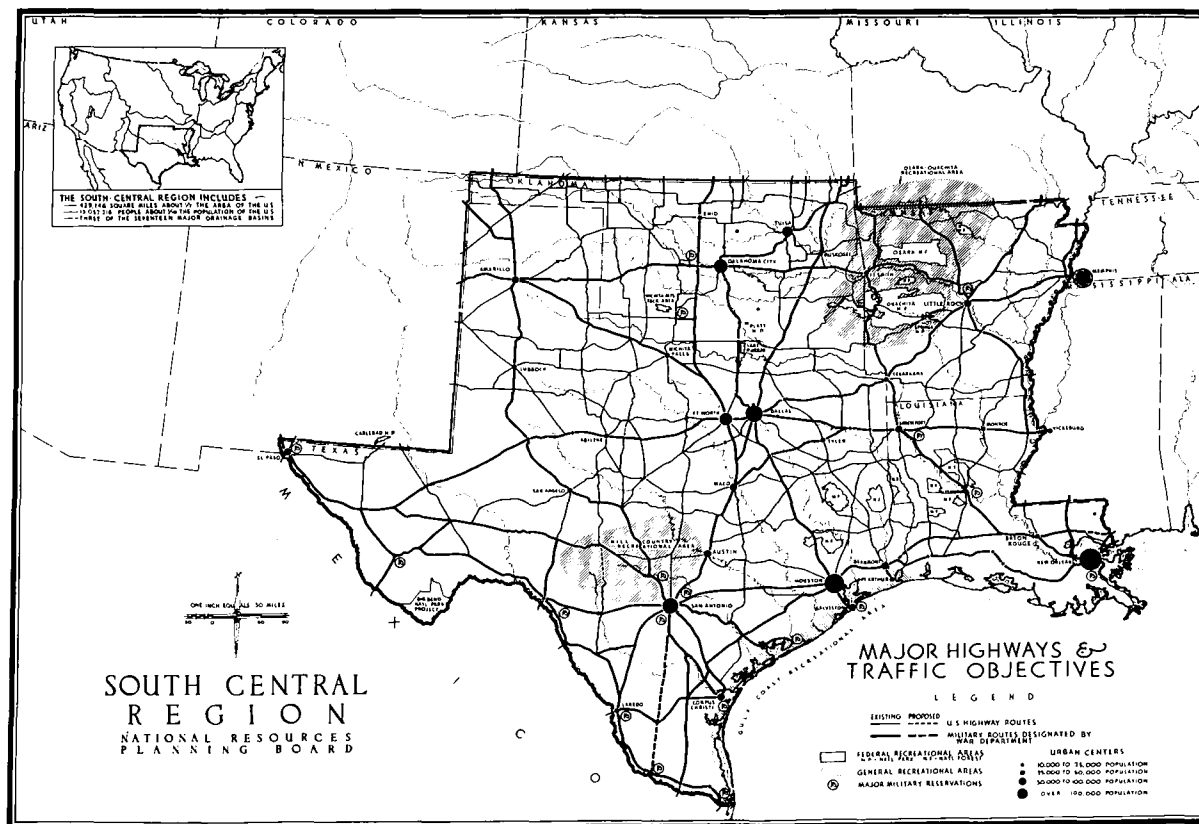


Figure 3.—Major Highways and Traffic Objectives

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 northeastern 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-Ouachita 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.² 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

² 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, archaeologic, 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 \$483, 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 798 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 492 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 OFFICE

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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD
ASSEMBLING THE VIEWS, HOPES AND PLANS OF STATE AND REGIONAL PLANNING AGENCIES AND OF REPRESENTATIVE
CITIZEN GROUPS FOR REGIONAL DEVELOPMENT OF THE AREAS THEY SERVE. REPRODUCED AS SUBMITTED FROM THE FIELD
AND UPON THE RESPONSIBILITY OF THE AUTHORS INDICATED AT THE BEGINNING OF EACH REGIONAL STATEMENT

