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AGRICULTURAL EXPERIMENT STATION

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Rural Land Use Activities in Missouri

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COLUMBIA, MISSOURI

CONTENTS

Introduction	page 3
State Agencies Aid Land Use Adjustments	5
Missouri Agricultural Experiment Station	5
Missouri College of Agriculture	6
Missouri State Department of Agriculture	7
Missouri State Planning Board	7
Missouri State Park Board	8
Missouri State Conservation Commission	8
Federal Agencies and Land Use Adjustments	9
Farm Security Administration	9
Tenant Purchase Division	9
Rural Resettlement Division	10
Rural Rehabilitation Division	10
Bureau of Agricultural Economics	11
United States Forest Service	13
Bureau of Biological Survey	14
National Park Service	14
Soil Conservation Service	15
Bureau of Agricultural Engineering	16
Agricultural Adjustment Administration	16
Bureau of Chemistry and Soils	17
Aerial Photography	17

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ROSS J. SILKETT*

Recently there has been a very great increase in land use adjustment activities in Missouri directed toward the improved use and conservation of land resources. These activities are due to a constantly growing realization of the necessity for fundamental changes in land use policies and the urgency for public action in correcting economic and social maladjustments resulting from the misuse of land.

Since the first important settlement in Missouri in 1765, most of the land has been used in the way which seemed to promise the largest immediate income. This desire for quick profits resulted in exploitative practices that have greatly reduced the productive capacity of extensive land areas in the State. Evidence of economic and social decadence in rural areas resulting from the misuse of land is quite apparent to the most casual observer.

The following facts indicate the need for soil conservation and land use adjustment activities in Missouri.

Missouri has about 8,500,000 acres of land definitely suited to continued crop use. There are about 16,000,000 acres with soils of moderate fertility requiring moderate adjustments in agricultural use and management to maintain their present level of productivity. Much of another 12,000,000 acres now used for crop production requires major agricultural use adjustments or should be retired from crop use. Approximately 7,500,000 acres are definitely submarginal for crops. The total area of the State is about 44,000,000 acres.

A reconnaissance survey made by the Soil Conservation Service, United States Department of Agriculture, shows that over three-fourths of the land area of the State has lost at least one-fourth of its surface soil. From half the area of Missouri over one-half of the surface soil has been lost by erosion.†

More than 8,000,000 acres of forest lands have been cut-over, burned-over and over-grazed to such an extent that they contribute very little to the support of the local population, government, and essential public services in comparison with former contributions. Failure to prevent the neglect and misuse of these near-idle acres contributes to floods as a result of rapid and excessive run-off dur-

*Agricultural Economist, Bureau of Agricultural Economics, United States Department of Agriculture.

†*Soil Erosion in Missouri*, Missouri Experiment Station Bulletin, 349.

ing periods of heavy rainfall, and by this loss of water droughts are thereby intensified.

The organized protection of wildlife, especially migratory birds, is now recognized as necessary if extinction of many desirable wild species is to be averted.

Rural families in certain areas of the State are unable, under present conditions, to obtain a minimum subsistence standard of living by farming the land. This is evidenced by high relief loads, the condition of farmsteads, and the increasing dependence of local units of government upon state and federal aid to finance and maintain essential public services, such as schools, health, relief, and roads.

Land is a basic resource, and it is now realized that the public welfare can best be served only if all land is guided into those uses for which it is best adapted.

