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WATERSHED PROJECTS—1972

TEKAMAH-MUD CREEK, NEBRASKA
SUGAR RIVER, NEW HAMPSHIRE
EIGHTEEN-MILE CREEK, SOUTH CAROLINA

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HEARING

BEFORE THE

COMMITTEE ON CONSERVATION AND
WATERSHED DEVELOPMENT

OF THE

COMMITTEE ON PUBLIC WORKS
HOUSE OF REPRESENTATIVES

NINETY-SECOND CONGRESS

SECOND SESSION

MAY 24, 1972

Printed for the use of the Committee on Public Works



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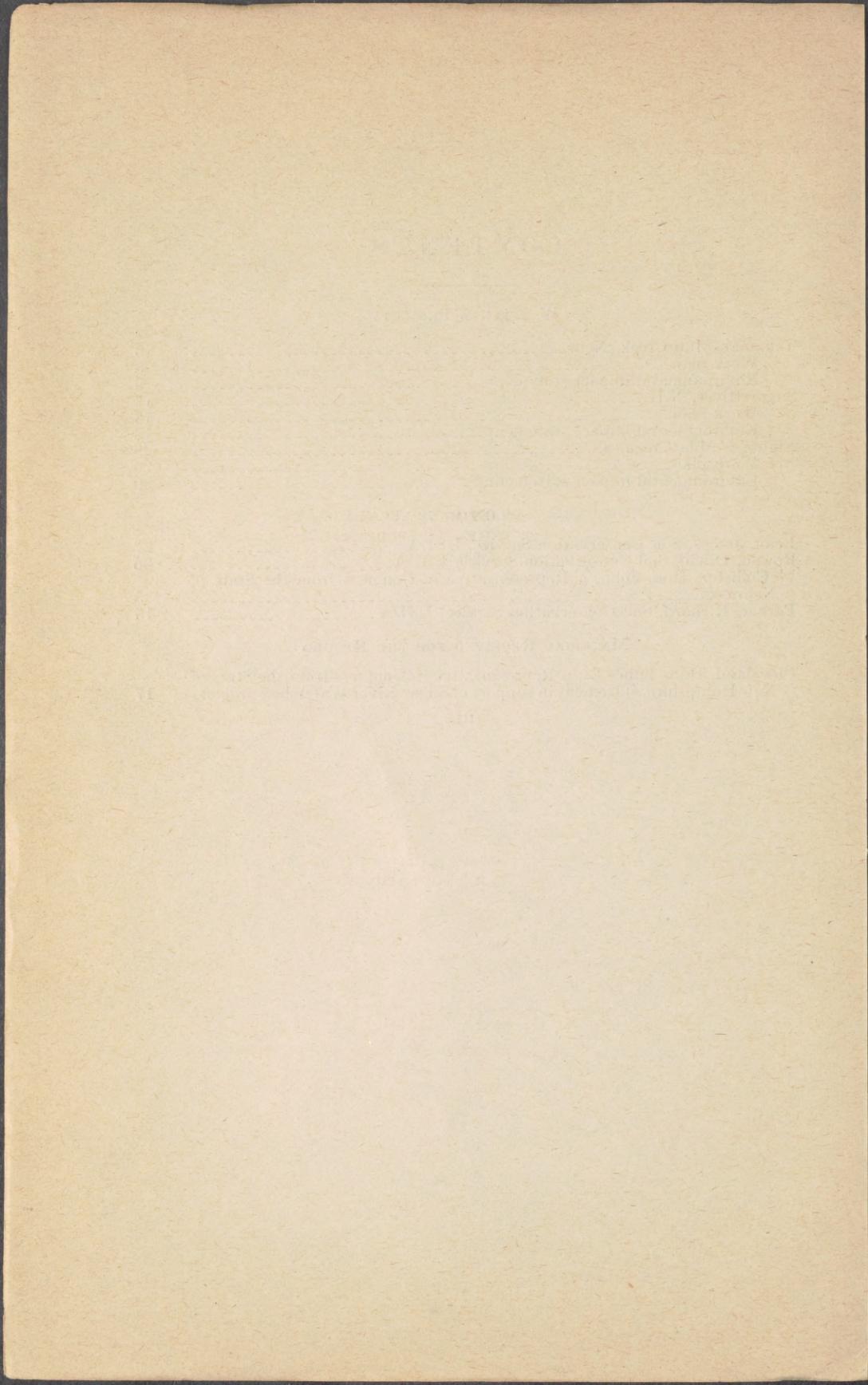
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WATERSHED PROJECTS—1972

TEKAMAH-MUD CREEK, NEBRASKA SUGAR RIVER, NEW HAMPSHIRE EIGHTEEN-MILE CREEK, SOUTH CAROLINA

WEDNESDAY, MAY 24, 1972

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON CONSERVATION AND
WATERSHED DEVELOPMENT OF THE
COMMITTEE ON PUBLIC WORKS,
Washington, D.C.