REPRINT FROM PART II - REGIONAL DEVELOPMENT PLANS
DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES

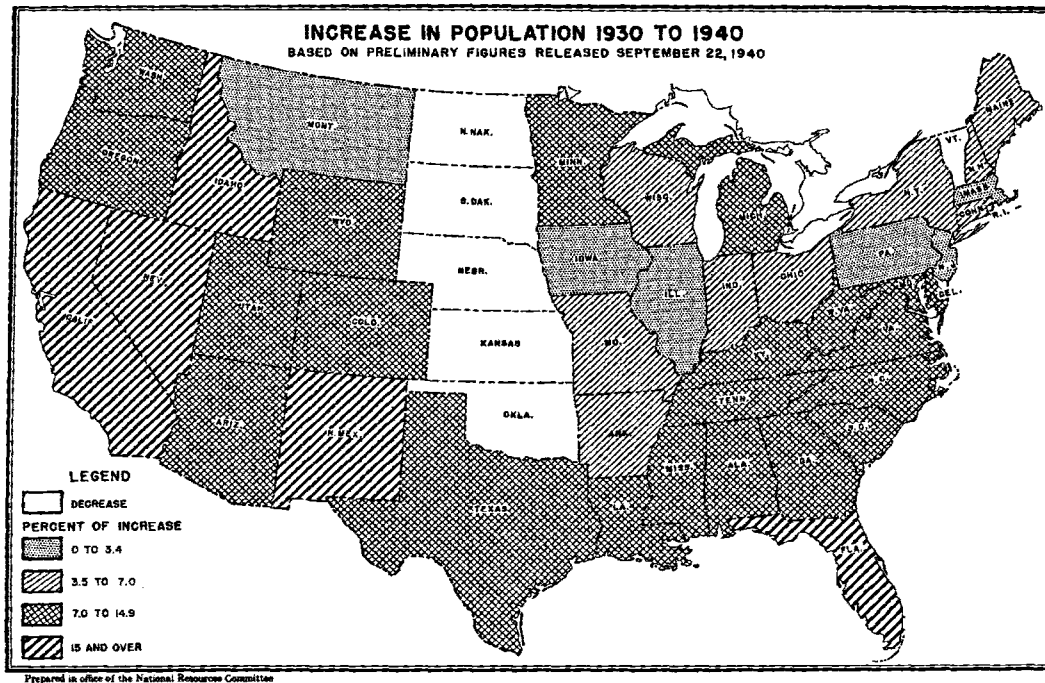


Figure 1. — Increase in Population, 1930 to 1940

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,

P. H. ELWOOD,
Chairman, Region 6.

PRELIMINARY STATEMENT REGIONAL DEVELOPMENT PLAN MISSOURI VALLEY

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.¹ 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.² 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

¹ 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).

² National Resources Committee, *Regional Factors in National Planning*, 1935.

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 96 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.² In brief, these areas were settled according to the small homestead pattern of eastern humid agriculture. A

² 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 26, especially pp. 733-775, 1933. For a more extensive treatment, see Hobb, *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 1938 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.⁴ 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-

⁴ 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:

	Percent of U.S. Production
Manufacture	
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,⁵ 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.

⁵ The Interterritorial Freight Rate Problem of the United States. A study of the Tennessee Valley Authority, printed as House Document 284, 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 obedience, 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.)

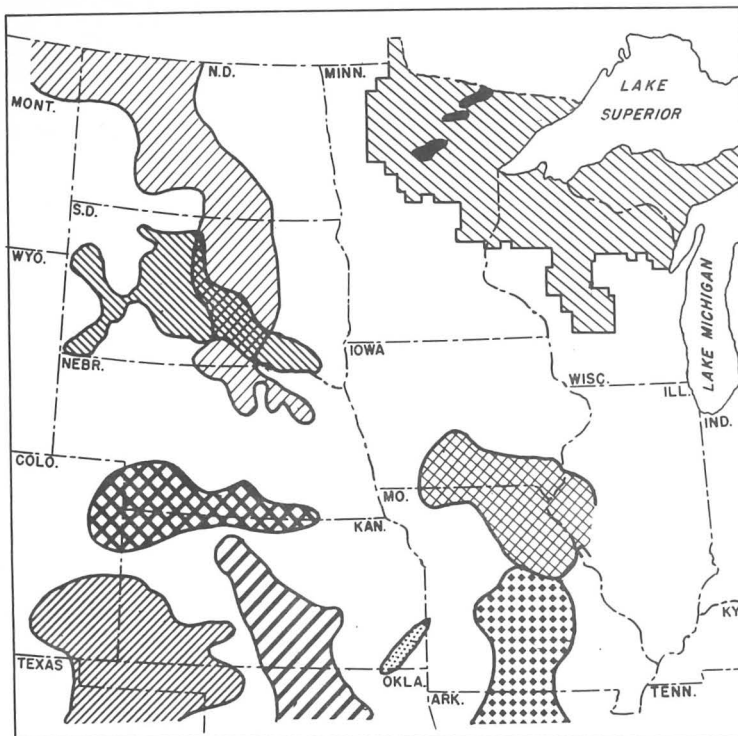
Upper Mississippi Drainage Basins

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

	STRIP COAL MINES		REPUBLICAN RIVER
	CRITICAL NORTHERN PLAINS		OZARKS CUT-OVER
	NORTHERN LAKE STATES CUT OVER		SELENIUM
	ERODED HILLS		DUST BOWL
	OIL AND GAS		IRON ORE RANGES

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, Fabius, 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	16	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
	36	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 be some 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	978,379	—
S. Dakota	5	1,998,800	798,748	52,550
Nebraska	1	510,090	131,022	—
	11	5,494,590	1,908,143	52,550

The figures and proposed planned use for purchases in Minnesota, Iowa, and Missouri are:

State	Number Projects	PURCHASES			
		Acres included	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		
		Grazing	Forestry, Recreations, Wildlife	Total
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 area. 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 recommendations⁶ 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.

⁶ These are found in:

The Future of the Great Plains, a report of the Great Plains Committee, 1936, 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, tuff, 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 carbon 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, Minnesota iron ranges, and tuff 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, raw materials, and adequate transportation facilities.⁷ For defense industries, Region VI is a most strategic choice because of its interior location. In short, by industrial development along economic lines, a great stride forward will be taken in the restoration 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-

⁷ 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.