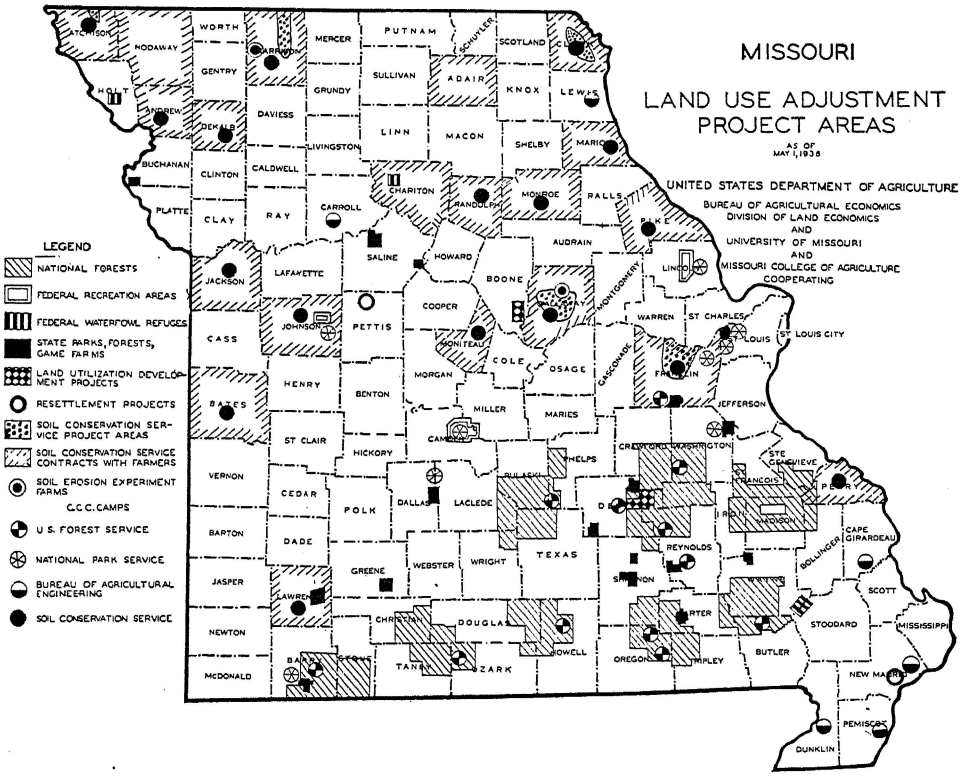


Figure 1.—Land Use Adjustment Project Areas in Missouri, as of June 30, 1937.

State Agencies Aid Land Use Adjustments

The activities of state agencies bring about many land use adjustments of great economic and social value to the citizens of Missouri. Land use research, establishing recreational areas, the conservation of wildlife resources, and the restoration of forests are a few of the constructive land use activities that can best be carried on by State agencies through public action programs.

In this publication the work of public agencies which are now active in giving direction to the future rural land use pattern of Missouri is briefly described. Many of these agencies have been created recently. Others have been active over a considerable period of years. The location of the various land use activities in Missouri is shown on Figure 1, Missouri Land Use Adjustment Project Areas.

MISSOURI AGRICULTURAL EXPERIMENT STATION

The Missouri Agricultural Experiment Station is actively engaged in furthering better land use in the State. Their research activities form the basis of intelligent land use.* Soil surveys, land use surveys, social and economic studies have been made from time to time. A special press service is issued to metropolitan dailies and news distributing syndicates maintaining special correspondents in Columbia. These are in the nature of spot news stories announcing new discoveries made by the Experiment Station, activities of the staff, and recommendations designed to meet emergencies and seasonal problems. During past years the Agricultural Experiment Station has furnished much technical information to federal and state agencies needing facts on agricultural and land use problems of state and national significance.

Several of the recent studies of the Agricultural Experiment Station are particularly valuable in promoting better land use. A study was made of adjustments in farming by regions and type of farming areas from the standpoint of agriculture adjustment and planning, including soil conservation. Recommendations, based on the information brought to light in the study, were made as to the important area problems which might be helped by adjustment. The contribution of pastures and pasture crops to the total physical

*Some recent publications for furthering better land use in Missouri, published by the Missouri Agricultural Experiment Station are: *Soil Erosion in Missouri*, Bul. 349; *Winter Barley, a New Factor in Missouri Agriculture*, Bul. 353; *Soil Conservation in an Improved Agriculture*, Bul. 362; *Cropping Systems in Relation to Erosion Control*, Bul. 366; *Forest Restoration in Missouri*, Bul. 392; *Effects of Better Selection of Crops and Pastures on Farm Income in Missouri*, Bul. 282; and *An All-Year Pasture System for Missouri*, Circ. 186.

production of a farm in areas representing the important soil problem areas of the State was studied. Work on improving varieties or crops better adapted to Missouri conditions is being carried on at all times. Experiments have been conducted on soils, soil treatment and soil erosion results of which point the way toward better use of Missouri lands.

