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Problems of small watershed districts in Tennessee organized under Public Law 566

Joseph Elroy Winsett

To the Graduate Council:

I am submitting herewith a thesis written by Joseph Elroy Winsett entitled "Problems of small watershed districts in Tennessee organized under Public Law 566." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

David W. Brown, Major Professor

We have read this thesis and recommend its acceptance:

Frank F. Bell, R. G. Spitze

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

January 29, 1958

To the Graduate Council:

I am submitting herewith a thesis written by Joseph Elroy Winsett entitled "Problems of Small Watershed Districts in Tennessee Organized Under Public Law 566." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

David L. Brown
Major Professor

We have read this thesis
and recommend its acceptance:

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Accepted for the Council:

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PROBLEMS OF SMALL WATERSHED DISTRICTS IN TENNESSEE ORGANIZED UNDER PUBLIC LAW 566

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

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by

Joseph Elroy Winsett

March 1958

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CHAPTER I

INTRODUCTION

Since the Watershed District Act of 1955 became law, seven local organizations in Tennessee have filed petitions to form a watershed district with the Secretary of State. Many others have expressed an interest in creating other watershed districts. However, some serious local problems have arisen within some of the watershed districts. In some cases the district has been voted down. In other cases the local people initially endorsed creation of a district and large sums of money were spent by the Federal Government conducting surveys, preparing alternate plans, etc. Then the interest of the local people waned, and the watershed program came to a standstill. The objective of this study is to define factors associated with landowners' attitudes toward watershed districts.

Watershed Defined

A functional definition of the term watershed is essential to an understanding of this study. The dictionary states, "the boundary line between one drainage area and others is rightly termed watershed . . .," or another meaning of a watershed is given as "the whole region or area contributing to the supply of a river or lake; drainage area; catchment

area or basin."[1]

In discussing the word "watershed", Brown and Murphy state:

> Thirty years ago that word was almost always taken to mean primarily the drainage divide that separated the waters flowing into different rivers or oceans. Thus the Continental Divide in Wyoming or New Mexico was truly a watershed. Gradually the term "watershed area" came into use to mean the drainage basin of a river or stream. In time the word "area" was dropped, and to most people watershed meant the same as drainage basin.[2]

Since the Watershed Protection and Flood Prevention Act, Public Law 566, was passed by Congress in 1954, many people have become familiar with the term watershed. It is now generally thought of as a drainage area of a few thousand acres or more which drain toward a single channel. Several of these small watersheds combine to form river watersheds, which are commonly regarded as river basins, just as creeks and their tributaries form rivers. These small watersheds are social and economic units for conservation of water, soil, and related resources.

Purpose of the Study

A large amount of time and money has been spent on watershed programs in an effort to assist local landowners. Since landowners in most districts had not found the program appealing, it seemed that some attempt should be made to identify some of the factors associated with

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[1]Webster's New International Dictionary, (2nd ed.; Springfield, Mass.: G. & C. Merriman Company, 1948), p. 2886.

[2]Carl B. Brown and Warren T. Murphy, "Conservation Begins on the Watershed," Water, the Yearbook of Agriculture, 1955 (Washington, D. C.: U. S. Government Printing Office, 1955), p. 161.

landowners' attitudes toward the watershed district. This is the main problem with which this study is concerned. It also points out some of the features of the program, or parts of it, which landowners do not like. Realizing that a watershed program is not necessarily in the best interest of all, or even most, of the people in a watershed district, an attempt is also made to identify groups of landowners which may be benefited or abused by the program.

Procedure

Field data for this study were gathered from one hundred and eighty-four landowners within three watershed districts in Tennessee. They are the Swan Creek Watershed District which covers parts of Lincoln and Marshall Counties; the White Oak Watershed District which covers parts of Henderson, Chester, McNairy, and Hardin Counties; and the Johnson Creek Watershed District which is located in Madison County. These three, which make up the three universes, were selected because they were the furthest advanced of any of the watershed districts of Tennessee.

Construction of the Frame

The frame, or list of landowners, for each watershed district was constructed from information obtained from Soil Conservation Service maps of landowners. Landowners' names were then arranged alphabetically and numbered consecutively.

Sampling Procedure

Preliminary investigation in Swan Creek and White Oak Watershed

Districts indicated that people owning land downstream from dam sites tend to have positive attitudes toward the watershed districts, while landowners above proposed dam sites tend to have negative or neutral attitudes[3] toward the watershed districts. For this reason these watershed districts were stratified into two strata to make certain that the sample would include owners of land both above and below the dam sites. All landowners who owned land in an area where the water would flow into a reservoir created by a district-built dam were in one stratum. All other landowners of a district were declared to be in the other.

The location of proposed dams was determined from tentative dam sites given on the Soil Conservation Service map which also showed the location of each landowner's farm in the watershed districts. Because the tentative dam sites were not shown on the Johnson Creek Watershed map, it was stratified according to the landowners who owned land in the northern (lower) half of the watershed district, and those who owned land in the southern (upper) half of the watershed district.

The number sampled from each stratum was proportional to the total number of landowners of the watershed district who lived in each stratum. The sample in each stratum was selected by a simple random procedure.

Collection of Data

The data was collected by interviewing 184 landowners between August 16, 1957 and September 14, 1957. It was collected by the writer

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[3]For definitions of the terms "positive", "neutral", and "negative" attitudes as used in this study see Appendix A.

and another full-time trainer interviewer[4] who was thoroughly familiar with the interviewing technique and purpose of the study.

Construction of the Questionnaire

To identify possible factors related to landowners' attitudes toward the watershed district in which they own land, interviews were held with landowners, professional agricultural workers, bankers, and merchants. Among the most frequently mentioned factors which were thought to affect the landowner's attitude toward the watershed district were:

(1) Landowner's level of knowledge of the watershed district program.

(2) Landowner's attitude toward government agencies and programs servicing the watershed area.

(3) Landowner's attitude toward local watershed leaders.

(4) Economic loss caused by flooding in the watershed area.

(5) Amount of protection the watershed district would render.

(6) Location of landowner's property in the watershed district.

With these factors in mind a tentative questionnaire was constructed. The questionnaire was then tested by interviewing twenty landowners in Swan Creek Watershed District to determine the pertinence of each question to the problem, the form of questions to be used, and understanding of each question by the landowners. After tabulating the results of the preliminary survey to determine whether meaningful information was

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[4]Arnold Stalling, graduate student in Department of Agricultural Economics, University of Tennessee, Knoxville, Tennessee.

being obtained, and after considering the landowners' reactions to the questionnaire, it was partially revised and expanded to provide a more complete coverage of information desired.

CHAPTER II

GOVERNMENTAL ACTIONS AFFECTING SMALL WATERSHEDS

This study is concerned with problems encountered when landowners undertook to make use of a state government act and a federal government act regarding watersheds. Therefore, a synopsis of these acts as well as a history of legislation preceding them is deemed important as a background of the study.

As recently as July, 1953, the President of the United States sent a special message to the Congress in which he said:

> It is fortunate that today there is a growing recognition on the part of land users and the public generally of the need to strengthen conservation in our upstream watersheds and to minimize flood damages. Inadequate conservation measures and unsound land use patterns vastly increase the danger of loss of valuable topsoil from water erosion in time of flood.
>
> In our past efforts to better utilize our water resources, to control floods and to prevent loss of life and property, we have made large investments on the major waterways of the nation. Yet we have tended to neglect the serious waste involved in the loss of topsoil from the Nation's farms and the clogging of our streams and channels which results from erosion on the upper reaches of the small streams and tributaries of the Nation's rivers.
>
> It is important . . . for groups of farmers banded together in local organizations, such as soil conservation districts and watershed districts, to take the initiative, with the technical advice and guidance of the appropriate Federal and State agencies in developing adequate plans for proper land use and resource improvement in watersheds throughout the Nation. As these plans are prepared and local agreement and cooperation are assumed, I believe that we should move ahead in the construction of works of improvement and the installation of land-treatment measures as rapidly as possible consistent with a sound overall fiscal program.[1]

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[1] U. S. Congress, House of Representatives, Program Designed to Conserve and Improve the Nation's Natural Resources. House Document No. 221, 83d Congress, 1st Session (Washington: Government Printing Office, 1953).

The President's message indicated the relatively short period of time in which there has been widespread public interest in small watershed projects. However, the roots of this interest, i.e., conservation based on management of watersheds, go far back into the history of the government's effort to deal with problems of the Nation's water resources.

Governmental Actions Prior to Public Law 566

In 1867, a commission which was established by the Wisconsin State Legislature pointed out the relationship between forest cover and streamflow. A New York State commission in 1872 investigated the desirability of maintaining the forests of the Adirondack Mountains for the purpose of benefiting the Hudson and other rivers and the Erie Canal.

As early as 1891 the Congress realized the need of watershed management by setting aside the first forest reserves, and later by appropriating funds for research on the influence of forest cover on runoff. In 1897 the Congress, in enacting the Organic Administration Act for natural forests, established as one of the principal purposes of such forests the "securing of favorable conditions of water flows."

The beginning of the twentieth century brought about an increasing public interest in waterflow-watershed relationships. Reflecting this interest were the Reclamation Act of 1902; the establishment of the Forest Service in its present form in 1905; the White House Conference of Governors on the Conservation of Natural Resources in 1908; and the Weeks Law of 1911, which authorized Federal acquisition of watershed lands in the headwaters of navigable streams for the purpose of "con-

serving the navigability of navigable rivers." Also there were the Flood Control Act of 1927, the McSweeney-McNairy Forest Research Act of 1927, and the first Federal appropriation for research on soil conservation in 1928. In 1929 the United States Department of Agriculture started its research on the cause and control of soil erosion.

A series of both State and Federal Laws was designed to provide the administrative tools and funds for the nationwide effort to develop, improve, and conserve land and water during the 1930's. The first of these was the Soil Erosion Service which was established in 1933 in the Department of Interior. This service was replaced by the Soil Conservation Service in the Department of Agriculture in 1935 by Public Law 46, 74th Congress, which expanded its type of work.[2] The Soil Conservation Service emphasized the need for planning and treating entire watersheds from its beginning. The first erosion-control demonstration projects undertaken by this agency were established within the natural boundaries of watersheds. While working with individual landowners, the Service soon discovered some measures which were needed for good land use and protection and for water conservation and use.[3] As recently as twenty years ago, however, local people were not generally organized for group work and were not authorized by the state government to plan and carry out their own programs of soil and water conservation. The states first began passing laws to enable landowners to organize and govern soil con-

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[2]Carl B. Brown and Warren T. Murphy, "Conservation Begins on the Watershed," Water, the Yearbook of Agriculture, 1955 (Washington, D. C.: U. S. Government Printing Office, 1955), pp. 161, 162.

[3]Donald A. Williams, "Small Watershed Protection and Land Use," American Forest (November 1955), p. 37.

servation districts in 1937. Since then all states have enacted such laws although they vary from state to state. Meanwhile, the Tennessee Valley Authority was created in 1933 to develop an integrated river basin resource development program. Also, there was the Flood Control Act of 1936 which recognized watershed treatment as the counterpart and complement of downstream flood control, and in 1937 the Soil Conservation Act was amended to provide incentive payments for landowners to carry out soil conservation practices.

Brown and Murphy in Water, the Yearbook of Agriculture, 1955, state:

> There is a growing movement away from single-purpose development or conservation and toward integrated or multiple-purpose undertakings. We have learned that the manner in which one resource, such as soil, is handled may have a serious impact upon another resource, such as the water supply or hydroelectric power.
>
> The primary interest was first directed (from about 1933 to 1952) to planning for the resources of major river basins such as the Missouri, Columbia, and Arkansas Basins . . . . Although major river basin programs have set forth desirable broad goals of resource use and have outlined the general relationship between soil and water resources and the major structural projects, they could not get into the details of accomplishing the goals on thousands of individual farms, ranches, and forest holdings. To do that required the understanding and active support of many thousands of individual landowners.
>
> Recognition of this situation has led to the small-watershed approach to the use and development of soil and water resources.[4]

This was climaxed by the passage of the Watershed Protection and Flood Prevention Act, Public Law 566.

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[4]Carl B. Brown, op. cit., p. 162.

Public Law 566

Need for the Watershed Protection and Flood Prevention Act, Public Law 566

The idea of upstream watershed development, which is the function of the Watershed Protection and Flood Prevention Act, was first embodied in the 1936 Flood Control Act. Although this act provided for downstream projects to be accomplished by the Army Engineers and a program of work by the Department of Agriculture on the upper watersheds, it did not work out this way. Appropriations were so meager for the upstream projects that none of them could be completed.[5]

Until 1954 a total of fifty-three million dollars had been appropriated for main-river flood control projects built by the Corps of Engineers.[6] It became apparent several years ago that these worthwhile upstream projects could not be accomplished with the approach set out in the 1936 Act or the Amendatory Act passed in 1944. A recognition of this failure finally brought about a different approach to federal aid for upstream projects.[7]

A subcommittee of the House Committee on Agriculture in the 82nd Congress, 1952, held hearings in Washington during the Congressional Session of 1951 and after adjournment of that session conducted field hearings. These hearings were to consider the feasibility and desira-

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[5]Clifford R. Hope, "The Progress of the Small Watershed Project," Land and Water, 11:4; Winter, 1956, p. 15.

[6]U. S. Congress, House of Representatives, Hearings Before Subcommittee on Appropriations, Part 1, 83rd Congress, 1st Session, p. 610.

[7]Donald A. Williams, "Small Watershed Protection and Land Use," American Forest, (November, 1955), p. 42.

bility of inaugurating agricultural flood-control programs. Great interest was found in this type of program. The hearings also indicated that the country was considerably ahead of Congress in its interest in the small watershed problem.

This subcommittee worked out a watershed bill during the second session of the 82nd Congress. However, it was unable to get the bill before the House for action during that session. This preliminary work showed up in the 83rd Congress in January, 1953, when small watershed bills were introduced by several members of the House. While these bills were pending, the so-called "Pilot Plan Projects" were included in the Agricultural Appropriation bill passed in the 1953 session. Five million dollars were appropriated to start fifty-eight pilot watershed projects. These pilot projects were selected from watersheds in which the Soil Conservation Service had made surveys under the authority of the Soil Conservation Act of 1935.[8]

These projects had two main objectives. One was to gain more knowledge of the best ways to achieve local-state-federal teamwork in planning and achieving watershed protection. The other was to demonstrate the benefits of watershed protection in various parts of the country. Technical assistance was rendered the pilot watersheds by the Soil Conservation Service, state and federal Forest Service, Extension Service, Vocational Agriculture teachers, and a variety of other local, state, and federal agencies; what is now the Agricultural Conservation Program provided cost-sharing assistance. Another important contribution of

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[8]Clifford R. Hope, op. cit., pp. 15, 16.

this program was the interest it created toward watersheds among civic groups and businessmen.[9]

Synopsis of Public Law 566 As Amended

Public Law 566, which may be referred to as the "Watershed Protection and Flood Prevention Act," was passed by the 83rd Congress in 1954, and amended by the 84th Congress in 1956. This Act authorizes "the Secretary of Agriculture to cooperate with States and local agencies in the planning and carrying out of works of improvement for soil conservation, and for other purposes."[10]

Erosion, floodwater, and sediment damage in watersheds causing loss of life and damage of property constitute a menace to the national welfare. Therefore, it was:

> . . . the sense of Congress that the Federal Government should cooperate with States and their political subdivisions, soil or water conservation districts, and other local public agencies for the purpose of preventing such damages, and of furthering the conservation, development, utilization, and disposal of water and thereby of preserving and protecting the Nation's land and water resources.[11]

Public Law 566 authorizes the Secretary to give technical and financial aid to local organizations in planning and carrying out works of improvement for flood prevention or the conservation, development,

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[9]Donald A. Williams, op. cit., p. 42.

[10]U. S. Department of Agriculture, Office of The General Counsel, Forestry and Lands Division. Legislative History of the Amendments to the Watershed Protection and Flood Prevention Act, Washington, D. C., March, 1957, p. VII.