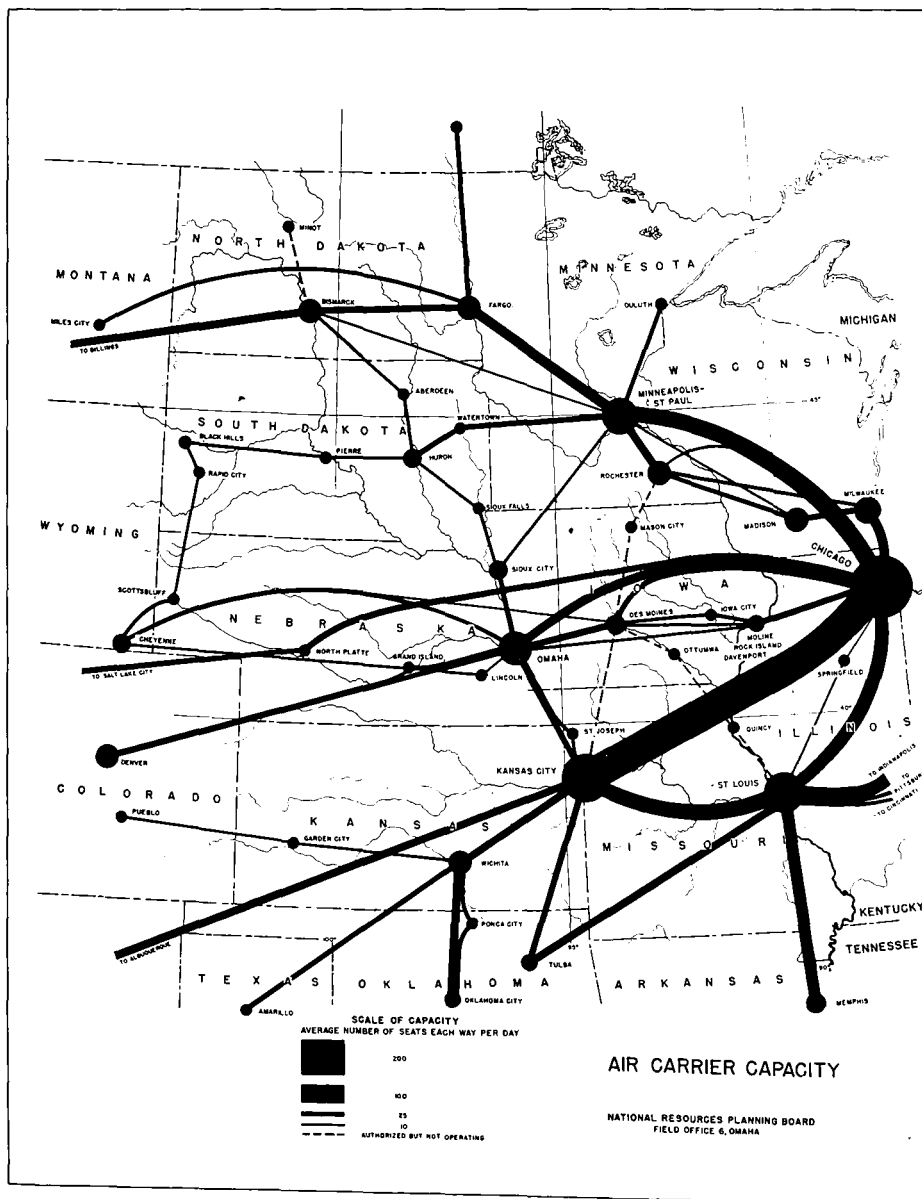


Figure 3. — Air Carrier Capacity

This Figure shows the average carrying capacity of transport planes operating in and through Region 8. 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 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

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.⁸
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-

⁸ 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. 210-254, September, 1934.

The Second Report, pp. 111-128, 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
78 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 drought-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 hodgepodge 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" fringe 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 OFFICE

Judge Clifford H. Stone,
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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD
ASSEMBLING THE VIEWS, HOPES AND PLANS OF STATE AND REGIONAL PLANNING AGENCIES AND OF REPRESENTATIVE
CITIZEN GROUPS FOR REGIONAL DEVELOPMENT OF THE AREAS THEY SERVE. REPRODUCED AS SUBMITTED FROM THE FIELD
AND UPON THE RESPONSIBILITY OF THE AUTHORS INDICATED AT THE BEGINNING OF EACH REGIONAL STATEMENT

REPRINT FROM PART II - REGIONAL DEVELOPMENT PLANS
DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES

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.

PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN M O U N T A I N S T A T E S

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 wildlife), 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, manganese 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.

8. 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 97 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	60,867	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

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 OFFICE

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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD

ASSEMBLING THE VIEWS, HOPES AND PLANS OF STATE AND REGIONAL PLANNING AGENCIES AND OF REPRESENTATIVE CITIZEN GROUPS FOR REGIONAL DEVELOPMENT OF THE AREAS THEY SERVE. REPRODUCED AS SUBMITTED FROM THE FIELD AND UPON THE RESPONSIBILITY OF THE AUTHORS INDICATED AT THE BEGINNING OF EACH REGIONAL STATEMENT

REPRINT FROM PART II - REGIONAL DEVELOPMENT PLANS

DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES 193 •

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.

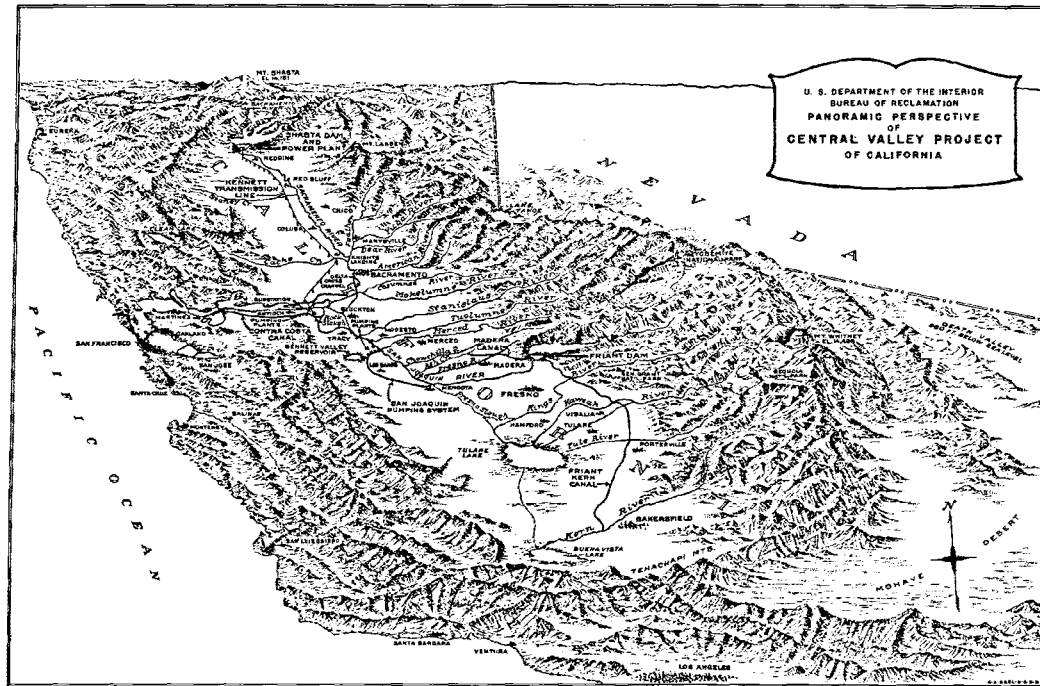


Figure 1. — Central Valley Project of California

PRELIMINARY STATEMENT OF REGIONAL DEVELOPMENT PLAN
P A C I F I C S O U T H W E S T

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 Uncomphagre 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