The service projects of the Agricultural Experiment Station includes such work as testing fertilizer for Missouri farmers, identification of plant diseases, insect identification and control recommendations, testing seeds, production and distribution of bacteria for legumes, testing soil for lime requirement and many other valuable contributions to aid the farmers of the State.

The Agricultural Experiment Station staff devotes much attention to the utilization of near marginal and low class farming land. Better utilization of near marginal, and submarginal lands is recognized as one of the State's primary needs in agricultural adjustment. Recognition of the need for work in this field is clearly stated in the report of the Director of the Agricultural Experiment Station for the year ending June 30, 1935. To quote from the report: "Land utilization has come to be a national problem. The policies of national, state, and local governments in the past have been too generally concerned with the settlement of all lands, regardless of their agricultural value. Not all land is agricultural land. It is entirely possible that today thousands of farmers may be cultivating land that under present conditions will not provide an adequate standard of living. Many of these farmers have been on relief during the depression. This situation never before existed in the United States. It should never exist again. . . There are many thousand farmers in Missouri, located on land which is of very low fertility. It is, however, the sole basis of economic life for the people living on these lands. It seems certain, therefore, that the Agricultural Experiment Station must devote more and more attention to the utilization of land of low productive capacity."

MISSOURI COLLEGE OF AGRICULTURE

The Missouri College of Agriculture devotes a great deal of time to the promotion of better land use in the State. Education in methods of maintaining and building soil productivity and improving crop varieties have received major attention for many years. An excellent teaching personnel engages in instructing several hundred students each year at the college. Extension courses are avail-

able for anyone unable to attend the regular sessions. Short courses are offered at various times throughout the year to give concentrated technical education in numerous fields of endeavor that are a distinct contribution toward better land use practices. The College, in cooperation with the Agricultural Extension Service, sponsors a daily radio program devoted to educational material of particular interest to the farmers of the State. The educational activities of the College reach all parts of Missouri and are very effective in disseminating information relative to efficient use of Missouri lands.

The Agricultural Extension Service is actively engaged in bringing the results of the experiments of the Agricultural Experiment Station directly to the farmers of the State. Their constant direction and advice aimed at better land use is a potent force in desirable land use adjustments. The Extension Service maintains a cooperative relationship with the administration of the Agricultural Adjustment Act in the counties of the State. A substantial measure of the success of this program is due to the activity of the Extension Service in support of it. In addition to its educational activities the Extension Service aids the farmers in benefiting from the service projects of the Agricultural Experiment Station.

MISSOURI STATE DEPARTMENT OF AGRICULTURE

The Missouri State Department of Agriculture, a reorganization by an act of 1933 of the State Board of Agriculture (enacted in 1865), is the continuing organization for service to agriculture and country life, having an unbroken official record throughout the years, gradually increasing in duties and obligations to the Commonwealth. One of the laws administered by the State Department of Agriculture is that of the "Annual Agricultural Census", which provides crop statistics by counties, this law being administered in cooperation with the Agricultural Statistician of the United States Department of Agriculture for Missouri, and is annually printed and distributed in bulletin form. This data is extensively used by all agencies concerned with land use problems. The office of the State Department of Agriculture is under the supervision of the Commissioner of Agriculture, and is located in Jefferson City.

MISSOURI STATE PLANNING BOARD

The State Planning Board was first established in 1933 by appointment by the Governor. In 1935 the State Legislature created the present official State Planning Board by statute.

An objective of state-wide land use planning is to suggest a coordination of the work of all agencies, state, federal, and local,

which have to do with land use. The State Planning Board serves to provide the National Resources Committee with information concerning land use in Missouri, and supplies similar information to all federal and state agencies.

The proposals concerning adjustments in the use of land are coordinated with plans for highways, recreational facilities, conservation of water resources, and other essential public programs affected by land use.

Close cooperative relations are maintained with all Federal and State land developing agencies and with all agencies engaged in land use research.