[11]Ibid., p. VII.

utilization, and disposal of water.[12] This includes conducting necessary surveys, preparing plans and estimates required for adequate engineering evaluation, determining whether benefits exceed cost, cooperating with local organizations, and furnishing financial and other assistance to these organizations, and obtaining the cooperation and assistance of other Federal agencies.

The local organization must pay the cost of easements and rights of way needed for works of improvement and the cost of installing that part of works of improvement not applicable to flood prevention, as well as maintenance cost of the works of improvement. The local organization must also assure the Secretary that landowners or water users have acquired necessary water rights under the state law, obtain agreements from 50 per cent of the landowners of farms above each retention reservoir to be installed with Federal assistance, and submit a satisfactory plan for paying that part which the local organization must pay.

When the Secretary and the local organization agree on a plan for works of improvement, the Secretary determines that the benefits exceed the cost, and the local organization has fulfilled its requirements as explained in the preceding paragraphs, the works of improvement may be started by the local organization with such assistance from the Secretary as he is authorized to give.

The Secretary sends a copy of the watershed plan to the Congress, through the President, if the estimated Federal contribution for construc-

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[12]United States Department of Agriculture, Soil Conservation Service, How To Get Help Under the Watershed Protection and Flood Prevention Act, Washington, D. C., December, 1955, p. 2.

tion cost of works of improvement exceeds $250,000, or contains any structure having a total capacity in excess of twenty-five hundred acre-feet. Any plan that (1) involves an estimated Federal contribution to construction cost in excess of $250,000, (2) includes a structure which has a capacity in excess of twenty-five hundred acre-feet including reclamation or irrigation works, or (3) affects any lands or wildlife under the jurisdiction of the Secretary of Interior must be submitted to the Secretary of the Interior. If it is larger than the size stated above, or the government contributes more than the amount stated above and it includes Federal assistance for floodwater detention structures, it shall be submitted to the Secretary of the Army. If the plans are to be submitted to the Secretary of the Interior or Secretary of the Army, they must be submitted for his views and recommendations at least thirty days prior to sending them to Congress through the President. These views, if received by the Secretary of Agriculture within the thirty days, must accompany the plan to the Congress.

As a basis for the development of coordinated programs, the Secretary is authorized to make investigations and surveys of the watersheds of rivers and other waterways, in cooperation with other Federal, State, and local agencies.[13]

Tennessee Watershed District Act of 1955

Need for the Tennessee Watershed District Act of 1955

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[13] U. S. Department of Agriculture, Office of the General Counsel, op. cit., pp. VII-XI.

The Watershed Protection and Flood Prevention Act (Public Law 566) authorized the Secretary to assist "local organizations" in preparing and carrying out plans for works of improvement upon application of local organizations. The application, however, must be submitted to, and not disapproved by, the State agency having supervisory responsibility over programs provided for in the Act. The Act also provided that the State or local agency must have "authority under State law to carry out, maintain and operate the works of improvement." The States, therefore, were required to establish legal criteria for the creation of local organizations in order to secure aid under Public Law 566. The Tennessee Watershed District Act of 1955 established these criteria.

Synopsis of the Tennessee Watershed District Act of 1955

The stated purpose of the Act is to enable the landowners of a watershed area to organize themselves into a legally authorized and responsible body, known as a "Watershed District," for carrying out and maintaining works of improvement. These works of improvement may be for flood prevention, erosion control, drainage, irrigation or other benefits of soil and water conservation. It is also to grant the power of eminent domain to the watershed district; authorize counties, cities, and towns to appropriate funds and levy taxes for the purposes of the act; authorize the issuance of bonds and the borrowing of money; and provide revenues for the purposes of the act.

To organize a watershed district at least 20 per cent of the landowners, representing at least 25 per cent of the acreage within the district, must sign a petition to be filed in the office of the Secretary of

State. Among other things this petition must state the name of the district, a description of the area, a map of the area, a statement of purpose for which the district is to be organized, and the names and addresses of the temporary board of directors.

If the Secretary of State determines that the petition is sufficient to meet the requirements of the act, he so notifies the acting chairman of the temporary board of directors. The acting chairman then must call a meeting of the temporary board to elect a president, a vice-president, a secretary, and a treasurer. The board must also call, by resolution, an election to let voters of the watershed district decide if they wish to organize a watershed district in accordance with the petition. A notice of the election must be published for three consecutive weeks in a local newspaper of each county of the watershed.

The results of the election must be filed with the County Court Clerk of each county where an election was held and with the Secretary of State.

A majority of the landowners voting in the election determines whether a district is to be organized and created. If a majority of those voting votes to proceed with the creation of the watershed district, a charter is issued the district by the Secretary of State. If a majority votes against the creation of the district, another application cannot be considered by the Secretary of State within eighteen months. To pay costs of the election or other necessary expenses the board may receive contributions from individuals, counties, cities, and towns located within the district. The governing bodies of the towns,

cities, and counties are empowered to appropriate the funds for contributions to the district if they so desire.

Each incorporated watershed district is a body politic and corporate. Among its powers are the following:

1. To adopt a seal.
2. To sue and be sued.
3. To purchase, hold, and sell land and personal property.
4. To conserve soil and water and retard floods.
5. To contract for the construction of works of improvement.
6. To employ professional help.
7. To construct, repair, improve, and maintain works of improvement.
8. To acquire personal property by gift or purchase.
9. To acquire land and water rights by gift, purchase, or eminent domain.
10. To issue bonds and incur indebtedness.
11. To cooperate and contract with any person, firm, corporation, government, or agency.
12. To extend district boundary lines in accordance with prescribed procedure.
13. To select a place to serve as the home office of the district.
14. To exercise all powers and to receive all benefits of Public Law 566.
15. To exercise all powers of section 4216-4406 of the Code of Tennessee.
16. To receive contributions or grants.

17. To acquire water rights and sell water for irrigation and other purposes.
18. To provide recreational facilities.
19. To lease district-owned land.
20. To contract for all material necessary for operation of the district.
21. To expend funds for any purpose set forth in the Act.
22. To take such steps as deemed necessary for the protection of public health.
23. To take such steps as deemed necessary for fire prevention.
24. To make all needed rules and regulations.
25. To do all other things necessary for the protection of the land and water in the district.

After the watershed district is incorporated, the board will have a study made to establish the boundaries of the area that can be served by the district to the best advantage. If it is found that the district should be enlarged or diminished, a petition must be filed with the Secretary of State and the same steps taken as when creating the district up to and including the voting.

All powers of the Act are exercised by a board of directors which is composed of five to nine members. They serve a term of six years, but must have staggered terms. Each county with at least fifteen landowners within the district is entitled to at least one director. Board members receive no salary, but are allowed actual expenses incurred in the performance of their duties. The local organization pays these expenses.

Within thirty days after the permanent boundaries of the district are established an election must be held to select a board of directors to replace the temporary board of directors. A notice of this election must be published at least ten days before the date of election. The election must be by secret ballot.

The meetings of the board of directors, which are held quarterly or more often if called by the president, must be open to the public.

Before any works of improvement may be started by the watershed district, a complete plan or program of the works of improvement must be filed with the County Court in the county where most of the land is located. The Court will then proceed with a public hearing after all affected landowners are notified and a notice of the meeting has been published in a local newspaper at least ten days prior to the first meeting. At the hearing the Court will hear proof and determine by decree:

(1) The soundness and economic feasibility of the proposed plan or project.

(2) The probable cost of the project.

(3) The benefits to be derived.

(4) What parts of the district are benefited.

(5) The recommended method of financing the cost of the project. Any landowner has the right to appeal any of the above decisions.

If bonds are to be issued to pay the cost of the proposed improvements, the Court may authorize their issuance in accordance with the Revenue Bond Law, but the date of maturity must be within twenty years.

If funds for improvement are to be raised by special assessment

on land to be benefited, the Court shall appoint three commissioners who will make a study of the proposed improvements and the cost of the improvements. They shall then determine the amount of land to be benefited. The commissioners' decisions must be filed with the Court.

The Court then shall call a public hearing in the same manner as the former hearing where each landowner may be heard if he does not agree with the Commissioners' report. The Court then shall consider the Commissioners' report and exceptions or objections given by landowners. The Court may then reject or accept the report of the Commissioners, with or without modifications. If the Court accepts and ratifies the Commissioners' report with or without modifications, it will then levy a tax on land to be benefited in accordance with the amount it is benefited. In no case, however, shall a tract of land be assessed for benefits in excess of 25 per cent of its assessed valuation for county taxation purposes. Any landowner may then appeal the Court's decision.

When the assessments have been made, the Court shall make an assessment list for the county trustee who shall make collections and quarterly settlements with the treasurer of the watershed district. If the payments become delinquent, Sections 4352-4364 of the Code of Tennessee shall be applied.

The district may also be financed by an ad valorem tax levied by the General Assembly of the State of Tennessee upon all the lands in the district. These taxes would be collected by the county trustee at the same time that county taxes are collected.

The treasurer of the district shall be bonded and the records and

finances audited annually by the Comptroller of the Treasury of the State of Tennessee.

The Board of Directors, its representatives and employees, may enter upon any private lands in connection with any work or proposed work of the district. However, the district shall be liable for any damages caused by such entry.

It is the duty of the Board of Directors to see that all projects constructed and operated by the district are maintained. In case they do not the Court may order them to do so.

The watershed district may be dissolved as set out in Section 4155, Code of Tennessee, or it shall be dissolved if none of its corporate powers are used in a ten year period of time.

This law supplements all existing drainage district, flood control, irrigation, soil conservation, and related laws. If any of it is declared unconstitutional, the remainder shall continue in full force.

The law became effective March 8, 1955.[14]

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[14]J. I. Bell, Watershed District Act of 1955, Public Chapter No. 112, House Bill No. 708, Public Acts of 1955, pp. 3-15.

CHAPTER III

THE UNIVERSE

The universe for the sample consists of three watershed districts, viz., Swan Creek, Johnson Creek and White Oak. A description of each facilitates an understanding of the study, and assists in explaining why landowners of the three watershed districts have different opinions toward their respective watershed districts.

Swan Creek Watershed District

Location and History of Swan Creek Watershed District

Swan Creek Watershed District is located in Lincoln and Marshall Counties, Tennessee; the major portion is in Lincoln County. These counties are situated in southern Middle Tennessee. Swan Creek which drains the area flows into the South Forked Deer River.

The first organizational meeting was held in Swan Creek Watershed District November 10, 1954. After much discussion at various locations in the watershed district, an election was held March 2, 1957 to determine whether the board of directors should proceed with the creation of a watershed district. The two voting places were Delina in Marshall County and Boonshill in Lincoln County. At Delina four landowners voted for the board of directors to proceed with the creation of the watershed district and 109 landowners voted for them not to proceed. At Boonshill eighty landowners voted for the board of directors to proceed with the creation of the watershed district and six voted not to proceed. This

made a total of 115 landowners voting against the Watershed District, and eighty-four for it. Thus, it was "voted down."[1]

Characteristics of Swan Creek Watershed District and Its Landowners

Swan Creek Watershed District encompasses an area of thirty-two thousand acres.[2] The average size of the farms in this area in 1950 was 111 acres. Approximately 51 per cent of the total land in farms, or an average of 28.4 acres per farm, is cropland. A general type of farming is practiced.[3] (See Figure 1.)

Mimosa and Ashwood soils, which occupy rolling to hilly slopes, comprise about 45 per cent of the watershed area. Other major soils include the frequently overflowed Huntington, Linside, Egam and Dunning, the well-drained upland soils which include Maury, Braxton, Hampshire, Culleoka, and Inman soils, and the steep, irregular shale, chert or limestone soils such as Bodine, Frankstown, Dellrose, and Mimosa.[4]

The soil association map and a narrative description of the soil associations are shown in Appendix B.

There is an average growing season of 198 days in the district.

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[1]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, United States Department of Agriculture, Soil Conservation Service, to Joseph E. Winsett, dated November 13, 1957.

[2]Roy McPeak, talk made before Soil Conservation District Supervisors at Gatlinburg, Tennessee, November 7, 1957.

[3]United States Bureau of the Census, U. S. Census of Agriculture, Minor Civil District Division Data (Washington, D. C.: U. S. Government Printing Office, 1950).

[4]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, United States Department of Agriculture, Soil Conservation Service, to Joseph E. Winsett, dated December 2, 1957.

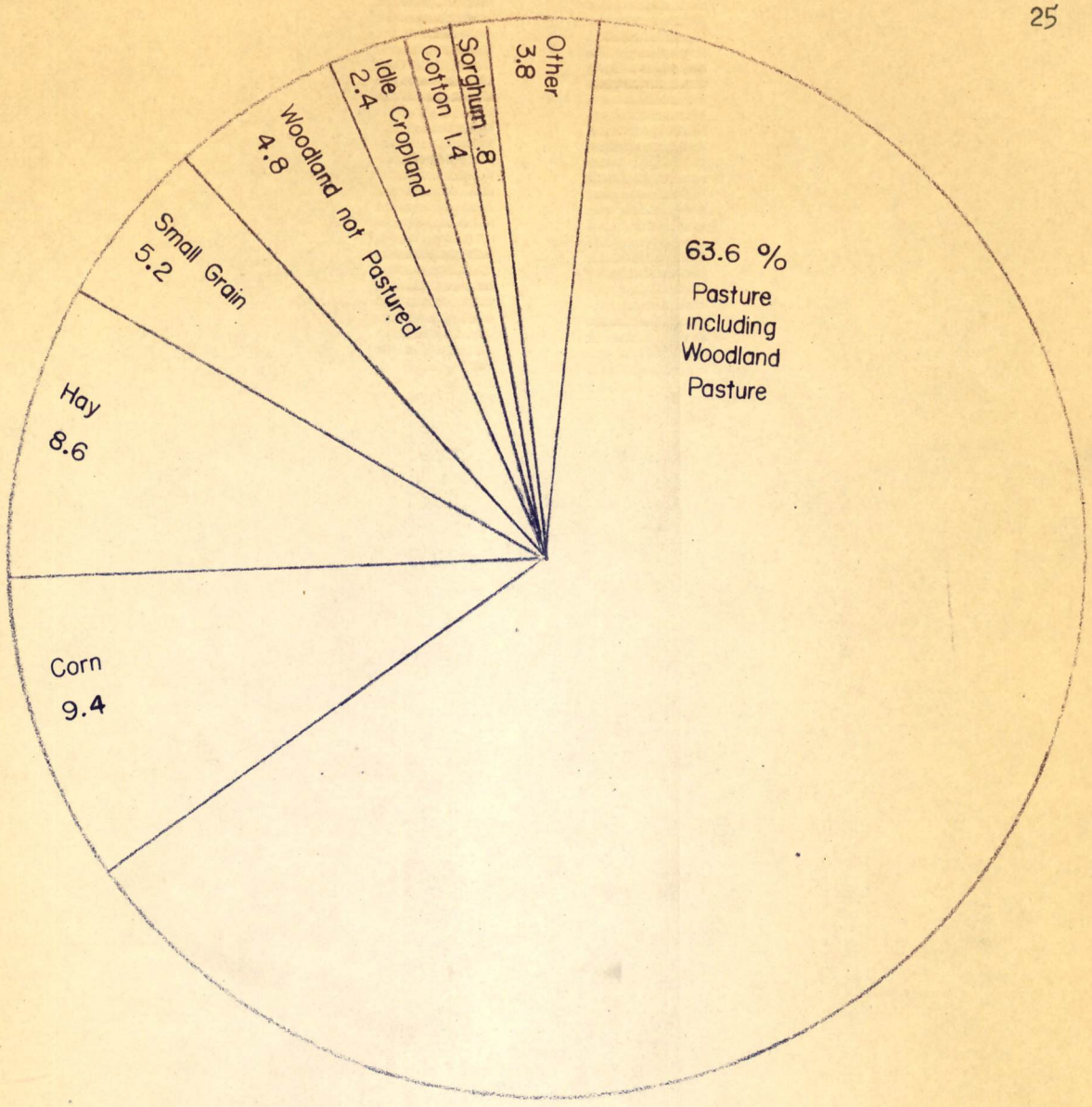

Figure 1. Per cent of land used for selected crops in Swan Creek Watershed District, 1954.