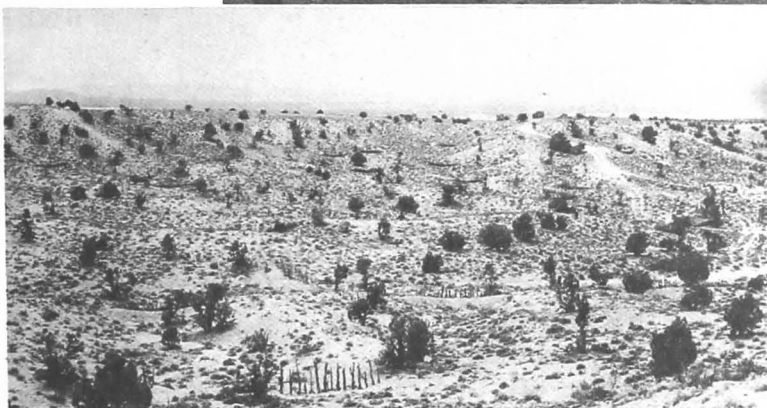
Consumption of electric power is rapidly increasing in the Pacific Southwest. Besides the larger demands from normal growth, expansion of national defense industries is fast absorbing existing generating capacity. Ample supplies of low-cost electric energy are essential for greater industrial development.

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, overgrazing, 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 overgrazing, 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 oases 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, Minton 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 produceable 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.

Curtail 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 seasonable 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.

Eliminate 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 unserved 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 pollutional 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	73,275
Maui	1,172	55,534
Kauai	620	35,818
Honolulu (including Oahu)	600	258,256
Total	6,407	423,329

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" (menehunes).

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 the 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 drouth.

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 (Kokee), 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 lauhalu 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

lagged, 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.

REGIONAL DEVELOPMENT PLAN

REPORT FOR 1942

PACIFIC NORTHWEST

REGION 9

PORTLAND, OREG.

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Report of the

PACIFIC NORTHWEST REGIONAL PLANNING COMMISSION

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REPORT TO THE NATIONAL RESOURCES PLANNING BOARD

Preliminary Statement revised to November 1941. Prepared in the Field by the Board's Regional Officers with the cooperation of Regional and State Planning Agencies, Federal Field Agencies, and citizen groups

Reprint from "Regional Resources Development—
Report for 1942"

FRAMEWORK OF A REGIONAL DEVELOPMENT PLAN FOR THE PACIFIC NORTHWEST

OUTLINE OF OBJECTIVES

- (1) *Land management—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, wild-life habitat, etc.
- (3) *Forest management—sustained yield:*
 - 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 development and management:*
 - 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 and management:*
 - Continued power installation in multipurpose 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) *Mineral development and utilization:*
 - Accelerated long-term program of geological and mineral survey and investigation.
 - Intensive surveys directed toward mineral use in defense and essential industry.
 - Aids and cooperation in development and utilization—exploration, research and experimentation, small industry, transportation.
 - Development of sources and stocks of strategic minerals.
- (7) *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.
 - Improved distribution.
- (8) *Improved distribution and marketing:*
 - Market research and development—public, industrial, cooperative.
 - Further development of cooperatives.
 - Improvement of standards—processing, grading, packaging, etc.
 - Waste eliminations, industrial utilization of materials.
 - Distribution—research and improvement of facilities.
- (9) *Transportation development; coordinated transportation:*
 - Trunk-waterway-system improvement.
 - Rail consolidations.
 - Highway improvement—including limited ways for main routes; strategic links.
 - Airway and airport system improvement.
 - Integration of transportation lines, terminal equipment, for effective operation.

- (10) *Social, economic, and technological betterment:*
Extended educational opportunities.
Community improvement and reconstruction.
Housing improvement.
Reconstruction, blighted urban and fringe areas.
Sanitary improvements.
Improved programs—Employment and employment stabilization, migratory labor, health, welfare, social security, education, planning.
- (11) *Cultural betterment; outdoor recreation:*
Educational system and curriculum improvement.
Regional study.
Community facilities and organization—for educational, discussion, arts, recreational activities, etc.
- Protection of scenic assets; development of recreational areas and facilities, parks, parkways, greenbelts, wildlife refuges, etc.
- (12) *Improvement of governmental machinery:*
Reorganization of system of school support.
Simplifications, consolidations.
Tax-system simplification and improvement.
Improvements in administration and administrative techniques, including planning and coordination.
Planning, programming, budgeting, coordination, of public works and services—Federal, State, local, interdepartmental, etc.

ACKNOWLEDGMENT

This summary statement is intended to present a composite view of the aims of the people of the Region, as formulated by the various agencies that serve them. The Regional Planning Commission does not presume to present this framework of a plan as its own creation—its purpose is that of synthesis. The broad view intended to be given 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 knowledge of the Region's resources and to policies and plans for their development. Grateful acknowledgment is made of long-term cooperation with the Regional Planning Commission on the part of associated committees and advisors, as well as of the immediate assistance of many agencies and individuals in furnishing data and advice and criticism of earlier drafts. It is regretted that the great amount and wide range of help received precludes specific mention here of those to whom sincere thanks are due.