Reports have been made on land and other resources of Missouri with recommendations for improved use.

STATE PARK BOARD

The 1937 State Legislature created the State Park Board with power to acquire by purchase, eminent domain or otherwise, real estate for the use and improvement of state parks. The Board is further granted power to make all rules and regulations necessary for the acquisition and/or maintenance of real estate, and the preservation of parks. Missouri now owns 45,158 acres of land in twenty-one state parks, forests, and game refuges. Forests and game refuges will be administered by the Conservation Commission.

The 1937 session of the State Legislature appropriated funds for the purchase of three new state parks. One is to be located on the historic site of old Fort Zumwalt in St. Charles county. Another is to be purchased in Grundy county in commemoration of General Enoch H. Crowder, and the third is to be Pershing Memorial State Park in Linn county. Funds were also provided for the acquisition of forty acres to Van Meter State Park in Saline county, and for an addition to Mark Twain State Park in Monroe county which will make this park suitable for a game reserve.

CONSERVATION COMMISSION

An amendment to the State Constitution adopted by the voters of the State in the 1936 election creating the Conservation Commission states: "The control, management, restoration, conservation, and regulation of the bird, fish, game, forestry and all wildlife resources of the State, including hatcheries, sanctuaries, refuges, reservations and all other property now owned or used for said purposes or hereafter acquired for said purposes and the acquisition and establishment of the same, and the administration of the laws

now or hereafter pertaining thereto, shall be vested in a commission to be known as the Conservation Commission”

The Director of Conservation appointed by the Conservation Commission is also Director of State Parks and a member of the State Park Board.

The Constitutional Amendment creating the Conservation Commission became effective July 1, 1937. There are few, if any, State Conservation Commissions that have the powers and freedom of action equal to those granted by Missouri to her Conservation Commission.

Federal Agencies and Land Use Adjustments

The activities of federal agencies in furthering land use adjustments in Missouri have greatly stimulated and supplemented State programs concerned with correcting economic and social maladjustments directly attributable to the misuse of land. Because the misuse of land in one State may adversely affect the welfare of another, or the benefits of certain land use adjustments may not be confined within the borders of a single State, it becomes a responsibility of the federal government to cooperate with states in bringing about changes in land use whenever the general welfare of the nation is involved. A few examples of programs involving land use adjustments that require federal participation, if they are to be most effective, include forest programs, control of soil erosion, flood control, conservation of wildlife, particularly migratory waterfowl, establishment of national parks, retirement of submarginal land, and promotion of farm ownership.

FARM SECURITY ADMINISTRATION

The Farm Security Administration was established by the Secretary of Agriculture on September 1, 1937, as an agency of the federal government, in the United States Department of Agriculture, to administer the program of rehabilitation and rural resettlement formerly carried on by the Resettlement Administration, and to administer the provisions for farm tenant loans and rehabilitation loans provided for under Titles I and II of the Bankhead-Jones Farm Tenant Act.

Tenant Purchase Division.—The Bankhead-Jones Farm Tenant Act, under Title I, authorizes the Secretary of Agriculture to make loans to tenants, farm laborers, sharecroppers, and others who obtain or have recently obtained the major portion of their income

from farming operations, for the purpose of acquiring farms. An appropriation of ten million dollars has been made for the fiscal year ending June 30, 1938, to carry out the provisions of Title I. The Act also authorizes to be appropriated not to exceed twenty-five million dollars for the fiscal year ending June 30, 1939, and not to exceed fifty million dollars for each fiscal year thereafter. This title is administered by the Tenant Purchase Division.

Rural Resettlement Division.*—The Rural Resettlement Division has as its primary objective to complete projects begun by the Resettlement Administration to acquire and develop productive farm land on which to relocate families moving from land being acquired by the government. In addition, other farm families now located on poor farms or dispossessed of their farms will be selected for occupancy of the two resettlement projects now being developed on a demonstrational basis in Missouri.