The temperatures have ranged from a low of -17° F. to a high of 107° F. with an annual average of 59.3° F.

The average annual precipitation is 51.39 inches and the most damaging rainfall tends to fall in the winter and early spring months.[5]

The average age of landowners interviewed in the watershed was fifty. According to census data, colored landowners comprise 6.6 per cent of the population.[6]

Johnson Creek Watershed District

Location and History of Johnson Creek Watershed District

Johnson Creek Watershed District is situated in Madison County, West Tennessee. Johnson Creek, which drains the area, flows into the South Fork, Forked Deer River.

The first organizational, or informational, meeting in the district was held in June, 1954. After a series of these meetings, the local landowners voted to form the watershed district August 30, 1955, by a vote of eighty-five to eight. The charter was duly issued to the local organization September 9, 1955. The permanent board of directors were then elected December 9, 1955.[7]

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[5]United States Department of Commerce, Climatic Summary of the United States - Supplement for 1931 Through 1952, Serial Number 11-35. (Washington: Government Printing Office), pp. 11, 13.

[6]United States Bureau of The Census, op. cit.

[7]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, United States Department of Agriculture, Soil Conservation Service, to Joseph E. Winsett, dated January 3, 1958.

Characteristics of Johnson Creek Watershed District and Its Landowners

The average size of farms in this area of twenty-two thousand, six-hundred and ten acres is 77.2 acres.[8] The average amount of cropland per farm is 49.4 acres or 64 per cent of the total. A general type farming is predominant. (See Figure 2.)

The predominant soil association in the area is the Lexington-Ruston series. They are sandy soils, low in fertility and dotted with numerous gullies. From this soil association comes most of the sand which is being deposited on the low-lying, productive Hyman, Ina and Beechy soils.

The "fragipan", gently sloping Grenada and Freeland soils probably should only be used for crops which will tolerate restricted drainage. The remaining soil association of the area, Memphis-Loring-Lexington, is composed of silty, deep, well-drained, fertile soils which are capable of producing high yields.[9] A soil association map and a description of the soil associations are shown in Appendix B.

The average annual precipitation in the area is 53.41 inches. The temperature has ranged from a monthly average high of 90.6° F. to a monthly minimum mean of -31.4° F. with the yearly average being 60.2° F. There is an average growing season of 198 days between the frost-free dates of April 10 and October 25.[10]

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[8]Roy McPeak, op. cit.

[9]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, United States Department of Agriculture, Soil Conservation Service, to Joseph E. Winsett, dated November 13, 1957.

[10]United States Department of Commerce, op. cit., pp. 11, 13.

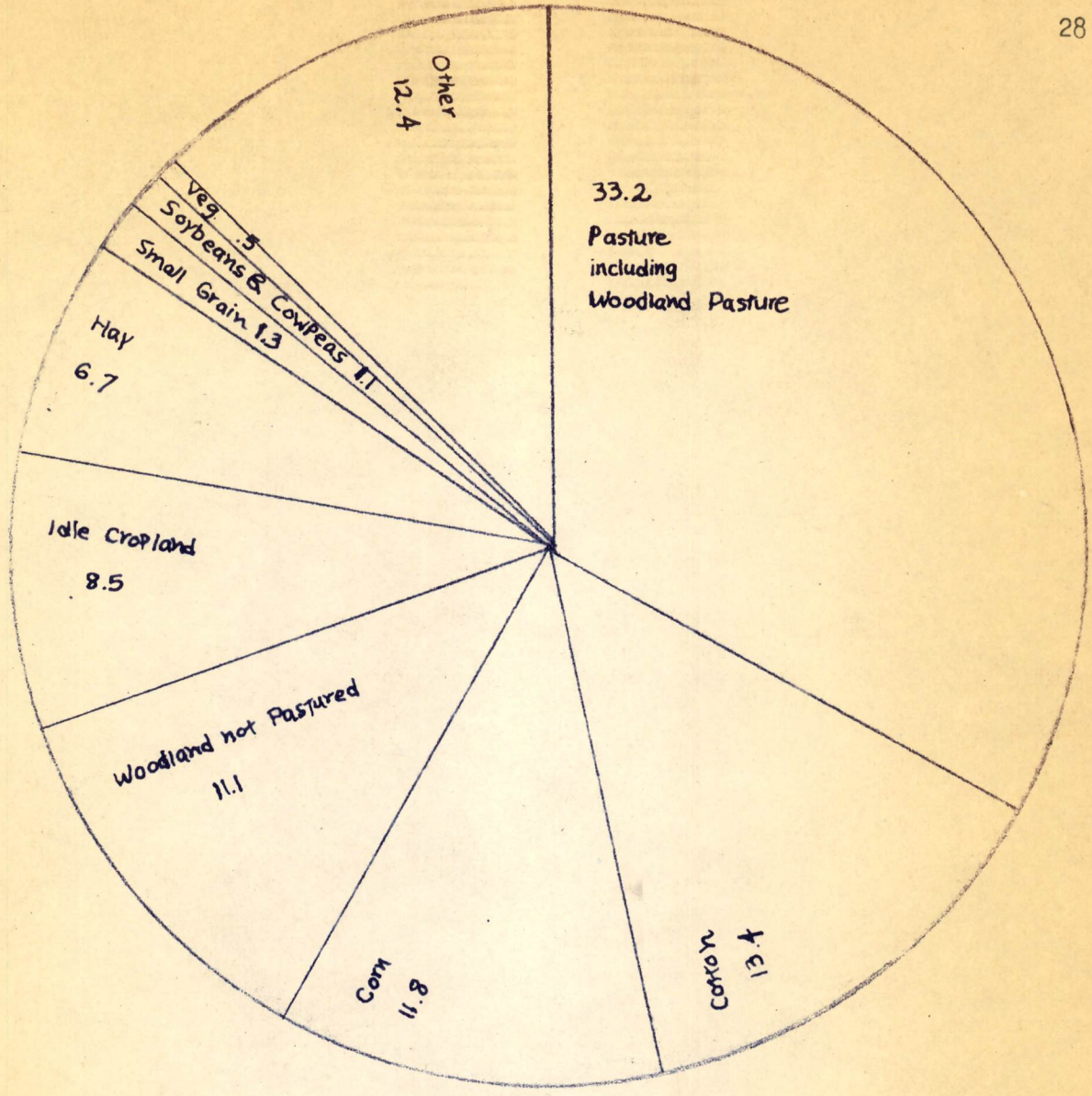

Figure 2. Per cent of land used for selected crops in Johnson Creek Watershed District, 1954.

The average age of landowners in Johnson Creek Watershed District is forty-seven, and the average education level of the male landowners is the fourth grade.[11] Colored landowners constitute 53.3 per cent of the total.[12]

White Oak Watershed District

Location and History of White Oak Watershed District

White Oak Watershed District is situated in Henderson, Hardin, McNairy and Chester Counties, which are in West Tennessee. Milledgeville, which is located in McNairy County a short distance from where the four counties join, is approximately in the center of the district. The area is drained by the White Oak Creek Canal and its many tributaries. They, in turn, drain into the Kentucky Reservoir (U. S. - T. V. A.), and finally into the Tennessee River.

The first meeting which was called to discuss the possibility of forming a watershed district in White Oak Watershed was held prior to May 1, 1954. The election to determine whether the board of directors would proceed with the creation of the district was held August 2, 1956. There were eight polling places, and the votes at each were as follows: Milledgeville 103 to 13 for, Enville 55 to 51 for, Rocky Knob 53 to 17 against, Center Point 69 to 18 against, Sardis 30 to 21 for, Morris Chapel 113 to 2 for, St. Paul 13 to 0 for, and Hurrican 97 to 36 for the board

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[11]Clarence L. Daniels, Work Unit Conservationist, Soil Conservation Service, Jackson, Tennessee, personal interview, June, 1957.

[12]United States Bureau of the Census, op. cit.

of directors to proceed with the creation of the watershed district. This gave a total of 447 for and 245 against proceeding with the creation of the watershed district.

The election to elect the permanent board of directors was held October 6, 1956.[13] However, the majority of the board that was elected does not feel that further work on watershed projects would be in the best interest of the landowners of the watershed district at this time. Therefore, there is now no action being taken by the board of directors.

Characteristics of White Oak Watershed District and Its Landowners

White Oak Watershed District is the largest of the three districts studied, with an area of one hundred twenty-five thousand acres.[14] The average size of farms is 103 acres with an average of 46.4 acres of cropland per farm. There is a general type farming being practiced. (See Figure 3.)

A wide variety of soils exists in the area. They include the shallow, silty, sloping soils with underlying sands and sandy clays such as Lexington and Ruston; the coastal plain clays such as Shubuta and Cuthbert on the steeper slopes; high terrace silt, sand and clay soils such as Etowah and Paden; and the riverbottom Wolftever and Taft. Most of the bottom soils are poorly drained and flooding is common on many of these.[15] The soil association map and a narrative description of the

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[13] Information received from Mr. H. N. Estes, op. cit.

[14] Roy McPeak, op. cit.

[15] Letter from H. N. Estes, op. cit.

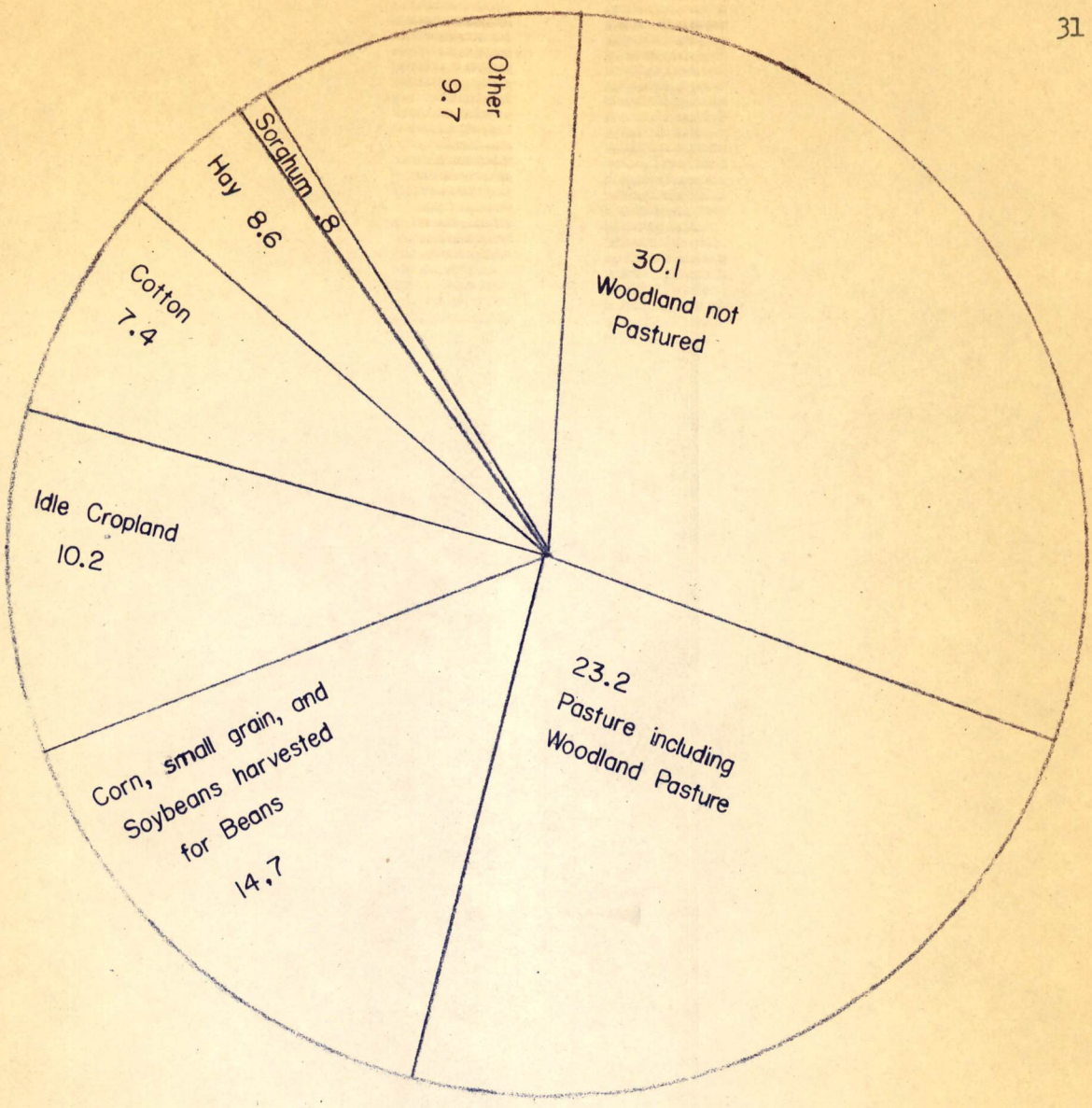

Figure 3. Per cent of land used for selected crops in White Oak Watershed District, 1954.

soil association are given in Appendix B.

The average annual precipitation in the district is 55.3 inches. The rainfall which causes the most flooding occurs in the winter and early spring months. The average annual temperature has been 61.3, ranging from a low of -12° F. to a high of 112° F. The average frost-free period has been from April 10 to October 25, thus giving an average growing season of 200 days.[16]

The average age of landowners interviewed in White Oak Watershed District was fifty-five. According to census data, 5.4 per cent of the landowners are colored.[17]

Summary

Being situated relatively close together, the climates of the three watershed districts are not significantly different. Thus, the climatic factors which help to determine the type of farming in each are similar. Each watershed district falls in the general farming category.

The greatest amount of rainfall tends to fall in the winter and early spring months. Since winter crops are not prevalent in a majority of the watershed areas, some of the landowners do not consider overflowing damaging. However, others consider themselves damaged by infertile sand and silt deposits left by the overflows.

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[16]United States Department of Commerce, op. cit.

[17]Ibid.

Colored landowners comprise 6.6 per cent, 56.3 per cent, and 5.4 per cent of the landowners of Swan Creek, Johnson Creek, and White Oak Watershed Districts respectively.

CHAPTER IV

FACTORS AFFECTING LANDOWNERS' ATTITUDES TOWARD THE WATERSHED PROJECT

The questionnaire was designed to determine whether each landowner interviewed had a positive, neutral, or negative attitude[1] toward the watershed district in which he owned land. An effort was made to determine the relationship which existed between his attitude toward the watershed district and his: (1) knowledge of the district, (2) attitude toward government agencies, (3) attitude toward local watershed leaders, (4) damage from the creeks, (5) attitude toward building dams, (6) opinion about having to help pay for the district, and (7) belief as to any of his land being flooded because of the district.

Knowledge of the Watershed District

Local watershed district leaders and government agency personnel have expressed the opinion that landowners would not be in favor of forming a watershed district unless they were well versed on the subject. Preliminary informal studies made in the three watershed districts did not tend to substantiate these opinions. Therefore, a series of questions was designed to determine the landowners' levels of knowledge concerning their watershed district or proposed watershed district

Some of the questions which were designed to determine levels of knowledge about the watershed district also provided information about

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[1] See definitions, Appendix A.

related problems. For example, if a landowner thought "the farmers above the dams must treat their land exactly like the Soil Conservation Service says," this would indicate a lack of knowledge about the Soil Conservation Service, as well as contributing to a negative attitude toward the watershed district.

Construction of the Knowledge Index

A questionnaire consisting of twenty-two questions was constructed to appraise the landowners' level of knowledge concerning:

(1) The organizational procedures involved.

(2) Who will pay (a) construction cost of works of improvement, (b) the maintenance cost of works of improvement, and (c) for easements and right-of-ways.