REGION 9

FOREWORD

The report epitomized herein presents a general plan and program for the development of the Pacific Northwest.¹ The framework of a regional development plan included in that report is the second such presentation.² The program part of the report is the first presentation of an over-all view of development programs and a reservoir of internal improvement projects for the Region. Since machinery and procedures have not been available for a complete assembly of public works and improvements contemplated at all levels of government, the current survey has been largely of a reconnaissance character—many important programs have been indicated only in very general terms, and, unquestionably, many desirable projects have been omitted. The view afforded of the nongovernmental programs that are so essential to regional development is particularly incomplete.

The basic intent is that the people of the Region should take stock of what resources are available, and realistically think out how these resources can best be used in promoting the welfare and security of the people who are dependent upon them. More specifically, it is intended to present a basis for consideration of general development and stabilization of employment in the Region, also a plan and program of works and activities that will look toward the expansion of economic opportunity in pace with migration of people to the Region, that will aid in meeting immediate needs in the present period of defense activity, and, finally, that will look toward the provision of a needed reservoir of work and improvements for the post-emergency era of readjustment and reconstruction.

The Regional Planning Commission has presented its report with due recognition of several fundamentals—that “our economic system is one of joint private and public activity”; that “the provision of certain basic facilities is an appropriate public function”; and that as a Nation we are confronted with the problem of planning for the “conservation and better utilization of our resources, for needed public facilities, and also for the productive employment of our resources in human skills and energies.”³

In the Pacific Northwest, the Regional Planning Commission began in 1934 to pursue a course toward planning that would envisage the regional community as a whole, and seek to facilitate the harmonizing of plans and the interchange of planning information among the many agencies and groups concerned. It has submitted reports on the prospective future of the Region and the desirable regional organization for planning, construction, and operation of public works;⁴ on the Region's balance of trade⁵ to throw light on the essential economic position of the Region; on the forest resources⁶ on which the Region is economically dependent to a high degree; and on other regional problems. The current reports are submitted in extension of that course.

Since early in 1939 the Pacific Northwest Regional Planning Commission and the regional office of the National Resources Planning Board have been engaged (at the direction of the latter and of the President and under allotment of funds from the Public Works Administration) in study of migration and other population trends, and of land, industry, and public works as fundamental means of adding to economic opportunity in the Region. A report on the background of this entire problem was completed in 1939⁷ and the study has been pursued farther in the special fields of land, industry, and public works. Report is being made, currently, on potential land development, including a Region-wide inventory of land capable of reclamation or more intensive use through irrigation, drainage, diking, and clearing, and a general appraisal of feasibility of such development. This inventory and feasibility analysis has been carried out, as a joint project, with the Bureau of Agricultural Economics. While a broader regional study of potential industrial development and of industrial location is going forward, with the cooperation of the Bonneville Power Administration, the Northwest Regional Council, and others, a third report in this series has been made to indicate the present status and potential development of industry in the Region.

¹ *Regional Planning, Part I—Pacific Northwest*, Pacific Northwest Regional Planning Commission, National Resources Committee, 1935-36.

² *Pacific Northwest Regional Planning Commission, Balance of Trade of the Pacific Northwest, 1937* (Mimeo.); *The External Trade of the Pacific Northwest, 1941*.

³ *Pacific Northwest Forest Resources*, Pacific Northwest Regional Planning Commission, National Resources Committee, 1938.

⁴ *Migration and the Development of Economic Opportunity in the Pacific Northwest*, Pacific Northwest Regional Planning Commission, 1939 (Mimeo.). Also *Men and Resources*, Northwest Regional Council, 1940.

¹ *Development of Resources and of Economic Opportunity in the Pacific Northwest, Part IV—A Plan and Program for Regional Development and Internal Improvements in the Pacific Northwest*, Pacific Northwest Regional Planning Commission, 1941.

² *Preliminary Statement, Regional Development Plan, Pacific Northwest Regional Planning Commission, 1940; Development of Resources and Stabilization of Employment in the United States*, National Resources Planning Board, January 1941.

³ *National Resources Planning Board, 1944*.

In the fourth report in the series on migration and economic opportunity, endeavor has been made to focus the earlier studies and reports into a first draft of a plan and program of internal improvements for the Region. The complete regional plan and program is a concept as yet far from attainable. Such a plan would have to be a synthesis of a great many individual plans and programs—of Federal departments, of States and their subdivisions, and of civic, corporate, and private interests. Many of these are nonexistent and all could not be secured and combined in a single, widely understandable scheme. Effort has been made to include in the report the broader essentials of the larger plans and to weave them into a relatively simple statement—of objectives for the Region; of major problems; of outstanding needs in policy, programs, and organization; and of known projects and types of projects that will tend to further the broad and progressive development of the Region.

In erecting the framework of a regional plan it has not been necessary to draw heavily on imagination. Tangible, strong plan elements have been constructed—in water, land, energy, and human resources fields, and in subregional areas—by such Federal agencies as the Corps of Engineers, Bureau of Reclamation, Bureau of Agricultural Economics, Forest Service, Soil Conservation Service, Farm Security Administration, Grazing Service, Fish and Wildlife Service, Park Service, Oregon and California Revested Lands Administration, and Bonneville Power Administration, and by various State and local planning and technical agencies. Supporting data for these elements of a plan have been provided through the investigations and researches of a considerable number of governmental, industrial, and civic groups.

The use of foresight, imagination, analysis, plan, and design is especially important in the critical periods—such as that of today. It may be granted that the turns of future events cannot be surely and clearly forecast. Yet there are considerable areas in which well-laid plans will be applicable regardless of the fortuitous turns. Variations in applicability of good plans are much more likely to be matters of degree rather than kind. Moreover, if flexible plans are available, eventualities may be met or alternative paths taken with greater promptness and assurance.