In the northwestern part of Pettis county, the Osage Project, consisting of 5,280.03 acres, is being developed to accommodate approximately seventy families. Construction of improvements and the selection of families is in progress of this project. About 6,700 acres have been optioned in New Madrid county in southeastern Missouri. Tentative plans on April 1, 1938, are to develop this project to accommodate approximately one hundred families. Most of the farms purchased for resettlement purposes were large. These are being subdivided and developed into smaller units.

Rural Rehabilitation Division.—Title II of the Farm Tenant Act authorizes the Secretary of Agriculture to make rehabilitation loans to farmers who cannot obtain credit on reasonable terms elsewhere.* It also provides for the continuation of a farm debt adjustment program.

The Division of Rural Rehabilitation makes loans to farmers for the purpose of aiding them in reestablishing themselves in the farming business. On July 3, 1937, there were 9,136 "Standard Farm Plan Clients." Since the program was initiated, there have been 11,030 regular borrowers, who have been loaned a total of \$5,236,946. About 12 percent of this amount, or \$624,654, has been repaid. In April, 1937, the delinquency on all repayments due was 10 per cent.

The farm families which qualify for loans are those whose last source of family support was from agriculture. Dispossessed farmers who have become stranded in towns, as well as farmers now

*This program was already under way under the Resettlement Administration at the time the Farm Tenant Act was enacted.

living in rural areas, are eligible. It is necessary that the farmers arrange for an adequate place to farm, that they be of good character and that they meet with the approval of the local county Rural Rehabilitation Committee. This Committee is composed of from three to five outstanding citizens in each county, who serve without pay.

County rural rehabilitation supervisors work out a feasible financial program and farm operating plan for each borrower designed to aid him improve the economic status of himself and family. In each instance the plan of farm operation includes soil conserving practices as a part of the consideration for the granting of the loans. Where the land occupied by the family is too poor to permit the development of a going farm business, the borrower is assisted in finding a more suitable location.

Such factors as absentee ownership, land speculation, drought, the World War, and the economic conditions which followed have played no small part in land misuse. In 1933, state and county debt adjustment committees were organized in Missouri with the saving of farm homes as the prime objective. This work made possible the continuation of farm ownership by farmers, based upon their ability to pay, which, to a great extent, is determined by soil production possibilities and the managerial ability of the farmer. Previous to September, 1935, these committees were responsible for adjustments which resulted in the saving of several thousand Missouri farms for farm owners. During the period September 1, 1935, to August 31, 1937, over 2,400 Missouri farmers obtained debt adjustment service through efforts of the Rural Rehabilitation Division. Over 400,000 acres were involved which otherwise would have entered into the speculative or absentee landlord fields of ownership.

BUREAU OF AGRICULTURAL ECONOMICS

The responsibility for the development of the program of land utilization and retirement of submarginal land heretofore carried on by the Resettlement Administration and as provided for under Title III of the Farm Tenant Act, has been assigned to the Bureau of Agricultural Economics, United States Department of Agriculture, and is described below.

Under Title III of the Farm Tenant Act—Retirement of Submarginal Lands—the Secretary is authorized and directed to develop a program of land conservation and land utilization, including the retirement of lands which are submarginal or not primarily suitable

for cultivation, in order thereby to correct maladjustments in land use, and thus to assist in controlling soil erosion, promoting reforestation, preserving natural resources, mitigating floods, preventing impairment of dams and reservoirs, conserving surface and sub-surface moisture, protecting the watersheds of navigable streams, and protecting the public land, health, safety, and welfare. An appropriation of 10 million dollars was made to carry out provisions of Title III for the fiscal year ending June 30, 1938. The Act also authorizes to be appropriated not to exceed 20 million dollars for each of the two succeeding fiscal years.

The Bureau of Agricultural Economics is developing and administering two land use adjustment projects in Missouri, the purchase of land for which was initiated under funds allotted to the former Resettlement Administration. These areas, although of low productivity, have been used for farming in the past. Under this program they are being converted into uses for which they are better adapted. The present occupants of the land, the use of which is to be shifted, will be assisted in locating elsewhere if they are not employed in the development of the land acquired."