(3) Who selects the measures to be adopted and determines their location.

(4) The specific improvement measures that have been considered and/or adopted.

Questions were selected after consultations with landowners of the watershed districts and professional workers associated with it. The questionnaire was then tested by interviewing twenty farmers in Swan Creek Watershed District. This was done mainly to determine the form of questions to be used and the extent to which the landowners could understand the questions.

The questionnaire was then revised to include twenty-one questions. The revised questionnaire included approximately the same questions as the original, with rewording being the major change.

Correct answers to the questions were determined by reference to the watershed district laws and watershed district records. If a landowner gave a correct answer, but also included an incorrect answer he was given one-half credit for the question. For example, landowners were asked, "Who pays for easements and right-of-ways?" If the landowner being interviewed said, "landowners benefited," and "the federal government," he was given one-half credit, since the federal government does not help pay for easements and right-of-ways. The knowledge index for each landowner was the number of correct answers he gave. Therefore the index range was from zero to twenty-one.

Swan Creek Watershed District

Landowners in Swan Creek Watershed District favoring the district had a better understanding of the watershed district program than did those who expressed attitudes unfavorable toward the district. However, the difference was not significant at the 50 per cent level. No landowner expressed a neutral attitude toward the watershed district. Questions most often missed by landowners can be determined from Table III.

Johnson Creek Watershed District

The average knowledge index of landowners in Johnson Creek Watershed District was 6.52. The average knowledge index for those favoring the watershed was 2.22 more than it was for those with neutral attitudes toward the district, but 3.35 less than it was for those who expressed opposition to the Watershed Project. However, there were only four in the latter group. There was a significant difference between each pair of attitude groups as shown in Table II. Because of the extremely small

TABLE I

AVERAGE KNOWLEDGE INDEXES AND NUMBER OF LANDOWNERS INTERVIEWED IN THREE SELECTED WATERSHED DISTRICTS IN TENNESSEE

Attitude Toward Watershed	Swan Creek		Johnson Creek		White Oak	
	Average Knowledge Index	Number Interviewed	Average Knowledge Index	Number Interviewed	Average Knowledge Index	Number Interviewed
Positive[a]	9.32	25	6.66	38	10.91	47
Neutral[a]			4.44	9	7.95	11
Negative[a]	9.04	26	9.87	4	7.83	24
Total	9.18	51	6.52	51	9.61	82

[a]See definitions, Appendix A.

TABLE II

SIGNIFICANCE OF DIFFERENCES IN LANDOWNERS' AVERAGE KNOWLEDGE INDEXES IN THREE SELECTED WATERSHED DISTRICTS OF TENNESSEE

Watershed District	Attitudes Toward Watershed[a]	Level of Significance	Type of Test
White Oak	Positive, Neutral, Negative	97.5%	f
White Oak	Positive, Neutral	90 %	t
White Oak	Positive, Negative	99 %	t
White Oak	Neutral, Negative	Negligible[b]	t
Johnson Creek	Positive, Neutral Negative	90 %	f
Johnson Creek	Positive, Neutral	80 %	t
Johnson Creek	Positive, Negative	80 %	t
Johnson Creek	Neutral, Negative	99 %	t
Swan Creek	Positive, Negative	Negligible[b]	t

[a]Significance of differences is between, or among, the landowners having attitudes given in column two.

[b]Below 50 per cent.

number of persons expressing an attitude unfavorable to the watershed district, no meaningful comparisons within the district can be made. The per cent of landowners giving correct answers to individual questions is shown in Table IV.

White Oak Watershed District

The average knowledge index for all landowners interviewed in the White Oak Watershed District was 9.61. The average knowledge index for those favoring the district was 2.96 more than for those neutral, or refusing to express an attitude toward the watershed, and 3.08 more than it was for those who were not in favor of it. There was a significant difference in the average knowledge index of those favoring the watershed and the other landowners as it is shown in Table II. Although those favoring the watershed tended to have a better knowledge of the watershed as measured by the knowledge index, it cannot be determined whether these landowners were in favor of the watershed because of their better knowledge, or whether they made a greater effort to gain knowledge about the watershed because of their greater interest in the success of the program.

Of the landowners who were not in favor of the district, two-thirds either (1) expressed the opinion that, if a watershed program is initiated, farmers above the dams must treat their land exactly as the Soil Conservation Service dictates, and that the contract between the landowner and the Soil Conservation Service was legally binding, or (2) claimed not to know whether the contract was binding. Also, only one of those not in favor of the watershed knew what determined the limit

as to the amount a farmer might be taxed, and only one-third or less of those interviewed said that the final decision as to the number and location of dams was made by the board of directors of the watershed. Most of them expressed the opinion that the entire decision was made by the Federal Government. These provisions which were believed to exist in the watershed program were among those most disliked by the landowners. The per cent of landowners missing other questions, which were asked, is shown in Table V.

Summary

Of the three watershed districts included in the study, landowners in the White Oak and Swan Creek Watershed Districts rated higher on the knowledge scale than did the landowners in the Johnson Creek Watershed District. Also, the Johnson Creek Watershed District was the only one of the three which seemed to be making any progress at the time of the survey. This fact would tend to discredit the hypothesis that landowners would not be in favor of forming a watershed district and/or carrying out the program unless they were well informed on the subject. However, in both the Swan Creek and White Oak Districts the landowners who had the best knowledge of the district favored it. Although the landowners who opposed the district in the Johnson Creek Watershed District possessed a better understanding of it than did the others of that district, there were only four opposing the district.

Practically none of the landowners in Johnson Creek Watershed District felt that any information had been intentionally withheld from them. They tended to blame only themselves for any lack of information

they had. One familiar comment heard was "they (the government agencies and local leaders) have always helped us, and I believe they will work this thing (watershed program) out to the good of everybody concerned."

This was not true in Swan Creek or White Oak Watershed. The landowners in those watersheds indicated that they thought governmental agencies and local leaders were withholding information. The writer is not making the inference that information was withheld, but merely stating the opinions of some of those interviewed.

As stated in the previous chapter the average education of the male landowners in Johnson Creek Watershed District was the fourth grade. Since they expressed a high degree of confidence in the watershed leaders, and many were unable to read and interpret the watershed information, it seemed to the writer that trust in leadership was more important to them than an understanding of the program.

In Tables III, IV, and V the percent of landowners in each watershed district that answered individual questions correctly is shown. Table VI is a composite of all three watershed districts.

Landowners' Attitudes Toward Government Agencies

Since close cooperation between local watershed districts and government agencies is required in a watershed program, one might hypothesize that the landowners' attitudes toward the watershed district would be affected by their attitudes toward these agencies. To test this hypothesis the relationship between landowners' attitudes toward the watershed district and their attitude toward the Soil Conservation

TABLE III

PER CENT OF LANDOWNERS INTERVIEWED IN SWAN CREEK WATERSHED DISTRICT GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX, BY ATTITUDES TOWARD THE WATERSHED DISTRICT

Questions	Attitude Toward Watershed District			
	Positive		Negative	
	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank
Can land needed for right of ways be condemned?	52.0	7[a]	61.5	4
If yes, who exercises right of condemnation?	28.0	15[a]	38.5	10[a]
What is the main purpose of the watershed district?	96.0	1	92.3	1
Who makes the final decision as to the number of dams?	24.0	17[a]	38.5	10[a]
How is the permanent board of directors selected?	60.0	5[a]	57.7	5[a]
Who determines if there will be dams?	20.0	19[a]	11.5	21
Who determines the location of dams?	52.0	7[a]	30.8	15[a]
Does the board of directors receive a salary?	16.0	21	19.2	18[a]
Who may attend board of directors' meetings?	52.0	7[a]	42.3	9
Who pays construction cost of dams?	68.0	3	57.7	5[a]
Who pays for easements and right of ways?	32.0	13[a]	30.8	15[a]
What may a landowner do if he doesn't like the price offered for his flooded land?	48.0	10	46.2	8
Who pays the upkeep cost of dams?	40.0	11	30.8	15[a]
Are local people required to pay any of the cost of the watershed district?	80.0	2	84.6	2
Who determines how money to pay local cost will be raised?	32.0	13[a]	50.0	7
For how long a period of time may the district borrow money?	24.0	17[a]	19.2	18[a]

- Continued

TABLE III (continued)

PER CENT OF LANDOWNERS INTERVIEWED IN SWAN CREEK WATERSHED DISTRICT GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX, BY ATTITUDES TOWARD THE WATERSHED DISTRICT

Questions	Attitude Toward Watershed District			
	Positive		Negative	
	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank
What is the lawful limit a landowner may be taxed?	20.0	19[a]	34.6	12[a]
Was it ever determined how many dams will (or would have been) built?	60.0	5[a]	69.2	3
How many landowners above the dam must agree to apply soil and water conservation measures?	28.0	15[a]	19.2	18[a]
Must landowners above the dam treat their land exactly like the Soil Conservation Service says?	36.0	12	34.6	12[a]
Is an agreement between the landowner and Soil Conservation Service legally binding?	64.0	4	34.6	12[a]

[a]Ranks equally with one or more questions.

TABLE IV

PER CENT OF LANDOWNERS INTERVIEWED IN JOHNSON CREEK WATERSHED DISTRICT GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX, BY ATTITUDES TOWARD THE WATERSHED DISTRICT

Questions	Attitude Toward Watershed District					
	Positive		Neutral		Negative	
	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank
Can land needed for right of ways be condemned?	50.0	6	33.3	5	100.0	1[a]
If yes, who exercises right of condemnation?	13.2	17	0		50.0	9[a]
What is the main purpose of the watershed district?	100.0	1	100.0	1	100.0	1[a]
Who makes the final decision as to the number of dams?	15.8	15[a]	11.1	8[a]	0	
How is the permanent board of directors selected?	55.3	3	22.2	6[a]	75.0	6[a]
Who determines if there will be dams?	5.3	19[a]	11.1	8[a]	0	
Who determines the location of dams?	21.1	12	0		50.0	9[a]
Does the board of directors receive a salary?	31.6	9	0		25.0	14
Who may attend board of directors' meetings?	42.1	8	0		50.0	9[a]
Who pays construction cost of dams?	60.5	2	77.8	2	0	
Who pays for easements and right of ways?	19.7	13	0		62.5	8
What may a landowner do if he doesn't like the price offered for his flooded land?	26.3	10	0		75.0	6[a]
Who pays the upkeep cost of dams?	22.4	11	11.1	8[a]	0	
Are local people required to pay any of the cost of the watershed district?	44.7	7	66.7	3[a]	100.0	1[a]
Who determines how money to pay local cost will be raised?	18.4	14	22.2	6[a]	0	
For how long a period of time may the district borrow money?	2.6	21	0		0	

-Continued

TABLE IV (continued)

PER CENT OF LANDOWNERS INTERVIEWED IN JOHNSON CREEK WATERSHED DISTRICT GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX, BY ATTITUDES TOWARD THE WATERSHED DISTRICT

Questions	Attitude Toward Watershed District					
	Positive		Neutral		Negative	
	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank
What is the lawful limit a landowner may be taxed?	5.3	19[a]	0		50.0	9[a]
Was it ever determined how many dams will (or would have been) built?	15.8	15[a]	0		0	
How many landowners above the dam must agree to apply soil and water conservation measures?	10.5	18	11.1	8[a]	50.0	9[a]
Must landowners above the dam treat their land exactly like the Soil Conservation Service says?	52.6	4[a]	11.1	8[a]	100.0	1[a]
Is an agreement between the landowner and Soil Conservation Service legally binding?	52.6	4[a]	66.7	3[a]	100.0	1[a]

[a]Ranks equally with one or more questions.

TABLE V

PER CENT OF LANDOWNERS INTERVIEWED IN WHITE OAK WATERSHED DISTRICT GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX, BY ATTITUDES TOWARD THE WATERSHED DISTRICT

Questions	Attitude Toward Watershed District					
	Positive		Neutral		Negative	
	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank
Can land needed for right of ways be condemned?	48.9	11	36.4	8[a]	50.0	6
If yes, who exercises right of condemnation?	27.7	17[a]	27.3	10[a]	29.2	9[a]
What is the main purpose of the watershed district?	100.0	1	90.9	1[a]	95.8	1
Who makes the final decision as to the number of dams?	52.1	10	18.2	12[a]	25.0	13[a]
How is the permanent board of directors selected?	87.2	3	90.9	1[a]	91.7	2
Who determines if there will be dams?	4.3	21	9.1	15[a]	12.5	18[a]
Who determines the location of dams?	39.4	14	27.3	10[a]	16.7	17
Does the board of directors receive a salary?	27.7	17[a]	9.1	15[a]	37.5	7
Who may attend board of directors' meetings?	55.3	9	36.4	8[a]	62.5	4
Who pays construction cost of dams?	81.9	5	68.2	7	52.1	5
Who pays for easements and right of ways?	37.2	15	9.1	15[a]	25.0	13[a]
What may a landowner do if he doesn't like the price offered for his flooded land?	40.4	13	9.1	15[a]	25.0	13[a]
Who pays the upkeep cost of dams?	57.4	8	18.2	12[a]	22.9	13[a]
Are local people required to pay any of the cost of the watershed district?	91.5	2	81.8	3[a]	87.5	3
Who determines how money to pay local cost will be raised?	29.8	16	18.2	12[a]	29.2	9[a]
For how long a period of time may the district borrow money?	17.0	19	0		12.5	18[a]

-Continued

TABLE V (continued)

PER CENT OF LANDOWNERS INTERVIEWED IN WHITE OAK WATERSHED DISTRICT GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX, BY ATTITUDES TOWARD THE WATERSHED DISTRICT

Questions	Attitude Toward Watershed District					
	Positive		Neutral		Negative	
	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank	Per Cent Answered Correctly	Rank
What is the lawful limit a landowner may be taxed?	46.8	12	9.1	15[a]	4.2	21
Was it ever determined how many dams will (or would have been) built?	80.9	6	72.7	5[a]	29.2	9[a]
How many landowners above the dam must agree to apply soil and water conservation measures?	10.6	20	9.1	15[a]	12.5	18[a]
Must landowners above the dam treat their land exactly like the Soil Conservation Service says?	83.0	4	72.7	5[a]	33.3	8
Is an agreement between the landowner and Soil Conservation Service legally binding?	72.3	7	81.8	3[a]	29.2	9[a]

[a]Ranks equally with one or more questions.

TABLE VI

PER CENT OF ALL LANDOWNERS INTERVIEWED IN THREE SELECTED WATERSHED DISTRICTS GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX

Questions	Watershed District					
	Swan Creek		Johnson Creek		White Oak	
	Per Cent Answers Correct	Rank	Per Cent Answers Correct	Rank	Per Cent Answers Correct	Rank
Can land needed for right of ways be condemned?	56.9	6	51.0	5[a]	47.6	9
If yes, who exercises right of condemnation?	52.9	7	13.7	15[a]	28.0	16[a]
What is the main purpose of the watershed district?	94.1	1	100.0	1	97.6	1
Who makes the final decision as to the number of dams?	31.4	15[a]	13.7	15[a]	39.6	11
How is the permanent board of directors selected?	58.8	5	51.0	5[a]	89.0	2
Who determines if there will be dams?	15.7	21	5.9	20	7.3	21
Who determines the location of dams?	41.2	11[a]	19.6	11	31.1	13
Does the board of directors receive a salary?	17.6	20	25.5	9[a]	28.0	16[a]
Who may attend board of directors' meetings?	47.1	9[a]	35.3	8	54.9	7
Who pays construction cost of dams?	62.7	4	63.7	2	71.3	4
Who pays for easements and right of ways?	31.4	15[a]	14.7	14[a]	29.9	14
What may a landowner do if he doesn't like the price offered for his flooded land?	47.1	9[a]	25.5	9[a]	31.7	12
Who pays the upkeep cost of dams?	35.3	13[a]	18.6	12	42.1	10
Are local people required to pay any of the cost of the watershed district?	82.4	2	52.9	4	89.0	2
Who determines how money to pay local cost will be raised?	41.2	11[a]	17.6	13	28.0	16[a]
For how long a period of time may the district borrow money?	21.6	19	2.0	21	13.4	19

-Continued

TABLE VI (continued)

PER CENT OF ALL LANDOWNERS INTERVIEWED IN THREE SELECTED WATERSHED DISTRICTS GIVING CORRECT ANSWERS TO QUESTIONS COMPOSING THE KNOWLEDGE INDEX

Questions	Watershed District					
	Swan Creek		Johnson Creek		White Oak	
	Per Cent Answers Correct	Rank	Per Cent Answers Correct	Rank	Per Cent Answers Correct	Rank
What is the lawful limit a landowner may be taxed?	27.5	17	9.8	19	29.3	15
Was it ever determined how many dams will (or would have been) built?	64.7	3	11.8	18	64.6	6
How many landowners above the dam must agree to apply soil and water conservation measures?	23.5	18	13.7	15[a]	11.0	20
Must landowners above the dam treat their land exactly like the Soil Conservation Service says?	35.3	13	49.0	7	67.1	5
Is an agreement between the landowner and Soil Conservation Service legally binding?	49.0	8	58.8	3	48.8	8

[a]Ranks equally with one or more questions.