The cyclical events of the past three decades, including many foreseeable changes and many disasters to the unready, have clearly demonstrated the need of maximum foresight and preparedness—preparedness for possible war in time of peace, for the benefits of peace in time of war, for potential depression in time of high economic activity, for recovery in time of depression. Certainly in the present period of rapidly increasing de-

fense activity, it is necessary for leaders—of Government in its executive and administrative branches, of industry, labor and finance, and of professional and civic groups—to look not only at the immediate effort that must be expended but beyond to the inevitable redirection of effort in the use of our expanded resources. Even while meeting the inexorable demands of the present, the future of Nation and Region must be constantly in view.

The formation and use of a reservoir of needed and desirable improvements for the post-emergency period, and for a long-range construction program generally, must be approached with a high degree of vision and realism combined. It is known that, on the slackening of the unprecedented defense effort, construction resources—essential plant, machines, science, technology, and labor—will be available in large quantities. We also know that radical and large-scale reconstruction is overdue for many kinds of public and quasi-public improvements—affecting highways, parking, transport, and terminals, blighted areas, housing, parks, sanitation, power, etc.—and that this reconstruction should be planned on an integrated community and regional basis. Ways and means must be imaginatively, realistically, and directly sought to bring these two fundamental factors together. It is unthinkable that these very real instruments for the production of wealth and better living be allowed again to fall into disuse or that the enormous economic and social wastes inherent in our lagging community development be allowed to continue indefinitely.

Thus, the first skeleton plan and program for the future of the Pacific Northwest is offered as a statement of the fundamental position of this subnational Region, of its principal assets and liabilities, of its resources and their capabilities in use, of the objectives that should be kept in mind for the long pull, and of the public and private works that should be planned and carried forward—either to meet immediate needs or to lay a foundation for a more secure and prosperous regional economy—at whatever rate may be consistent with the national security and the available resources of men and materials. In this summary, because of limitations of space, greatest emphasis is placed upon the fundamental objectives.

Since regional development and stabilization are of such broad concern, it is the hope of the Regional Planning Commission that both the development plan and program and this summary statement will contribute toward understanding of regional aims and toward regional advancement, and also that agencies and individuals in the Region will contribute to the development of a plan and program that will become increasingly complete, workable, and effective in both its public and private aspects.

REGION 9

SUMMARY OF A REGIONAL DEVELOPMENT PLAN

Introduction: Status and Problems of the Region, and Direction of Readjustment

Essentials of Regional Economy

Very briefly summarized, the essentials of the regional position are: A relatively immature economy; an excessive dependence upon agriculture and forestry and extractive industries generally; and a deficiency in extent and diversity of manufacturing activity—coupled, however, with a resource base broad and strong enough to permit a very considerable expansion in industrial development, a material expansion in agricultural-land development and settlement, and, as a result, a considerable expansion of the population that can be supported in the region without jeopardy to standards of living.

The commerce of the Region strongly reflects its economic immaturity—it being characterized by a preponderance of raw and semiprocessed materials in shipments and manufactured goods in receipts.

The economic equipment of the Region is in a stage of youth corresponding to that of the pattern of resource use. The manufacturing plant—predominantly lumber processing—is lacking as to general capacity and diversity, and as to geographic balance. While the transportation and utilities net is generally adequate for present needs, there is room for improvement and expansion. Urban centers exist in sufficient numbers, although some are precariously situated due to local depletion of resources.

Present trends indicate possibility of a rather rapid coming of age, with acceleration due largely to new power and industrial developments.

The General Regional Problem: Regional Development and Progress

The general regional problem is that of progressive development. This involves improvement of the essential position of the Region as outlined—the use of resources to round out the regional economy and to enhance the security and well-being of the people of the Region and the Nation. The rate and some of the other aspects of such progress may be very materially altered by various emergencies—those of expanding defense activity or of post-emergency readjustment, for example.

The first approach to solution of the problem should be along the more or less realistic line of determining where the Region should go during the next 10 or 20

years—following such trends, and with the aid of such programs, as can now be visualized. While it may be necessary to accept a modified rate of progress, or even some alteration of the goals themselves, such aims are indispensable.

Directions of Readjustment

The general long-term direction for adjustment of the regional economy should be looked upon as the resultant of the directions desirable for progress of various geographic and functional parts of the regional economy. This general direction may be somewhat simplified by emphasizing the aims for two or three of the more fundamental elements of the regional economy: The expansion and diversification of commodity producing industry; progress toward establishment of balance of forest production and drain; and an intensified conservation and development of agricultural land resources in pace with new industrial development. The forward movement with respect to economic and social services and welfare depends in considerable part upon progress in these basic industrial fields.

The desirable adjustments of the defense period and of the post-emergency period lie in the same general direction—toward a stronger regional economy. In the present emergency, adjustments must be strongly in the direction of production of essential material. In the post-defense period the general course must veer back toward production for more normal economic and social and developmental needs—for the filling of piled-up needs for producers and consumers goods of various kinds, for capital improvements held in abeyance, and for new improvements, goods, and services.

To achieve the requisite degree of definiteness and distinctness in directions for readjustment, a whole series of aims must be detailed. These correspond to a considerable extent with the general objectives of regional development and progress and cannot readily be considered apart from them.

Objectives of a Plan and Program of Internal Improvement

Any regional plan and program of readjustment and internal improvement would be lacking in purpose, content, and vitality unless clearly defined general and specific objectives formed an integral part of the work. The formulation of some general objective or objectives should actually precede development of the plan; desirable modifications and amplifications of the aims

should result from analyses of the conditions and needs and directions of readjustment and from the actual development of the plan and program itself.