The University of Missouri Game Preserve and Arboretum project is located in the southeastern part of Boone county about 20 miles from Columbia. It includes 2,223 acres. This project is designed to serve the Botany and Zoology Departments of the University of Missouri as an experimental area and outdoor laboratory where procedures of wildlife management may be studied. It will also be a state game refuge.

The Meramec Forest is a land use project involving 3,100 acres located in that part of the Clark National Forest Purchase Unit which lies in Dent county. This is a typical Ozark hill area, occupied by families who are dependent upon timber resources and a self-sufficing type of farming. The rough, stony soil is unsuited to agricultural use. The primary purpose of this project is the reforestation of the submarginal farm land.

The Bureau of Agricultural Economics maintains at the Missouri College of Agriculture a staff which conducts research relating to land use problems in Missouri. The work of the staff is directed toward the development of a factual basis for formulating public policies of land use from which can be determined the need for State and Federal programs of reforestation, soil erosion control, flood control, population adjustments, local-government reorganization, rural zoning, and other similar programs. The work is carried

on in cooperation with the University of Missouri, the Missouri State Planning Board, and other state and federal agencies.

UNITED STATES FOREST SERVICE

There are two National Forests in Missouri, each with four separate purchase units. The Clark National Forest includes the Clark, St. Francois, Fristoe, and Wappapello Purchase Units. The Gasconade, Gardner, Pond Fork, and Table Rock purchase units comprise the Gardner National Forest. The forest units are situated on rough lands in the Ozarks that were forest-covered in their virgin state.

Prior to 1933 land acquisition in Missouri by the United States Government was limited by state statute to 2,000 acres in any one county. In 1933 the State Legislature passed an Enabling Act which authorized the Federal government to purchase a maximum of 25,000 acres in one county. This legislation made possible the national forest-purchase program which was started in August, 1933. The Enabling Act was amended in 1934 to permit the purchase of 100,000 acres per county. In 1935 all restrictions were removed.

Within the boundaries of the eight forest purchase units is a total area of some 3,300,000 acres. Approximately 800,000 acres of the land within the forest boundaries have actually been purchased by the government. Title perfection is now in process on an additional 220,000 acres. The average purchase price of the federal forest land has been about \$2.15 per acre. Provisions have been made for a permanent Federal land-purchase policy, and under present plans, government holdings in the forest areas will be increased as rapidly as funds become available.

Fire prevention and suppression are now exercised by the government throughout the entire area of the purchase units. In 1930, an Act was passed authorizing the Secretary of Agriculture to establish forest-tree nurseries. Under authority granted by this Act a federally-owned tree nursery was established at Licking, Missouri, with an annual output capacity of 15,000,000 seedlings. These seedlings are used for planting in the National Forests. Approximately 10 per cent of the net purchasable area, or 275,000 acres within the present Forest Purchase Unit boundaries, needs replanting to trees. Only about one-fifth of the total area in the State which should be reforested is included within the present boundaries of the eight forest purchase units and only about one-tenth has been placed under proper forest management.

The men from 12 of the camps of the Civilian Conservation Corps located in Missouri are developing national forests and state owned forest lands under the direction of the United States Forest Service.

BUREAU OF BIOLOGICAL SURVEY

The Bureau of Biological Survey of the United States Department of Agriculture is acquiring land in Missouri to be used as waterfowl rest areas. The two areas now in the process of acquisition are Swan Lake Migratory Waterfowl Refuge in Chariton county, and Squaw Creek Migratory Waterfowl Refuge in Holt county. Approximately 11,000 acres have been optioned or approved for purchase for the Swan Lake Refuge. The total cost of acquisition is estimated at approximately \$320,000. The total approved area in the Squaw Creek Sanctuary is approximately 7,000 acres. All of this has either been optioned or approved for purchase at a total cost of about \$165,000.

Mingo Swamp, situated in Wayne and Stoddard counties was, in its natural state, one of the best refuges for migrating waterfowl to be found in the Mississippi Valley. This swamp was drained under the numerous drainage projects completed in the southeast lowlands. The land has subsequently proved to be unsuited to agriculture and a project has already been initiated by the Bureau of Biological Survey for the restoration of the swamp to its natural state, but because of a reduction in appropriations this project has been temporarily abandoned. Under the right conditions it would again become one of the best refuges in the fly-way of midwestern waterfowl.