Service, Extension Service, and Vocational Agriculture Departments was studied.

To aid in explaining relationships those landowners who expressed a positive attitude toward their watershed district will be designated as group I, those who expressed a neutral attitude will be designated as group II, and those who expressed a negative attitude will be designated as group III.

"Two-tailed t" tests were used to determine the significance of differences between two average scores, and "F" tests were used when needed to determine significance of differences among three average scores.

Construction of Index to Measure Landowners' Attitudes Toward Government Agencies

Five questions were designed to measure the landowners' attitudes toward the Soil Conservation Service, Extension Service, and Vocational Agricultural program. To measure the landowners' attitudes toward these agencies, some form of index was required. To construct the index, the list of attitude questions was given to an upper division class of twelve students at the University of Tennessee, the writer, and two members of the University faculty. They were then instructed to determine what attitude they thought a landowner would have that selected any one of the possible answers to the attitude questions. They wrote a number by each possible answer to signify the expected attitude. The attitudes toward the agencies and the signifying numbers to be used were:

4 Strong positive attitude toward the agency

3 Positive attitude toward the agency

2 Neutral attitude toward the agency

1 Negative attitude toward the agency

0 Strong negative attitude toward the agency

The mode, which also turned out to be the median, of the answers given was selected as the scale to be used.

Swan Creek Watershed District

Of the twenty-five landowners in group I, seventeen expressed attitudes toward the Soil Conservation Service, eighteen expressed attitudes toward the Extension Service, and fourteen expressed attitudes toward the Vocational Agriculture Department. Thirteen of the twenty-six landowners in group III expressed attitudes toward the Extension Service and eight expressed attitudes toward the Vocational Agriculture Departments. These attitudes are given in Table VII.

Soil Conservation Service. Landowners in both group I and in group III had positive attitudes toward the Soil Conservation Service. Thus, the difference in the attitude scores, which is .57 and significant at the 95 per cent level, is only one of degree of positive attitude toward the Soil Conservation Service. However, it does indicate a positive relationship between the landowners' attitudes toward the Soil Conservation Service and their attitudes toward the watershed district.

Extension Service. Both groups of landowners also had positive attitudes toward the Extension Service, with those in group I having a higher Extension Service attitude score by .22. This score was signifi-

TABLE VII

AVERAGE ATTITUDES TOWARD GOVERNMENT AGENCIES SCORE OF LANDOWNERS INTERVIEWED IN SWAN CREEK WATERSHED, BY LANDOWNERS' ATTITUDES TOWARD SWAN CREEK WATERSHED DISTRICT

Attitude Toward Watershed	Attitude Code Number	Average-Attitude-Toward-Soil-Conservation-Service Score	Average-Attitude-Toward-Extension-Service Score	Average-Attitude-Toward-Vocational-Agriculture Score
Positive	I	3.15	3.02	3.14
Negative	III	2.58	2.80	2.94

cant at the 60 per cent level and indicated that a relationship exists between landowners' attitudes toward the watershed district and their attitude toward the Extension Service.

Vocational Agriculture Department. The landowners in group I and those in group III did not differ significantly, even at the 50 per cent level, in their attitudes toward the Vocational Agriculture Departments.

Summary. The findings in Swan Creek Watershed tended to substantiate the hypothesis that the landowners' attitudes toward the watershed district would be affected by their attitudes toward government agencies. Since the Soil Conservation Service was more active in the watershed movement than the other agencies, there was a greater correlation between the landowners' attitudes toward the Soil Conservation Service and their attitudes toward the watershed than for the other agencies.

Johnson Creek Watershed District

Thirty-one of the landowners in group I expressed attitudes toward the Soil Conservation Service, twenty-nine expressed attitudes toward the Extension Service, and thirteen expressed attitudes toward Vocational Agriculture. Three of the nine landowners in group II expressed attitudes toward the Soil Conservation Service, four expressed attitudes toward the Extension Service and none expressed attitudes toward Vocational Agriculture. There were three in group III who expressed attitudes toward the Soil Conservation Service and Extension Service, but none of them expressed attitudes toward Vocational Agriculture.

The average scores are given in Table VIII.

TABLE VIII

AVERAGE ATTITUDES TOWARD GOVERNMENT AGENCIES SCORE OF LANDOWNERS INTERVIEWED IN JOHNSON CREEK WATERSHED BY LANDOWNERS' ATTITUDES TOWARD JOHNSON CREEK WATERSHED DISTRICT

Attitude Toward Watershed	Attitude Code Number	Average-Attitude-Toward Soil-Conservation-Service Score	Average-Attitude-Toward-Extension-Service Score	Average-Attitude-Toward-Vocational-Agriculture Score
Positive	I	3.53	3.63	3.71
Neutral	II	3.27	3.00	
Negative	III	2.32	2.57	

Soil Conservation Service. The average attitudes toward Soil Conservation Service scores for groups I, II, and III were different at the 99.5 per cent level of significance. The .26 difference in scores between group I and group II was significant at the 80 per cent level; the 1.21 difference between group I and group III was significant at the 99.9 per cent level, while the .95 difference between group II and group III was only significant at the 60 per cent level. The small significant difference between group II and group III was partially due to the small number of landowners in these groups. It is interesting to note that the large differences were between group I and each of the other two groups. This emphasized the correlation between a positive attitude toward the Soil Conservation Service and a positive attitude toward the watershed district in this district.

Extension Service. The correlation between a favorable attitude toward Extension Service score and a positive attitude toward the watershed district is shown in the following data. Those in group I had a more favorable attitude toward Extension Service score than those in group II, and also a more favorable attitude than those in group III. These differences were significant at the 99 per cent and 99.9 per cent levels respectively. However, there was no significant difference at the 50 per cent level between the scores of group II and group III.

Vocational Agriculture Department. Since group I was the only group to express an attitude toward Vocational Agriculture, no comparisons can be made between groups. However, it is interesting to note the very high average attitude score of 3.71 out of a possible score of four which is associated with those in group I.

Summary. The high percentage of landowners who expressed opinions toward the Soil Conservation Service and Extension Service indicates the familiarity which exists between the landowners and the agencies, and the fact that both agencies have been active in the area. As would be expected because of the difference in the type work they perform, fewer people were familiar with Vocational Agriculture personnel.

The landowners who had positive attitudes toward the watershed district tended to have higher attitude scores for all three agencies.

It can also be seen that there is a high average attitude score toward the various agencies for all three groups combined. They were 3.41, 3.47, and 3.71 for the Soil Conservation Service, Extension Service, and Vocational Agriculture respectively. These high scores should be viewed while considering the fact that Johnson Creek is the only watershed district of the three in the study making satisfactory progress at the time of this writing.

White Oak Watershed District

There were eighty-two landowners interviewed in White Oak Watershed District. Forty-nine of these expressed their attitudes toward Soil Conservation Service, forty-three expressed their attitudes toward the Extension Service, and fifteen expressed their attitudes toward Vocational Agriculture. These scores are given in Table IX.

Soil Conservation Service. The most favorable attitudes toward Soil Conservation Service were found in group II, where attitude scores were .10 higher than the scores from group I, and .63 higher than the scores from group III. These differences were only significant at the

TABLE IX

AVERAGE ATTITUDES TOWARD GOVERNMENT AGENCIES SCORE OF LANDOWNERS INTERVIEWED IN WHITE OAK WATERSHED, BY LANDOWNERS' ATTITUDES TOWARD WHITE OAK WATERSHED DISTRICT

Attitude Toward Watershed	Attitude Code Number	Average-Attitude-Toward-Soil-Conservation-Service Score	Average-Attitude-Toward-Extension-Service Score	Average-Attitude-Toward-Vocational-Agriculture Score
Positive	I	3.44	3.16	3.79
Neutral	II	3.54	3.60	
Negative	III	2.91	2.62	2.50

50 per cent and 70 per cent levels respectively. The difference of .53 between group I and group III was significant at the 99 per cent level since there were more landowners in these groups. Although the landowners in group II had higher average scores than those in group I, the statistical significance of the difference between group II and group I was much less than that between group I and group III. Therefore, the landowners with the most favorable attitudes toward the Soil Conservation Service tend to be in favor of the watershed district.

Extension Service. The landowners in group III had less favorable attitudes toward the Extension Service than either group II or group I. The difference from each was significant at the 95 per cent level. However, those in group II had a more favorable attitude toward the watershed district than did group I. This difference was significant at the 70 per cent level. This is the only watershed of the three studied in which group II had a higher score than did group I. The various county agents of the counties having land in the watershed district did not take a very active part in the creation of White Oak Watershed District and some of the landowners in group I criticized them because of this. It is to be remembered that those in group I were wanting to see the district progress. This would account for some of the difference between group I and group II.

Vocational Agriculture Department. Only a small number of landowners expressed an attitude toward Vocational Agriculture. However, it is significant to notice that of the fifteen who knew enough about Vocational Agriculture to express an opinion about it, thirteen, or 87 per cent of them, were in group I. Those in group I had a 70 per cent higher score

than those in group III, even though both groups had a very positive attitude toward the Vocational Agriculture Service.

Summary. In White Oak Watershed those landowners with negative attitudes toward the watershed district, i.e., those in group III, who expressed an opinion had negative attitudes toward both the Soil Conservation Service and Extension Service. They did not have negative attitudes toward Vocational Agriculture, but only two in group III expressed an attitude toward Vocational Agriculture. The highest scores toward both Soil Conservation Service and Extension Service were made by landowners in group II; however, the small number of landowners who expressed opinions in group II might indicate that those with unfavorable attitudes would not express any attitude.

Summary of Landowners' Attitudes Toward Government Agencies

Because of the time at which the interviews were conducted, i.e., several months after landowners had voted for board of directors to proceed or not to proceed with the creation of the watershed district, it was difficult to determine anything other than correlations between landowners' attitudes toward the watershed district and their attitudes toward the selected government agencies. It could not be determined which of the attitudes were causes and which were effects. However, there are certain relationships that do exist in all three watersheds.

In each of the watersheds studied the landowners who had negative attitudes toward the watershed district had less favorable attitudes toward the Soil Conservation Service and Extension Service than did those who had positive or neutral attitudes toward the watershed district. Not

enough landowners expressed an attitude toward Vocational Agriculture to provide an insight into relationships regarding it. However, the largest number of group III landowners in any one watershed district who expressed an attitude toward Vocational Agriculture were the eight in Swan Creek Watershed District who expressed negative attitudes toward Vocational Agriculture. Conversely the group of landowners who expressed positive attitudes toward the watershed also expressed positive attitudes toward each of the three government agencies. In each watershed the landowners with positive attitudes toward the watershed and those with negative attitudes toward the watershed had government agency scores more significantly different than any other groups of two which were analyzed.

Table X shows that landowners interviewed in Johnson Creek Watershed District, which is the only watershed district of the three that is making any progress at present, had the highest average attitude score toward both the Soil Conservation Service and Extension Service. Also, landowners in Johnson Creek Watershed District were very similar to landowners in White Oak Watershed District in attitude-toward-Vocational-Agriculture scores, with a difference of only .08. This difference was not significant.

The average attitude scores for each of the government agencies were less for landowners interviewed in Swan Creek Watershed District, where landowners voted not to proceed with the creation of a watershed district, than for either of the other two watershed districts in the study. The average attitude scores for all landowners interviewed in Swan Creek were negative toward the Soil Conservation Service and Extension Service. Their average attitude toward Vocational Agriculture was

TABLE X

AVERAGE ATTITUDES TOWARD THREE GOVERNMENT AGENCIES OF LANDOWNERS INTERVIEWED IN THREE SELECTED WATERSHED DISTRICTS

Watershed District	Average Attitude Scores Toward: Soil Conservation Service	Extension Service	Vocational Agriculture
Swan Creek	2.90	2.91	3.07
Johnson Creek	3.41	3.47	3.71
White Oak	3.34	3.06	3.79

positive, but many of those giving opinions stated, in informal discussions with the interviewers, that they were not aware of any part the Vocational Agriculture Department had in the creation of the district.

The average attitudes toward both the Soil Conservation Service and Extension Service for all landowners interviewed in White Oak Watershed were between those expressed by landowners in Johnson Creek, where most landowners had a positive attitude toward the watershed district, and landowners in Swan Creek, which voted not to proceed with the creation of a watershed district. White Oak Watershed District landowners accumulated a very high attitude-toward-Vocational-Agriculture score; however, only two landowners in White Oak Watershed, other than those in favor of the watershed, expressed an attitude toward Vocational Agriculture.

The observations stated in the previous paragraphs suggest that if a watershed district is to be a success the government agencies involved must seek and gain a high degree of confidence from the landowners of the watershed.

Landowners' Attitudes Toward Local Watershed District Leaders

The local watershed leaders, i.e., the local farmers and/or businessmen who instigate the initiation and creation of a watershed district, are primarily responsible for the progress of the watershed. Because of this, one might logically infer that a landowner's attitude toward the watershed district would be greatly influenced by his attitude toward the local leaders. This should be especially true in the early stages of the development of a watershed project, since the landowners would know a

great deal more about the local leaders than they would about the watershed project. This would tend to cause landowners to form opinions about the watershed based on their opinion of the person responsible for the watershed district. If landowners questioned the motives of individual leaders, they would tend to question the general community benefits to be derived from the watershed district.

Construction of Index to Measure Landowners' Attitudes Toward Local Watershed District Leaders

Four questions were prepared to determine the landowners' attitudes toward the local watershed district leaders. The landowners were asked to check one of the prepared answers which were designed to indicate favorable, neutral, or unfavorable attitudes toward the leaders. A value of two was given each favorable attitude, a value of one was given each neutral attitude, and a value of zero was given each negative attitude. The index for each individual landowner was the summation of the value for the four questions. Thus, it was possible for a landowner to have an index value between zero and eight.

Swan Creek Watershed District

Landowners who favored the watershed district had more favorable attitudes toward local leaders than did those who were against the watershed district. (See Table XI.) This difference was significant at the 99.9 per cent level. This shows a very high correlation between a favorable attitude toward local leaders and a favorable attitude toward the watershed. From informal talks with the landowners it was apparent that some of the unfavorable attitudes toward individual local leaders were

caused directly by the local leaders' actions in promoting the watershed, or acts which landowners thought the local leaders had committed.

Some common complaints given by landowners were: (1) "They wouldn't tell us anything at meetings, but just kept 'beating around the bush'," (2) "Those who are being benefited most are trying to push this over on us," (3) "They (local leaders) only have a personal motive for this thing (watershed district)," and (4) "I believe they knew more than they were telling." Some of the things the landowners wanted to know from the local leaders were: (1) where would the dams be located, (2) who would have to pay the local cost, and (3) how much would be paid to those whose land was condemned. Of course under the present law these questions could not be answered until after a permanent board of directors was elected, but this fact was overlooked by many landowners.