Although the general objectives arrived at will be continuing ones, component aims must be raised or shifted from time to time, and contemplated rates of progress must be modified to suit the character or urgency of the needs of a particular time. Thus, in emergency times like these it is necessary to add modifying objectives: First, with respect to the current defense aims and activities, and, second, with respect to the post-emergency period of readjustment and reconstruction. Many objectives are of such character that we may move toward them without sacrifice of immediate security; many are essential to real security. Progress toward long-term goals may be slackened when resources of men and materials are largely absorbed in meeting immediate needs or speeded up when these resources are available. But the broad aims are little changed by emergency, at least as we have known it; they must remain to guide the thread of progress that must be maintained in any emergency and to aid, on the side of progress, in meeting the many situations where there are alternative ways ahead.

General Objectives of a Regional Development Plan and Program

The general objectives that follow, in the form of a 12-point program, are those of the earlier report on the framework of a regional development plan* as modified on the basis of rather wide review, criticism, and discussion subsequent to their publication.

The central-motive-of-action programs 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. Certain and orderly progress in an action program toward regional objectives is, of course, highly dependent upon the use of democratic processes in formulating the plan and upon subsequent understanding and support by the people it is designed to serve.

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 a 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 20-point program here outlined is not an artificial creation of the Re-

gional Planning Commission or of a planning staff. It is intended as 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 a general pooling of insight and experience.

Each of the 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 future development that may be hoped for in the period of a decade or two.

The Major Objectives

1. Land Management

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 which will meet the need for maintaining the productivity of western croplands.

2. Land Development

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 million 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,

*Preliminary Statement, Regional Development Plan for the Pacific Northwest, Pacific Northwest Regional Planning Commission, 1940; Development of Resources and Stabilization of Employment in the United States, National Resources Planning Board, January 1941.

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 which 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 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. Forest Management

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 as well as continuing productivity of forest lands. 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 which 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 in weak ownerships. Steps should also be taken to keep to the minimum the area of tax-delinquent and abandoned lands that so often lie derelict for years. Research and experimentation should be further developed to aid in the solution of the technical problems involved in logging, silviculture, waste reduction, and forest economics.

4. Water Development and Management

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 responsible agencies, including the Corps of Engineers, 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 agreement 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 must be promptly 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, run-off retardation and stabilization of soil and cover. In the lower sectors of each drainage, flood-protection works and flood-plain zoning should be developed wherever necessary.

d. Pollution-abatement measures should be in operation on the streams where waste and sewage disposal create a menace. Every practicable effort should be made 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. Hydroelectric Power Development and Management

To derive the greatest 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. Mineral Development and Utilization

To derive greatest practicable social and economic benefit from the Region's extensive mineral resources, and to enhance the national security, there should be carried forward an extensive program of investigation, development, and utilization in this field.

a. This would involve an accelerated and more comprehensive long-term program of geological and mineral survey and investigation, by the Federal Government, the States, and other cooperating agencies; also quick, intensive surveys and investigations, of extent, nature, and possible utilization of minerals, specifically directed toward their immediate use in national-defense or essential industry.

b. It also calls for a broad cooperative program of aid in mineral development and utilization, including exploration, research and experimentation, capital for essential small mining operations; and transportation improvements necessary to development and marketing of essential minerals.

c. Especial attention should be given to development of adequate sources of essential minerals and to the creation and maintenance of suitable stocks of strategic minerals.

7. Industrial Expansion and Diversification

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 dependence upon those activities which 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 hydroelectric power, to better use of low-grade and waste materials from forest and farm, to more intensive manufacture of high-grade forest and farm products, 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 programs 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 co-operation 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 10 years a number of economically sound basic industries—metallurgical, chemical, chemical, food, etc. This should provide the basis for the growth of other new fabricating and processing industries, large and small. Through the influence of the strong power net and the favorable location of large key industries, there should be evidence of improving patterns of industrial distribution.

8. Improved Distribution and Marketing

To extend the markets for Pacific Northwest agricultural and industrial products, to reduce the unit cost of bringing products to markets and of marketing services, and to make marketing facilities available to the majority of producers, there should be established an

improved and better organized system of marketing services and practices, trade connections, and distributing outlets.

a. Some of the ways to accomplish these objectives 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; improved packaging; reduction of wastes and improvement of methods of processing, preservation, and handling of perishable products; improvements in distribution methods, removal of price-depressing influence of low-grade, cull and waste materials through increased industrial utilization of such materials in chemurgic and byproduct processes and outlets.

9. Transportation Development

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) 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 co-ordinated transportation system of the Region.

c. Railroad consolidations and extended joint use of trackage should be accomplished wherever conditions warrant.

d. Highway improvements, including the development of limited access ways on some of the main routes, the

improvement of certain routes to reduce effects of mountain barriers, and the completion of strategic links in primary and secondary nets, 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.

10. Social and Economic Betterment

To aid in 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; development of improved housing and housing standards through private industry, encouragement of elimination of substandard housing, both urban and rural, 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; development of governmental policy and programs which would induce stabilization of employment through better planning of production; further evolution of democratic planning processes looking toward social and economic advancement.

b. Special efforts should be made to raise annual income and living standards of seasonal and migratory agricultural labor, through such measures as: Cooperation of public agencies and private interests in providing decent and sanitary housing facilities at sites of seasonal work; improved facilities for medical service, especially immunization and child care; improved public employment-agency procedures for accurately forecasting labor requirements and for keeping in constant touch with those seeking such work. In such ways, much needless wandering would be eliminated. In many localities it should be possible to establish a "home base" for the worker's family, consisting of small tract of land and low-cost house, which the family might own or rent; insofar as practicable, these people should be aided and encouraged to use tracts for 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.

11. Cultural Betterment; Recreation

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. The fostering of community organizations for dramatic, literary, musical, and art productions is also an important means. Educational services of libraries, and of museums, should be improved and extended. Opportunities for training in a wide variety of handicrafts should be greatly extended and efforts should be made to develop original designs which express the qualities inherent in the Region and its people.