These federal refuges are chiefly to provide feeding grounds for birds in their spring and fall migrations. If waterfowl, when migrating, do not have protected areas in which they can rest and feed, they fall prey to hunters or, in some areas, perish for the lack of food. Other activities of the Bureau of Biological Survey include wildlife research carried on through the United States Forest Service, the University of Missouri, the Missouri Game and Fish Department, and individuals who are interested in conservation. The Bureau also cooperates with the State in the enforcement of both state and federal game laws.

NATIONAL PARK SERVICE

The National Park Service, of the Department of the Interior, is acquiring and developing three recreational areas in Missouri with an aggregate acreage of 27,542 acres. It is expected that these

will ultimately be turned over to the State. In addition the National Park Service is developing some of the state owned parks. There are 13 C.C.C. and ERA projects located in parks and recreational areas in Missouri. The men are developing these lands under the direction of the National Park Service.

The Grand Glaize Recreational Area is a 16,500-acre tract located in Camden and Miller counties on the Grand Glaize arm of the Lake of the Ozarks. This land is designed to be a regional recreational area. The Lake of the Ozarks is the largest body of water between the Great Lakes and the Gulf. This location was selected partly because of its recreational advantages and partly because the land is submarginal for agricultural purposes. A part of the area has been set aside as a refuge for upland wildlife and a part along the upper Glaize as a waterfowl rest area.

The Cuivre River Family Vacation Area is designed to serve the people of St. Louis as well as others within a 50-mile radius. The location was selected because of the submarginal character of the land combined with its recreational advantages. The area contains 6,441 acres and is 55 miles northwest of St. Louis in Lincoln county. There are in excess of 1,000,000 people within short driving distance of this area.

The Montserrat Family Vacation Area is a 3,500-acre park located near Knobnoster in Johnson county. This area is designed to serve the people of Kansas City and vicinity in the same way as the Cuivre River Park is designed to serve the people of St. Louis. One camp unit of 44 buildings has been completed and leased to the Camp Fire Girls organization of Kansas City. Additional camp sites are proposed.

SOIL CONSERVATION SERVICE

The Soil Conservation Service, of the United States Department of Agriculture, was established by an Act of Congress in April, 1935, which declared its policy to "provide permanently for the control and prevention of soil erosion and thereby to preserve natural resources. . . ."

Based on good land-use and erosion-control practices, demonstrations of soil conservation are being conducted by the Service in Missouri on five watershed areas located in Harrison, Atchison, Clark, Franklin, and Callaway counties and by Civilian Conservation Corps camp areas located in 21 counties.

Demonstrations have been established on the predominating soil types throughout the State. Projects are located on privately owned land with the government and the owner sharing the costs. Records of July 1, 1937, indicate work is being carried on with 2,514 farmers operating 395,978 acres. All land is farmed under a mutually agreed upon five-year cooperative plan of conservation.

The objective of the service is to demonstrate the various practical methods of soil and moisture conservation through land utilization and erosion control measures. These conservation practices include farm management, crop adaptations, use of rough or badly eroded land, fire protection for farm woodlots and cropped fields, and wildlife conservation. Erosion control measures include approved rotations, and supplemental mechanical practices, where applicable, including terraces and outlets, contour cultivation, strip cropping, gully control, and contour furrowing.

BUREAU OF AGRICULTURAL ENGINEERING

The Bureau of Agricultural Engineering directs the work of five Civilian Conservation Corps drainage camps in Missouri. These are located at Canton, Rockport, and Carrollton in the northern part of the State, and at Delta, New Madrid, and Hayti in southeastern Missouri. About 150 men are enrolled in each camp. The work of the men in these camps consists of cleaning and excavating drainage ditches, and restoring them to their original specifications. The men also install tile drains and make levee repairs in certain instances where this type of work is needed.

AGRICULTURAL ADJUSTMENT ADMINISTRATION

One of the most extensive efforts in organized agricultural adjustment has been that made by the Agricultural Adjustment Administration of the United States Department of Agriculture.