Johnson Creek Watershed District

The differences in attitudes toward local watershed leaders among those landowners having positive, neutral and negative attitudes toward the watershed district were significant at the 99.95 per cent level.

The four landowners interviewed in group III had less favorable attitudes toward local leaders than did the nine landowners in group II or the thirty-eight in group I. The level of significance was 90 per cent and 99.9 per cent respectively. There was only a slight difference in the scores of group I and group II. This difference was not significant at the 50 per cent level. This indicates that those with unfavorable attitudes toward local leaders will tend to have negative attitudes toward the watershed district.

There were not enough landowners in group III in Johnson Creek Watershed District to detect reasons for the negative attitudes. Only two of the landowners interviewed stated negative average attitudes toward local leaders, and these two gave no reasons for their negative attitudes.

White Oak Watershed District

Of the three groups interviewed in White Oak Watershed, i.e., those with positive, neutral, and negative attitudes toward the watershed district, the differences in their attitude toward local leaders score were significant at the 99 per cent level. As shown in Table XI, those in group III had less favorable attitudes toward local leaders than those in group I or group II. This difference was significant at the 99 per cent level and the 99.9 per cent level respectively. Those in group I expressed more favorable attitudes toward local leaders than did those in group II. However, the difference was only significant at the 60 per cent level. Thus, those with relatively unfavorable attitudes toward local leaders tended to have negative attitudes toward the watershed, and those with a relatively favorable attitude toward local leaders tended to have either positive or neutral attitudes toward the watershed district.

Some unfavorable comments about local leaders expressed by landowners were: (1) "Before the permanent board of supervisors were elected all the local leaders were those just below the dams and they were getting all the benefits," (2) "They (local leaders) went to see some landowners, but never stopped to see me," (3) "I just can't find out anything from them," (4) "They might not have meant to hurt us (farmers above the dams), but I don't see how they can help it if they go ahead with this thing

TABLE XI

LANDOWNERS' ATTITUDES TOWARD LOCAL WATERSHED DISTRICT LEADERS IN THREE SELECTED WATERSHED DISTRICTS BY DISTRICTS AND BY LANDOWNERS' ATTITUDES TOWARD THE DISTRICT

Watershed District	Attitude Toward The Watershed	Attitude Code Number	Average Attitude Toward Local Watershed Leaders (Index)
Swan Creek	Positive	I	6.40
Swan Creek	Negative	III	3.62
Johnson Creek	Positive	I	7.74
Johnson Creek	Neutral	II	6.67
Johnson Creek	Negative	III	4.50
White Oak	Positive	I	7.23
White Oak	Neutral	II	6.64
White Oak	Negative	III	3.71

(watershed program)," and (5) "They told us some things, such as, where the dams would be, and then changed their statements." However, many of those who complained that they could not secure information went on to say that they did not attend any of the watershed district informational meetings because they were not interested in the watershed district. Also in interviewing it was noticed that practically all of those who had unfavorable attitudes toward local leaders lived in the areas above the dams.

Summary

The tendency throughout the three watersheds was for those who had unfavorable attitudes toward local leaders not to be in favor of proceeding with the watershed district. The average attitude-toward-local-leaders scores were 7.30, 6.12, and 4.88 for Johnson Creek, White Oak, and Swan Creek watersheds respectively. Johnson Creek Watershed District is progressing very well at present; White Oak Watershed District landowners voted to proceed with the creation of the watershed district, but later a majority of the landowners seemed to think the project was not in their best interest; and Swan Creek Watershed District landowners turned down the program at the first vote. These facts indicate that the attitude which landowners have toward the local leaders is a major factor in determining their attitude toward the watershed.

Some of the comments given by landowners point out the need for local leaders in various sections of the watershed rather than all of them being concentrated in one area such as in the flood plains. Also it was noticed that landowners formed unfavorable opinions about some

local leaders because of alleged actions of the local leader concerning the watershed district. The unfavorable attitudes toward these leaders apparently did not exist in the initial stage of the watershed, but developed as the program progressed. Thus, it would not be possible to completely evade this pitfall by selecting the proper local leaders when initiating the project. This also points out the fact that local leaders must work closely with the landowners and try to develop a program in accordance with their wishes in order to retain their confidence as the program progresses.

Individuals' Damage From the Creeks

Before anyone can be interested in combating a problem he must be aware of a problem existing. One of the problems in a watershed is flood damage. To determine how widespread this damage was, landowners interviewed were asked: (1) "Does any of your land ever overflow?" (2) "What part of a crop do you usually lose when flooded?", and (3) "What part of this damage . . . do you think the watershed district would correct?"

Swan Creek Watershed District

Of the fifty-one landowners interviewed in Swan Creek Watershed District, eighteen had land flooded at least one year out of five. Of these eighteen, nine had a positive attitude toward the watershed district and nine had a negative attitude toward the watershed district. However, only five of those with negative attitudes toward the watershed district and eight of those with positive attitudes toward the watershed district thought they were being damaged by the overflow from the creeks.

Also none of those with negative attitudes toward the watershed district thought it could solve their problems and five were undecided; four of those with positive attitudes toward the watershed district believed the watershed district would correct their problems, while two said it would not, and three said they did not know. Thus, only four landowners of the fifty-one interviewed said they were being damaged by floodwater that they believed would be controlled by the proposed watershed district.

Johnson Creek Watershed District

Fourteen of the thirty-eight landowners interviewed in Johnson Creek Watershed District who had positive attitudes toward the watershed district stated that they had land which overflowed at least one year out of five; ten of them thought the watershed district would eliminate or minimize their problem, and the remaining four did not know. Only two of the nine landowners with neutral attitudes toward the watershed district had land which overflowed at least one year out of five, and they had no opinion as to the amount of protection the watershed district would provide. Of the four with negative attitudes toward the watershed, two had land which overflowed, but their crop damage from overflow was less than 5 per cent. They did not believe the district would provide them any protection. Of the fifty-one landowners interviewed eighteen had land being damaged by overflow. Ten of these eighteen definitely believed the watershed district would benefit them, six did not know, and the remaining two did not believe the watershed district would benefit them.

White Oak Watershed District

Twenty of the forty-seven landowners interviewed in White Oak Watershed District who had positive attitudes toward the watershed district had crop losses from overflow. Seven thought the watershed district could eliminate their losses, eleven were undecided, and one did not think the district could affect his crop losses. Only one of the eleven landowners with neutral attitudes toward the watershed district had any damage from overflow and he did not know whether the watershed project could help him. Eight of the twenty-four landowners with negative attitudes toward the watershed district had land that overflowed at least one year out of five. However, only two of these thought the floodwater was causing any damage to their crops, and only one of them thought the watershed program would help correct his problem.

Of the eighty-two landowners interviewed in the White Oak Watershed District, there were fifteen who were being damaged by floodwater, and fourteen who were not certain and said damage was little, if any. Of these, eight thought the watershed district could correct the problem, five did not think so, and sixteen were undecided.

Summary

Of the fifty-four landowners interviewed in the three watersheds who expressed negative attitudes toward the watershed districts, seven felt they were being damaged by overflow water from the creeks. Only one of these thought the watershed district would correct this situation.

There were 110 landowners in the three districts who expressed positive attitudes toward the district. Thirty-three of these felt that

they were being damaged by overflow water from the creeks and twenty-two expressed the opinion that the watershed districts would definitely correct this situation. This indicated a relationship between expected flood benefits from the district projects and landowners' attitudes toward the watershed district. However, there was a weakness in the design of the questionnaire since, when analyzed, it tended to point out only the damage caused by the water drowning out crops. If the questionnaire had been designed to determine other expected benefits such as a change in the farming program, lowering of the water table, less sand deposits, and greater security, it could have been more meaningful. Consideration of these benefits might have shown more landowners to expect some benefits from the watershed development program.

Other Factors Measured

In addition to the previously discussed major factors affecting landowners' attitudes toward watershed districts, individual questions of the schedule were analyzed to determine what other factors might be of significance.

Swan Creek Watershed District

Nine of the landowners interviewed in the Swan Creek Watershed District who had positive attitudes toward the watershed district said they would have been required to help pay for the proposed watershed district. Only one of them did not think they would receive adequate benefits from the district in return for the expenses. In the group with negative attitudes toward the watershed district, there were eight who

said they would have to help pay for the district. Not one of these eight said they would receive sufficient benefits to compensate them, and seven said they definitely would not.

Nine landowners interviewed thought some of their land would be flooded, and all nine expressed negative attitudes toward the watershed district. Two of these did not feel that they would receive an equitable price for their land, while the other seven would not express their ideas.

Only four of the twenty-six with negative attitudes toward the watershed districts thought it "made sense to build the dams." Conversely seventeen of the twenty-five with positive attitudes toward the watershed districts thought there definitely should be dams while seven were undecided. This indicates that dams are a very controversial subject and were a major factor in determining attitudes toward the watershed district.

Johnson Creek Watershed District

Landowners interviewed in Johnson Creek Watershed District tended to reply, "they (the government agencies and local leaders involved) have always worked out things to our advantage, and I believe they will do the same this time" when they were asked questions concerning their individual costs and benefits caused by the watershed district.

Only four of the thirty-eight interviewed with positive attitudes toward the watershed district thought they would be required to help pay for the watershed district. These four thought they would be amply rewarded for doing so. None of those with neutral attitudes toward the watershed district thought they would have to help pay for the project,

and only one of the four with negative attitudes thought they would have to help pay. He was the only one who thought he would definitely not receive adequate benefit for his payment.

Only two thought some of their land would definitely be needed for dams or flooded areas. They both had positive attitudes toward the watershed district; one stated he was sure he would receive adequate compensation for his land, and the other would give no answer.

Three of the four who had negative attitudes toward the watershed district did not think large dams should be built to help control the water. Only one of those with positive attitudes toward the watershed district thought dams would not help solve the problem; however, there were five who said they were not sure. Thus, in Johnson Creek Watershed District a landowner's attitude toward dams would be indicative of his attitude toward the watershed district.

White Oak Watershed District

Twenty-eight of the landowners interviewed in the White Oak Watershed District who had positive attitudes toward the watershed district thought they would be required to help pay the local watershed district cost. Only one said he definitely would not benefit this much. Although there were only eight landowners, or one-third of the total, with negative attitudes toward the watershed district who thought they would have to help pay the local cost, not one of them thought he would receive compensable benefits. Only two of those with neutral attitudes toward the watershed district said they would be required to help pay the local cost. Of these one thought he would be amply benefited and the other was not

sure whether or not he would be.

Landowners did not agree as to what was adequate compensation for land which would be flooded. The two with positive attitudes toward the watershed district who believed they would have land condemned thought they would be paid sufficient damages. Conversely, of the eight with negative attitudes toward the watershed district who thought they would have land condemned, five doubted receiving proper compensation and the other three stated that they did not have enough information to decide. No landowner with a neutral attitude toward the watershed district thought he would have land flooded because of flood retention structures.

Forty-one of the forty-seven landowners with positive attitudes toward the White Oak Watershed District thought dams were definitely needed in the watershed and only one did not think they were; of those with negative attitudes toward the watershed, though, eighteen did not want to see dams built and the remaining six expressed a "don't know" opinion.

Watershed District Comparisons

The preceding findings point out that those who would expect to help pay for a watershed district tended to favor proceeding with the establishment of a watershed district. They apparently realize the benefits to be derived from the program. However, those in Swan Creek and White Oak Watershed District who do not think they would be required to help pay for the watershed district, i.e., those not in the "benefited area", tend to have neutral or negative attitudes toward the watershed district. The problems they would expect the watershed district to solve

are not as easily seen as the flooded, sand-laden bottomlands downstream. Many of them fear that the dams, which the watershed district would construct, would have a more destructive effect on them and/or their neighbors than the problems which the watershed district seeks to correct for them. They tend to realize the problems faced by many landowners downstream, but fear that if the watershed district becomes a reality they and/or their neighbors will then have problems which they did not have before. Indicative of this is the fact that, of the landowners with negative attitudes toward the watershed district in Swan Creek and White Oak Watershed Districts, 77 per cent and 92 per cent, respectively, stated that they thought the group of landowners adjoining and above the dams would be "harmed" to some extent by the watershed district.

In Johnson Creek Watershed District, which appears to be progressing satisfactorily, only eight landowners, or 16 per cent of those interviewed, stated that they thought landowners in any section of the watershed district would be harmed by the watershed district. Of those eight, four were those who had negative attitudes toward the watershed district. Of the total landowners interviewed in Swan Creek and White Oak Watershed Districts 57 per cent and 40 per cent respectively stated that they thought those landowners above the dams would be "harmed" by the watershed district. Thus, this indicates the attitude of landowners as to a given section being "harmed" is positively correlated to the success of the watershed district.

CHAPTER V

SOME PROBLEMS OF WATERSHED DISTRICTS OBSERVED WHILE CONDUCTING INTERVIEWS

While interviewing landowners in the three selected watershed districts, some of the problems encountered in initiating and carrying out a watershed project were revealed by both those opposing and those favoring the watershed district. These revelations were in addition to answers given to specific questions.

Dissemination of Correct Information

One of the most difficult tasks of landowners in a watershed district is that of gathering and interpreting factual information. Although it can rarely be determined where or how it originated, there is quite a bit of false information being circulated in the watershed districts. For example, one landowner said he thought the watershed district could be improved by limiting the salary of the board of directors when actually the board of directors receive no salary.

Under these conditions a landowner often forms an opinion toward the watershed district very different from the one he would form if the true facts were known. Of course this might increase the number favoring the watershed district or increase the number opposing it, but it appears to the writer that the only way for a landowner to actually decide what he wants is to know the true facts concerning the alternatives. At present the ranks of professional agricultural workers are too thin to contact landowners individually, and it is difficult, if not impossible,

to get a majority of landowners to attend informational meetings. Apparently literature concerning the watershed districts is not widely disseminated nor is it easily understood. Thus, many landowners must depend upon information received orally from persons rabidly favoring or opposing the watershed district. Information received in this way is very easily, consciously or unconsciously, distorted by the person giving it. People tend to listen to information that is most readily available. Consequently, if correct information is not available, they will tend to listen to that which is available. For this reason false information tends to be worse than a lack of information, especially is this true in an area where landowners do not make an attempt to secure information, but only listen to whatever comes along. Thus, many landowners may be forming their opinions on the basis of false, incorrect, or distorted information.

Opportunity and Relocating Cost As A Factor in Determining Damages

One of the reasons most often given by those having negative attitudes toward the watershed district was the fear that those having land flooded would not receive adequate compensation for opportunity cost or relocation cost. Very often, if a landowner were to have his bottom land flooded, it would cause the remainder of his farm to become an uneconomical unit to operate. Likewise, the landowner's buildings might then be of little or no benefit. For example, if a dairy farmer had been raising his grain, silage and/or hay on his bottom land and it was flooded, the remainder of his farm might be uneconomical to operate

as a dairy farm; but if he did not operate it as a dairy farm, his milking parlor, silos, etc. might then be useless. If a landowner were to be paid only for the land flooded, this would not cover his actual loss.

Likewise a landowner who was forced to move would have relocating expenses in addition to the expense of buying another farm.

Many landowners said they could not be in favor of a watershed district until those matters were clarified for them.

Others thought the total local cost and the amount each landowner would have to pay should be determined before the landowners voted to determine whether the board of directors should proceed with the creation of the watershed district. Likewise many thought the dams should be located and the landowners given assurance that they would not be moved.

Many landowners overlooked the face that the above-mentioned problems must be considered and solved by the permanent board of directors and appraisers who are chosen after the initial election. Others were aware of this fact, but thought the situation should be changed.