School and college curricula and other educational programs should be so organized that they can accommodate materials and activities which relate to regional geography, conditions, problems, research, aims, plans, and accomplishments.

b. Special attention should be given to the further development of outdoor recreation, to the preservation of the Region's outstanding scenic assets in natural state, to the development of other valuable recreational areas in harmony with multiple-use principles, to the preservation of wildlife habitat, to the preservation of roadside forests and scenery, to the development of roadside parks and parkway systems, to the development of urban recreational and greenbelt areas, and to the problems of making these accessible both to visitors and resident at costs which are attractive even for people of modest means.

12. Improvement of Governmental Machinery

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 which should be realized within a decade are: Systematic reorganization of machinery and methods for school support that will make it possible to equalize educational opportunity and at the same time equitably to spread the burden of school costs; adaptation of all units of local government to the use capabilities of the lands that each may embrace; adjustment of the property tax to make it 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 gov-

ernment; some desirable consolidations of city and county government.

b. Federal, State, and local governments should make marked improvements in the machinery and techniques of administration, especially in procedures for planning, budgeting, financing, and coordinating projects and programs for resource conservation, for public aids and controls in economic development and for public services and public works. With respect to planning, conservation and development particularly, the techniques for intergovernmental coordination and for the cooperation of educational, business, and civic groups should have reached a considerably higher stage of effectiveness.

Special Objectives in Defense and Post-Defense Programs

Improvement Program Objectives in the Defense Period

The basic objective in the defense period is security—a dynamic and total defense—military, economic, and social, and the use of the regional resources to their fullest capacity for that purpose.

Beyond the directly military purposes of providing public works and improvements for the armed forces are almost equally important purposes in the provision of civil works. These are primarily community facilities—housing, transport, utilities, sanitation, hospitals and clinics, schools, recreation, police and fire protection—necessitated by the military and industrial establishment and the attendant shifts of population.

In meeting these needs, secondary but very important aims should be recognized: To use to the maximum existing economic and social facilities; to provide for best practicable adjustment of military establishment or industry and community or area; to minimize potential dislocations in both defense and post-defense periods; to improve where practicable the patterns of distribution of industry and of population.

A final purpose in defense improvement planning should be to lay the ground work for the post-emergency improvement work. If a program of readjustment and reconstruction is to be started without delays that will be costly from the standpoint of idle men and resources much of the preliminary work of investigation, survey, location, planning, and design for selected programs and projects, and of necessary governmental and economic organization will have to be done in advance during the period of defense activity.

Objectives for a Post-Defense Program*

The underlying objective of an improvement program in the post-emergency period should continue to be security—still dynamic and still total, but with a

* See *After Defense—What?* National Resources Planning Board, 1941.

shift of emphasis from the military to the economic and social aspects, including the stabilization of employment and industry. Aims should emphasize:

Recognition and removal of various barriers to a timely and smooth transition from defense to post-defense economy.

Resumption of use of resources for economic and social advancement, and for a more rapid rate of progress toward regional objectives.

Conversion of a considerable portion of defense industrial capacity to peacetime use; establishment of basic and linked industries and other improvements to facilitate economy and stability in such conversion.

Improvement and modernization of physical and economic-resource bases for producing and service industries; basic provisions (resource development, utilities, distribution facilities, etc.) for improved distribution of industry in national, regional, and local patterns.

Rehabilitation and renewed effort in conservation in natural-resources fields—land, soil, forests, water, energy.

New acceleration of progress toward modernization and rationalization of communities; basic improvements looking toward better integration of towns, cities, and their metropolitan and service areas; improvements designed to raise living standards and reduce social and economic costs in communities.

Reorganization of civil and community facilities and works of the defense program, looking toward effective conversion to peacetime use.

Conclusions

Progress toward the objectives will be very materially aided through a comprehensive plan and program for regional development and internal improvement.

Such a plan and program, presented in preliminary and incomplete form,¹⁰ should be expanded and improved and periodically revised.

¹⁰ *Development of Resources and of Economic Opportunity in the Pacific Northwest, Part IV—A Plan and Program for Regional Development and Internal Improvement, Pacific Northwest Regional Planning Commission, 1941.*

The plan and program should comprehend a reserve of public works and services, as one of the major means of promoting full use of resources, employment stabilization, and regional progress.

The work program and reserve should encompass developmental public works and services planned at all levels of Government; it should also envisage the more significant potential development projects of private or cooperative sponsorship. Wealth-producing and investment-inducing projects—those that tend to generate other improvements and general economic activity—and projects that provide facilities for essential services—those that tend to raise planes of living—should be given the greater emphasis.

Program and reserve should be built upon cooperative over-all area analyses designed to disclose the most fundamental needs, as well as upon plans and programs of individual agencies.

Establishment of an effective program—with a reserve ready for use—calls for a number of steps to set the stage for and remove barriers to a quick beginning of actual operations. These would involve extension of programming and budgeting procedures; surveys of projects in relation to the available materials and labor force; advance surveys and preparation of plans and specifications for selected projects, advance financial planning, advance legislative authorization of needed projects and procedures, advance purchase of needed sites and rights-of-way, and coordination of public works policy, and construction.¹¹

Planning and programming in the war emergency calls for some modification of planning and programming procedure to accord greater emphasis to the use of resources for war purposes, to war facilities locations, and to adjustment of the community to such locations, as well as to provision of community facilities immediately needed as a result of war activities.

Planning and programming in the post-war period will call for reorientation with respect to use of resources, including added facilities, and for drawing on the work reserve as may be necessary or desirable.

¹¹ *Development of Resources and Stabilization of Employment in the United States, National Resources Planning Board, 1941.*