The Soil Conservation and Domestic Allotment Act, which became law in February, 1936, has as its purpose "to promote the conservation and profitable use of agricultural land resources."

The Agricultural Conservation Program, as it is known, has for a goal in Missouri the increase of the crop land devoted to soil-conserving and soil-building crops; to establish a maximum ratio of soil-building crops to soil-depleting crops on each participating farm, consistent with good farming practices; to promote the adoption of soil-building practices, such as seeding sod-forming grasses and legumes, turning under green-manure crops, establishing ter-

races on farms where needed, and the adoption of other soil-conserving and soil-building practices.

To encourage landowners and operators to divert land from soil-depleting to soil-conserving crops, and to adopt recommended soil-building practices, benefit payments are offered for the diversion of land from depleting to conserving use, and for the adoption of soil-building practices.

In 1936, soil-building payments were made on 1,962,433 acres of new seedlings of legumes, on 194,179 acres of new seedlings of grasses, on 85,057 acres of soybeans and cowpeas plowed under as green manure, for the liming of 107,357 acres, for the use of phosphate fertilizer with conserving crops on 17,187 acres, and for the terracing of 11,372 acres.

The records indicate that 160,548 farms were included in the 1936 Missouri Agricultural Conservation Program. An average diversion of 20 per cent from soil-depleting to soil-conserving crops or uses was made on these farms.

BUREAU OF CHEMISTRY AND SOILS

Fifty-nine counties have been surveyed in detail and maps published by the Bureau of Chemistry and Soils of the United States Department of Agriculture in cooperation with the University of Missouri Agricultural Experiment Station. Soil survey work in Missouri is being continued as the result of an appropriation of funds made by the 1937 General Assembly of Missouri.

Aerial Photography

The Agricultural Adjustment Administration made aerial photographs of 2 Missouri counties in 1935, 17 in 1936, and 21 counties were photographed in 1937. Aerial photographs of 40 counties are now available. The present intentions are to complete aerial photographs of all counties south of the Missouri River in 1938.

In addition, eight counties and large segments of other counties have been photographed by the Soil Conservation Service. The Union Electric Light and Power Company has photographed the area around the Lake of the Ozarks, and the land along the power lines extending from the Dam at Bagnell to St. Louis, and from Bagnell to Flat River. The National Guard has made photographs of the land adjacent to Camp Clark in Vernon county.

The Engineer Corps of the War Department has made aerial photographs covering the flood plain of the Mississippi river between

the mouths of the Ohio and Missouri rivers, and from West Alton to Clarksville, Missouri. Aerial photographs covering the flood plain of the Missouri river, including bluffs, from the mouth to St. Joseph, and aerial photographs of the Missouri river with a limited amount of bank-line and flood-plain topography from the mouth to Rulo, Nebraska, have been completed.

The 50 counties that have been completely photographed or are now in process of being photographed are as follows:

- | | |
|-------------------|--------------------|
| 1. Andrew | 26. Lincoln |
| 2. Atchison | 27. Mississippi |
| 3. Bates | 28. Montgomery |
| 4. Bollinger | 29. New Madrid |
| 5. Buchanan | 30. Nodaway |
| 6. Butler | 31. Perry |
| 7. Caldwell | 32. Pettis |
| 8. Cape Girardeau | 33. Pemiscot |
| 9. Callaway | 34. Pike |
| 10. Cass | 35. Platte |
| 11. Chariton | 36. Randolph |
| 12. Christian | 37. Ray |
| 13. Clay | 38. Ripley |
| 14. Clinton | 39. Saline |
| 15. Daviess | 40. Scott |
| 16. DeKalb | 41. Shelby |
| 17. Dunklin | 42. Stoddard |
| 18. Franklin | 43. Stone |
| 19. Gentry | 44. St. Charles |
| 20. Henry | 45. St. Louis |
| 21. Holt | 46. Ste. Genevieve |
| 22. Jackson | 47. St. Clair |
| 23. Jefferson | 48. St. Francois |
| 24. Johnson | 49. Taney |
| 25. Lafayette | 50. Warren |