Proper Selection of Local Leaders in the Initial Stage of Development of the Watershed District

In the Journal of Soil and Water Conservation, Neiderfrank and Fascher state:

> Experience and study of the community development approach, which is now widespread across the southern states, proves the existence of quality rural local leadership and the value of local group planning. Certainly the experience of the Soil Conservation Service with group participation methods, informal leadership and district organization also proves the validity of reliance upon local leadership, involvement of people in programs, and adaptation of procedures to local situations.

> The group or social action process idea which embodies the aforementioned principles is fundamental in the successful promotion, organization and operation of any program. This is especially true for watershed organization. Group process is the idea of doing things with people rather than for them and to them, the idea of the democratic philosophy of leadership rather than authoritarian leadership, the idea of understanding people and having faith in them, the idea of letting them take part in the decision making.
>
> Programs succeed and conservation progresses when agency workers and local supervisors believe in and are skilled in following the group process idea as they work with people on soil and water conservation problems.[1]

The success of a watershed is directly dependent upon the caliber of those individuals who initiate and guide the actions of a watershed district. For this reason it is imperative that local leaders be the type of persons that can command and retain the respect of the landowners of the watershed district. Because a watershed district is a dynamic rather than a static organization, local leaders need to evaluate themselves periodically to determine if their actions are meeting with the approval of landowners of the watershed district.

Defining Benefited Area

Usually, when watershed districts in Tennessee are initiated, it is intended that those who are benefited by the district pay the local share of flood-control costs. However, some landowners above the dams contend that this could mean everybody in the watershed district since everybody in the watershed district could conceivably be benefited either directly or indirectly by the watershed district. Some have even demanded

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[1]Neiderfrank, et al., "The Human Side of Watershed Programs," Journal of Soil and Water Conservation, 11: 289-292, December, 1956.

that the benefited area be determined before the landowners vote as to whether or not the board of directors are to proceed with the creation of the watershed district. Of course it is impossible to consider this suggestion under the present law, but it does point out the ambiguity of the term "benefited area."

Need For a Watershed Program More Appealing to Upland Farmers

The results of the interviews conducted in Swan Creek and White Oak Watershed District showed that the locations of the dams formed a fairly distinct dividing line between those favoring the watershed district and those opposed to the watershed district. Of course this line did not exist in Johnson Creek Watershed District since there were very few landowners opposing the district there. However, the results in Swan Creek and White Oak Watershed Districts indicated that the programs should be made more appealing to landowners in the upper reaches of the watersheds.

A real problem is involved when farmers in the upper part of a watershed lose their few acres in the bottoms, where most of their farm income is produced, because they are needed for floodwater detention structures. This is still more disagreeable to the upland farmers when they believe the larger operators in the lowlands to be reaping the benefits from the projects. Rural people are "basically fairminded and generally do not like to take advantage of other families, or even appear that they are doing so."[2] Consequently when landowners above the struc-

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[2]Neiderfrank, et al., op. cit.

tures cannot see any benefits they can derive from the project, but can see where some of their neighbors may be inconvenienced by the project they tend to disfavor the watershed district.

If some way could be found to make this project more appealing to the upland farmers it would remove many complications. Suggestions which landowners expressed to the interviewers included: (1) persuade the lawmakers to allow ditching in the uplands at government expense, (2) strive to determine the location of detention structures while conducting the preliminary survey before the watershed district is voted on, and (3) attempt to construct more but smaller retention structures so a farming program will not be completely disrupted.

Need For Close Cooperation Between Agricultural Agencies

There is a lesson in cooperation to be learned in Johnson Creek Watershed District. In this watershed district all agricultural agencies have worked in unison toward the common goal of seeing the Johnson Creek Watershed District in operation. The Vocational Agriculture teachers discussed it in their classrooms and adult classes, the Extension Service agents discussed it at community clubs and other meetings, the Soil Conservation Service technicians discussed it whenever they worked with landowners, and the various other agencies talked about it whenever the opportunity presented itself. The important thing here was the fact that all agencies were informed as to the benefits and shortcomings of the program. All of them exploited the benefits and sought to correct the shortcomings of the program.

This has not been so in other watersheds and the story of watershed failures told the results. It cannot be claimed that cooperation will make a good program of a poor one, but a lack of cooperation can bring about the downfall of a good one.

Favorable Position of the County with the Most Land in the Watershed District

The Tennessee Watershed District Act of 1955 states that in "the county in which the greatest number of acres of land in the district is situated" (1) shall be filed "a petition describing in detail" the work plan or project, (2) the court shall set a day for a hearing on the proposed work plan, (3) interested landowners shall make appearance and file in writing any objection which they have to the proposed project, and (4) in that county the feasibility of the plan, probable cost of the project, benefits to be derived, lands benefited, and recommended method of financing will be determined by the County Court. In addition the court of the county in which most of the land is situated appoints three Commissioners to study the proposed improvements, their cost, and in what proportion lands are benefited. (Dissatisfied landowners then must go to the court in the county in which most of the land of the watershed district is located if they wish to file their objections.[3])

(Many landowners expressed their dissatisfaction with this part of the law.) Some jealousy or mistrust seemed to exist; this was especially

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[3]J. I. Bell, Watershed District Act of 1955, Public Chapter No. 112, House Bill No. 708, Public Acts of 1955, pp. 3-15.

so when the county in which most of the land of the watershed was located was also the county in which most of the benefits were to be derived. Some landowners rationalized that the price to be paid for their condemned land would be determined in the county from which most of the funds were to come. This was very antagonizing to landowners in other counties of the watershed.

It is significant to observe that Johnson Creek Watershed District, which is progressing satisfactorily, is completely in one county.

CHAPTER VI

IMPLICATIONS OF THE STUDY

Summary and Conclusions

This study of the organizational problems and causes of slow movement of watershed districts in Tennessee was made to identify some of the factors associated with watershed district failures in Tennessee. In addition to preliminary discussions held with agricultural leaders and businessmen, information was secured from personal interviews with 184 landowners in Swan Creek, Johnson Creek, and White Oak Watershed Districts. Landowners in Swan Creek Watershed District voted not to proceed with the creation of the watershed district. Landowners in White Oak Watershed District voted to proceed with the creation of the watershed district, but then elected a board of directors, whose majority was opposed to proceeding with the creation of the watershed district. Landowners in Johnson Creek Watershed District, not only voted in favor of proceeding with the creation of the watershed district, but are making excellent progress with completion of the development projects.

Landowners in Johnson Creek Watershed District had a lower level of knowledge about the watershed development project than did the landowners in either of the other two. Also, of those interviewed in Johnson Creek Watershed District, the four landowners with negative attitudes toward the district possessed a more thorough average understanding about the project than did the thirty-eight with positive attitudes toward it. These facts would tend to indicate that a knowledge of the district laws,

regulations, and accomplishments were not necessary for the success of the development program of a watershed district. However, in both Swan Creek Watershed District and White Oak Watershed District, where those opposing the project and those seeking a way to proceed with the creation of it were more equally proportioned, the landowners with most complete knowledge of the watershed district expressed favorable attitudes toward the program. This was in contrast to the findings in the Johnson Creek area. (One explanation for landowners' knowledge of the program in Johnson Creek Watershed District being relatively unimportant was the fact that they had complete confidence in the agricultural agencies and local leaders to act in their behalf.) They expressed a more favorable attitude toward agricultural agencies, and a much higher regard for local leaders than did the landowners of the other two districts in the study. A frequent comment heard in Johnson Creek Watershed District was, ("They (the local leaders and agricultural agencies) have been working for our advantage and I believe they will continue to do so.") A factor in bringing about this attitude was that those interested in the creation of a watershed district in Madison County went into the uplands of the area and explained the benefits to be derived from the Agricultural Conservation Program (ACP). They went to the extent of borrowing money to make ACP payments quickly available to landowners who would carry out ACP practices. Until that time, many of the landowners who received the payments had not been conscious of the financial payments made by the ACP. Although the Agricultural Conservation Program was not associated with the watershed program, the actions of those interested in the creation of a watershed district served to implant confidence in the minds of the landowners.

Not only in Johnson Creek Watershed District, but also in the other two studied, a positive correlation existed between attitudes toward local leaders and agricultural agencies and attitudes toward the watershed district. Hence, there is evidence that confidence in watershed leadership is a stronger factor than understanding of the watershed district. Where landowners have confidence in local leaders and agricultural agents, it seems to make the job much easier, or even to be an essential part of the project. However, it is to be remembered that the population in the upstream portion (where the opposition to a watershed district is usually concentrated) of Johnson Creek Watershed differs significantly from that in the upstream portion of the other two watershed districts. The upstream portion of the Johnson Creek area is predominantly Negro-populated, and the average male has received only a fourth-grade education. This would tend to explain partially why trust in leadership was a more important factor in this district than was knowledge of the watershed district.

Several other factors seemed to affect landowners' attitudes toward the projects. The group of landowners with positive attitudes toward the watershed district in each of those in the study tended to (1) think landowners with land condemned would be dealt with more equitably, (2) not think any group in the watershed district would be particularly damaged, (3) think the dams were the answer to their problems, (4) think they would receive more benefits from the project in return for the cost they would be required to pay, and (5) be aware of the damages from the creek that that the watershed district would correct more than did the group of landowners with negative attitudes toward the watershed district.

Since landowners in Johnson Creek Watershed District are predominantly in favor of the program, they as a whole had more of the characteristics listed above for landowners with positive attitudes toward the watershed district than did the landowners in the other districts. Thus, when considering these factors either within a given watershed district, or between Johnson Creek Watershed District and the two less successful ones, there appears to be a significant relationship between these factors and a landowner's attitude toward the watershed district.

Since there were so few landowners opposing the movement in Johnson Creek Watershed District, no definite conclusions could be drawn as to how attitudes toward it differ in various sections.

However, there was a large group of landowners below the proposed dams in both Swan Creek and White Oak Watershed Districts who would have been benefited by the project. Almost all of these landowners were in favor of the projects.

There was then a small group of landowners in Swan Creek Watershed District, and a similar group in White Oak Watershed District, who occupied sites where the dams and empounded water areas would have been located and, therefore, could conceivably be damaged by the project. Many of them feared they would not be amply rewarded for their loss. Some had large investments in housing and equipment that could be made practically worthless should much of their bottomland be flooded. Also, it might have been unprofitable to operate the remaining land as a farm unit. Thus, if landowners were repaid for only the land flooded, as many of them thought they would be, their loss would have been great.

There were also some landowners who did not wish to relocate no matter how much the district might pay them.

There was one other large group of landowners who were above the dams and were not greatly affected by the watershed district. Even though they should have benefited from better farming practices such as reforesting badly eroded areas and a more balanced farming program, they could have done these things without the watershed project if they so desired. The Extension Service and Soil Conservation Service was willing to offer them technical assistance when needed, the Agricultural Conservation Program offered financial assistance for many practices, and the Farmers Home Administration would loan additional money needed to install approved conservation practices. Hence, the majority of these people did not seem to really have any strong opinions about the watershed district until they were motivated by others with strong feelings and/or false or misleading information. In both Swan Creek and White Oak Watershed Districts this group seemed to be influenced by the group of landowners immediately adjacent to the dam sites. They feared that those near the dam sites would not receive just compensation for damages that might occur to them. Thus, these two groups were able to defeat the project through their actions in voting against the watershed district or in voting for members of the board of directors who were not in favor of proceeding with the creation of the watershed district.

Recommendations

Each watershed district is composed of a different group of indi-

viduals and therefore each district presents a unique problem. However, the recommendations to be made should apply to a majority of future watershed districts.

Each landowner should be made aware of the problems which the watershed district would correct. He should be given as much information about the watershed district as he desires, kept informed as the movement progresses, and an effort should be made to combat false and misleading information. This should be more easily accomplished by a number of small periodic meetings within communities of the district. With the "work load" which the Soil Conservation Service and Extension Service has in each county there is need for a watershed agent in each of the districts to perform these duties.

Since the opposition to watershed projects has been concentrated in the upper part of the area, these people should be contacted and informed about the project while it is in the planning stage. The landowners must recognize the objectives of the watershed district. More measures (e.g., drainage ditches above the water detention structures) should be incorporated into the watershed program to make it more attractive to the landowners in the upper portion of the district. Also there should be an effort made to secure a board of directors which will geographically represent the entire area. Thus, they may disseminate information and determine localized opinions about the watershed district.

Under the present law, landowners cannot be assured of the location of water detention structures until after the permanent board of directors is elected. Therefore, it is recommended that the watershed planning party complete a minimum amount of survey work in the area before the

landowners vote to determine whether the temporary board of directors shall proceed with the creation of a district. To facilitate good public relations permission should be secured from each landowner before going on his farm.

Many landowners objected to the following powers being vested in the county court of the county in which most of the lands of the district are located: (1) To determine (a) the soundness and economic feasibility of the plan, (b) the probable cost of the plan, (c) the benefits to be derived from the proposed project, (d) the recommended method of financing it, and (e) the terms and conditions of bonds if they are issued, and (2) to appoint the commissioners who determine how much each landowner is being benefited and/or damaged. Therefore, it is the opinion of the writer that there should be a state commission established to perform these duties when the watershed includes part of two or more counties.

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APPENDICES

APPENDIX A

DEFINITION OF TERMS USED IN THIS STUDY

1. The Secretary: The Secretary of Agriculture of the United States.

2. Works of improvement: Any undertaking for (1) flood prevention (including structural and land treatment measures) or (2) the conservation, development, utilization, and disposal of water in watershed or subwatershed areas.

3. Local organization: Any state, political subdivision thereof, soil or water conservation district, flood prevention or control district, or combinations thereof, or any other agency having authority under state law to carry out, maintain and operate the works of improvement.[1]

4. Publication: A newspaper or newspapers admitted to the United States mail as second-class matter, of general circulation within the watershed district.

5. Land: Real property as that term is defined by the laws of the State of Tennessee and shall include, but not be limited to, easements, water rights, or any other interest in real property.

6. Voter: Any landowner of the district who is more than 21 years of age and who is sui juris.

7. Board: The board of directors of a watershed district.

8. District: A watershed district for which organization is proposed or which has been granted under the provisions of this Act.

9. Landowner: Any person owning any interest in land located in a district, including tenants in common, tenants by the entireties, joint tenants, life tenants, owners of dower or courtesy rights, vested remaindermen, and the holders of leasehold interests of more than three years' duration.

10. Watershed area: An area of land which drains toward a common channel.

11. Person with positive attitude toward the watershed district: Any person who says he voted for the board of directors to proceed with the creation of the watershed district or would have voted that way if he had voted.

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[1]U. S. Department of Agriculture, Office of the General Counsel, Forestry and Lands Division. Legislative History of the Amendments to the Watershed Protection and Flood Prevention Act, (Washington: Government Printing Office, 1957), p. vii.

12. Person with negative attitude toward the watershed district: Any person who voted against the board of directors proceeding with the creation of the watershed district or would have voted that way if he had voted.

13. Person with neutral attitude toward the watershed district: Any person who did not vote in the election to determine if the board of directors shall proceed with the creation of the watershed district, and did not know how he would have voted if he had voted, or any person who would not state an attitude when interviewed.

APPENDIX B

SOIL ASSOCIATION MAPS OF SWAN CREEK, JOHNSON CREEK, AND WHITE OAK WATERSHED DISTRICTS AND DESCRIPTION OF THE SOIL ASSOCIATIONS

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Figure 4. Soil association map of Swan Creek Watershed District, Chester, Hardin, Henderson, and McNairy counties, Tennessee.

DESCRIPTION OF SOIL ASSOCIATIONS FOUND IN SWAN CREEK WATERSHED DISTRICT, LINCOLN AND MARSHALL COUNTIES, TENNESSEE

AREA 1

This association area comprises about 3,000 acres or approximately 10 per cent of the watershed area. It consists of nearly level to sloping stream bottoms and terrace lands along Swan Creek and its tributary streams. The low terrace lands or second bottoms are generally 5 to 10 feet higher than the adjoining first bottoms.

The Huntington, Lindside, Egam and Dunning soils are found along the bottom land areas subject to frequent overflow. The Armour, Wolftever, and Taft soils generally occupy the low terrace or second bottom lands at slightly higher elevations. The well-drained Huntington and the moderately well-drained Lindside soils are deep and inherently fertile. The Egam and Dunning soils are dark-colored and poorly drained. The Egam and Dunning soils generally predominate along the bottom land areas of the tributary streams of Swan Creek near area 3.

The Armour, Wolftever and Taft soils that occupy the low terrace or second bottom lands are subject to periodic overflow waters. The Armour soils are deep, well-drained and productive. The Wolftever and Taft soils have heavy-textured clayey subsoils that restrict internal drainage and plant root development.

The soils in this association area are the most productive of the watershed, and crop yields are relatively high. All the soils are derived from stream alluvium washed from uplands underlain by limestone. Most all areas are medium to high in content of phosphate.

Over 95 per cent of this association area has been cleared and used for row crops. Some areas are used for hay and pasture in rotation with other crops, while other areas are used for permanent pasture especially where swift, scouring overflow flood waters occur. Many of the short, steep, sloping areas are left in woodland or are idle.

AREA 2

This association area comprises about 20 per cent of the watershed and occurs throughout the central portion of the area. Slopes are gently sloping to rolling for the most part, but include some hilly areas. This area is characterized by well-drained productive soils of variable depths, and includes the most desirable upland soils for agriculture production in the watershed. In general, the soils are moderately fertile, phosphatic, and moderate to severely eroded.

The Maury, Braxton, Hampshire, Culleoka, and Inman soils predominate the landscape. Included are many small areas of gullied land and stony-land miscellaneous land types. The Maury soils that have brown, well-drained deep profiles generally occupy the broad, gently sloping areas. The Braxton soils have heavier textured subsoils than the Maury soils but occupy similar positions. The Hampshire, Inman, and Culleoka soils occur in more dissected areas where there are sloping ridge tops and narrow hillsides. The Hampshire and Inman soils are moderately deep to shallow, and have firm, plastic heavy clay subsoils. The Culleoka soils are more open and porous and contain sandy limestone flags throughout their profiles.

Practically all the soils in this association area are acid in reaction, but comparatively high in phosphate. The underlying parent rocks vary from high-grade to clayey and sandy limestones, containing some chert impurities in places.

Most all the soils in this association are used for crops or pasture. On the steeper sloping areas a sizeable acreage is idle or supports low quality pastures, especially where erosion losses have been great. General livestock and grain farming prevails. Corn, cotton, small grains, hay and pasture crops are grown. Many of the gullied land and stony land areas are in woods of low quality timber producing species, that have seeded naturally.

AREA 3

This association area comprises about 45 per cent of the total watershed area, and occurs throughout the watershed at higher lying elevations than association areas 1 and 2. The area consists of rolling to hilly slopes occupied by shallow, heavy clay soils and rockland areas. Differences in elevation normally range from 50 to 200 feet. Included in this problem area are some high steeply sloping knobs, that are capped with cherty soils developed from cherty limestones and shales. In this association area, however, most of the soils grade from moderately deep to shallow, rocky in places, and have heavy, plastic clay subsoils. These soils are acid to neutral in reaction, and have developed from clayey limestones containing varying amounts of phosphate.

The Mimosa and Ashwood soils occupy a large acreage in this association area and are closely associated with large areas of stonyland and rock land. The Mimosa soils are moderately deep, and somewhat phosphatic but have heavy clay subsoils. In many areas their productive capacity is quite low due to severe erosion losses of their more friable surface soils.

The Ashwood soils are dark colored, shallow soils with heavy textured clay subsoils, and have rock outcrops in many places. They are somewhat phosphatic and slightly acid to neutral in reaction. Most of the soils in this problem area are used for hay and pasture especially

if more productive soils for cultivation are found on the farm. Many areas are idle, however, or supporting wild unimproved pastures. Areas of stony land and rockland are usually in cedars or mixed hardwoods.

AREA 4

This association area comprises about 25 per cent of the total land area and is widespread along the northern and western boundaries of the watershed. This association, in general, represents the steepest and most irregular part of the watershed area. It occupies high rolling to steep topography, characterized by long, narrow cherty ridges and knobs, steep cherty slopes and narrow cherty valleys that lead down into the less sloping areas of the watershed. The soils in this association are nearly all cherty, acid in reaction, and are derived primarily from weathered cherty and clayey limestones and shales mixed with cherty soils material that has rolled down from the higher positions. Most of the soils are moderate to low in fertility, and difficult to work due to steepness of slope or cherty condition.

The Bodine, Frankstown, Dellrose and cherty Mimosa soils dominate the landscape but included also are stonyland and gullied areas, and cherty colluvium soils along the drainage ways in the valleys. The cherty Frankstown and Bodine soils occupy the tops and short steep slopes of the winding ridges and knobs of the area. The Bodine soils overlay low-grade cherty limestones and Frankstown soils have formed from weathered materials of cherty limestone and phosphatic shales. The deep, well-drained Dellrose soils occupy steep sloping areas below the Bodine and Frankstown soils and have formed from cherty soils material that has rolled and drifted down from higher lying soils. The Dellrose soils are moderate in fertility but hard to cultivate. They comprise the largest acreage in this problem area. The Mimosa soils have friable cherty surface soils and heavy plastic clay subsoils. They have developed from clayey limestones overlain with cherty soils material. They are moderately fertile, but very erosive, and many areas are frequently gullied. Most all the soils are strongly acid, and phosphatic except the Bodine soils, and where cleared are moderate to severely eroded.

The high, steep, cherty ridge tops, stonyland and gullied areas are usually forested; however, a large acreage of this problem area is cropped or pastured. Many of the Dellrose soils are cropped in corn then left idle or in unimproved pasture for two or three years. Many areas of the Mimosa soils are generally used for pasture due to their low producing capacities as a result of severe erosion losses. Farming throughout this area is basically livestock programs, that provide the main source of income.[2]

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[2]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, Soil Conservation Service, United States Department of Agriculture, to Joseph E. Winsett, dated November 13, 1957.

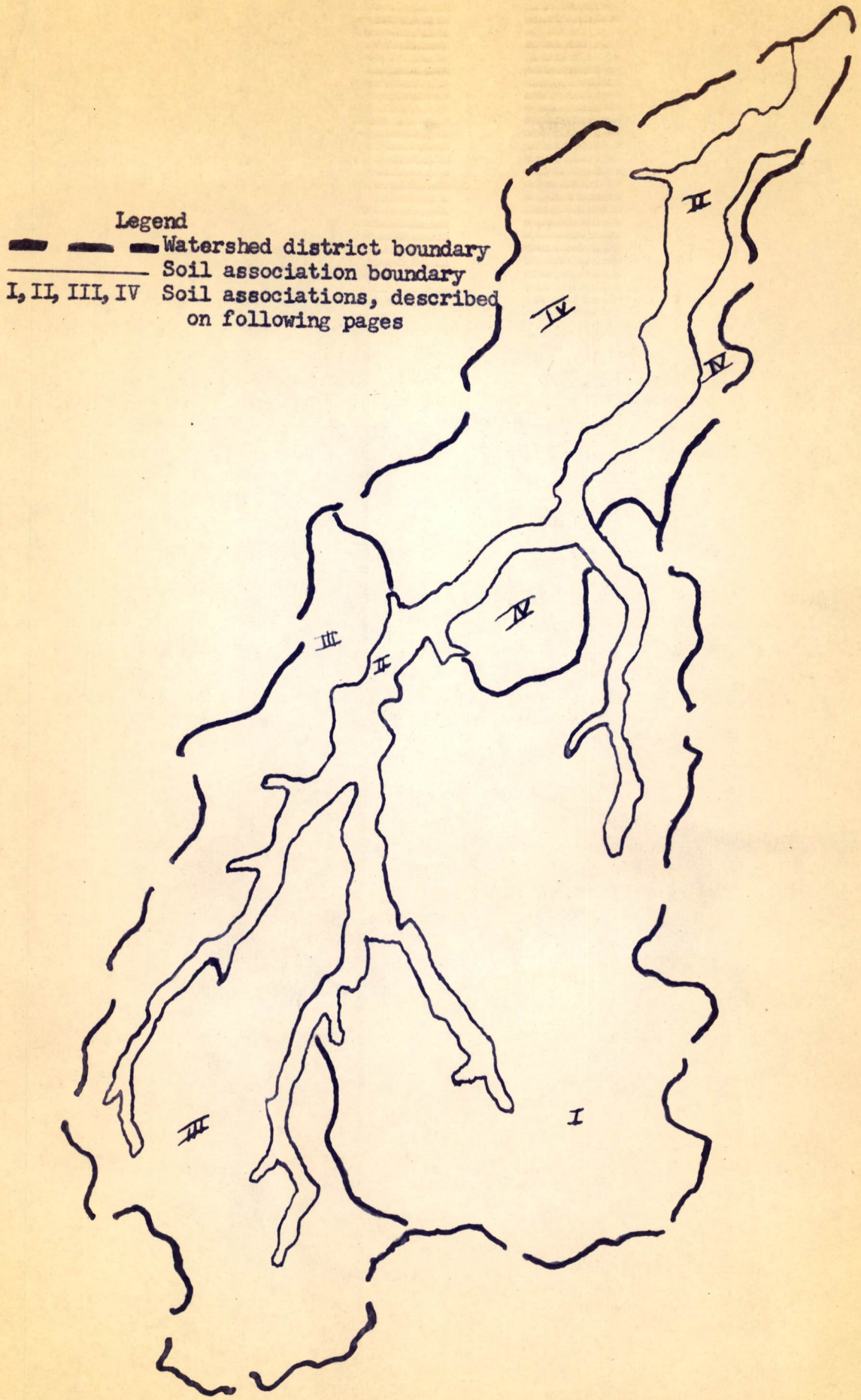

Figure 5. Soil association map of Johnson Creek Watershed District, Madison County, Tennessee.

DESCRIPTION OF SOIL ASSOCIATIONS FOUND IN JOHNSON CREEK WATERSHED DISTRICT, MADISON COUNTY, TENNESSEE

AREA 1 - Lexington and Ruston Soils

This area consists of strongly sloping ridge tops with moderately steep to steep hillsides. Sheet erosion is severe and gullies are common. The soils on the ridges and upper slopes are developed from a thin mantle of loess, overlying sands. The loess mantle is much thinner on the hillsides and the soils contain more sand than those on the ridge tops. These sandy soils are low in natural fertility. Most of the sloping and strongly sloping land has been cleared. Many of the steeper slopes are in woods.

AREA 2 - Hyman, Ina and Beechy Soils

This area consists mainly of bottom lands along the principal streams in the watershed. This is the most productive land in the watershed. Most of the land is cleared and used chiefly for the production of row crops. Usually the narrow bottoms near the heads of streams are better drained than the wider bottoms down streams. The soils range from moderately well drained to poorly drained.

AREA 3 - Memphis, Loring and Lexington Soils

This area is predominantly moderately sloping but is broken at intervals by short steep slopes. The soils are silty, deep and predominantly well drained. They are naturally fertile and under good management produce high yields.

AREA 4 - Grenada and Freeland Soils

This area is gently sloping. Many of the soils are characterized by a "fragipan," restricts drainage and influences the use suitability and management requirements for crops. Erosion has not been as severe in this area as in the other upland areas of the county.[3]

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[3]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, Soil Conservation Service, United States Department of Agriculture, to Joseph E. Winsett, dated January 3, 1958.

Figure 6. Soil association map of White Oak Watershed District, Chester, Hardin, Henderson, and McNairy counties, Tennessee.

DESCRIPTION OF SOIL ASSOCIATIONS FOUND IN WHITE OAK CREEK WATERSHED DISTRICT, CHESTER, HARDIN, HENDERSON, AND McNAIRY COUNTIES, TENNESSEE

AREA 1 - Lexington - Ruston

This area is in the western part of the watershed. It consists of sloping hill tops to strongly sloping to steep hill sides breaking off sharply into narrow draws. Most of the sloping and strongly sloping land has been cleared. The erosion is severe and gullies are common. Most of the steeper slopes are in woods. There is a lot of idle land in this area. The soils on the ridges and upper slopes are shallow silty soils over sands and sandy clays. Such soils as Lexington, Ruston, and Lexington-Ruston complex are the most common. Generally the soils on the lower slopes are heavier and such soils as Cuthbert, Cuthbert-Ruston occur.

AREA 2 - Shubuta - Silerton - Dulac - Cuthbert

This area consists of the gently sloping to strongly sloping land north of White Oak Creek. The soils in this area are derived from coastal plain clays. Such soils as Shubuta and Cuthbert are found on the steeper slopes. On the more gently slopes such soils as Dulac and Silerton occur. There are rather large areas of hardpan soils (Dulac) in this area. Erosion in this area is moderate to severe. Most of the steep slopes are in woods. Most of this area has been cleared and is being farmed.

AREA 3 - Shubuta - Silerton - Cuthbert - Dulac

This area is similar to Area 2 but is more rolling. The soils are derived from sands, sandy clays and clays of the coastal plain formation. Erosion is severe and gullies are common. Most of the steep slopes are in wood. There is quite a bit of idle land. On the more rolling topography such soils as Shubuta - Silerton - Cuthbert are common. On the gentler slopes Dulac is the most common soil.

AREA 4 - Cuthbert - Ruston - Guin

This area consists of the sloping to steep land extending from right northwestward to the bottomland of White Oak Creek. Most of the steepest land is still in woods. Most of the cleared land is severely eroded with gullies common. There is considerable idle land in this area. The soils of this area are rather variable and consist of a mixture of sands and sandy clays and clays. There are a few small areas of gravel deposits. The predominant soils are Cuthbert, Ruston, and Guin.

AREA 5 - High Terrace Etowah - Pickwick - Paden

This area is in the eastern part of the watershed. Most of it in the vicinity of Saltillo and some near Prospect. It consists of rather wide flat to gently rolling topography breaking off sharply in draws. Most of this is an old high terrace consisting of silts, sands, clays and gravel. The highest part of the flatter land is being farmed. Erosion on this is moderate to severe. Most of the steeper slopes are severely eroded. The predominant soil on the flatter areas is Paden and on the sloping to steep slopes Pickwick and Etowah are the most common soils.

AREA 6 - Low Terraces and Bottoms
Freeland - Hatchie Hymon, Ina - Beechy

This area consists mainly of bottom land and second bottoms along most of the streams in the watershed. Most of this land is cleared and is being farmed mainly for the production of row crops. This is the most important farm land in the watershed. Generally the narrow bottoms near the heads of the streams are better drained than the wider bottom down stream. The topography of this area is nearly level to gently sloping. The second bottom soils are imperfectly to somewhat poorly drained. The predominant soils are Freeland and Hatchie. The bottom soils range from moderately well drained to poorly drained. The main soils are Hymon, Ina, and Beechy. Along Mud Creek south of Morris Chapel the bottom soils are darker and heavier than the bottoms soil along the other stream.

AREA 7 - Tennessee River Low Terraces and Bottoms
Wolftever - Taft Ergam - Melvin

This area is located at the lower end of White Oak Creek where it enters the Tennessee River. It consists of bottom land and second bottoms on nearly level to flat topography. Most of the bottom land is still in woods. Nearly all of the second bottoms or terraces have been cleared and are used for the production of cotton, corn, and soybeans. The bottom land is subject to frequent floods and is under water over long periods of time during the winter and early spring months.

The soils of this area are derived from sediments mainly from the Tennessee River. The soils on the second bottom are moderately well drained to somewhat poorly drained. The most common series are Wolftever and Taft. Wolftever being the moderately well drained one and Taft somewhat poorly drained. The bottom land soils are moderately well drained to poorly drained. The poorly drained soils are the most common.[4]

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[4]Letter from H. N. Estes, Assistant State Conservationist for Watersheds, Soil Conservation Service, United States Department of Agriculture, to Joseph E. Winsett, dated November 13, 1957.