The subcommittee met at 10:15 a.m., in room 2253, Rayburn House Office Building, Hon. James Kee (subcommittee chairman) presiding.

Mr. KEE. The Subcommittee on Conservation and Watershed Development is now in session.

Before we get down to business, I feel it only proper that I make a brief statement. Today will probably be the last time I will have the responsibility to serve as chairman of the Conservation and Watershed Development Subcommittee. We have but three project plans before us, and it is highly unlikely any others will come to us during this session of Congress.

It has been a real and deep privilege for me to have so served in the 92d Congress. Working with you, my esteemed colleagues and members of the Soil Conservation Service has been a rewarding experience. I feel this subcommittee is doing a necessary job for the residents of our country.

True, there are detractors of the watershed development program. So, strong attacks have been made on this program as I and other members of this committee have traveled throughout the United States, and right here [indicating subcommittee printed report] is the consolation of our experience in the hearings we have held. We have left the door open for all views—pros and cons—anything anyone wants to say.

The purpose of our trips was to study the benefits which have accrued under Public Law 566. In each city and town we visited, opponents of the channel improvements appeared before us and repeated their charges. It was a stereotype thing. We have heard them to the maximum possible extent. In almost every instance these opponents cited the harm caused by channel improvements—but not once could a single solitary one of them name such a project where channelization was a real detriment to the ecology, if you want to call it that.

We would have gladly changed our itinerary to visit a project which had failed to live up to its promises if we had known of one.

I am certain that there have been mistakes in the past. It is our fervent hope that lessons learned from these mistakes—whatever mistakes there may have been—are being applied to all planning. I am confident this is being done.

What we saw, what we learned, and what we heard is now a matter of public record on our field trips and hearings. From my personal experience, I know that those of us who made field inspections are in wholehearted support of the watershed development program. I hope that the members of this committee will continue to support it in the coming years and future Congresses.

I would be remiss in my duties if I did not commend the unsurpassed knowledge—the full and complete dedication—the full and complete cooperation—the vital help of our distinguished ranking minority member, to my left, Representative Fred Schwengel. Mr. Schwengel, I have said this publicly in meetings, and I will say it again, is much more knowledgeable than I am. Fred and I have worked together like two peas in the same pod because I learn from him.

Mr. Baker of Tennessee has gone out of his way to take trips with us. And, needless to say, I am personally in your debt.

Our most informative majority staff member, Bob Spence, has at all times gone that extra step to be of constructive service to our committee and to our Nation. Also, Rick Barnett, the minority staff member, has contributed significantly in our joint effort to be of service.

In the years to come, our Nation will recognize the true value of this subcommittee which will provide adequate clean water as well as recreation to our Nation.

I thank you all so very much for your wonderful cooperation.

Now, before we call on Mr. Dorn, who is pressed for time, I am happy to yield to my illustrious friend, for whom I have great admiration, Fred Schwengel.

MR. SCHWENDEL. Mr. Chairman, and members of the committee, this is a solemn moment for me—and one I had hoped would never come. I know all of the members of the committee on both sides will echo the refrain that we are sorry to hear this may be the last time you will preside.

Mr. Chairman, I have come to know you intimately. I have known of you and your family for a long time, and they have made magnificent contributions to the betterment of our country. You especially, as I have learned about you, about your sense of dedication and willingness to work, and your capability, have made a very, very significant contribution in various ways.

You are the leader who broadened the scope of this Subcommittee on Conservation and Watershed Development. There is no area that deals with nature in America that is more important to the public and to this country than this area of soil conservation, proper water use, and soil protection.

We are dealing here with the only natural resource that can restore itself.

I regret your loss—the loss of leadership. I am sure this subcommittee agrees with me, and certainly the committee members and Congress will realize it more as time goes on.

West Virginia loses, in my view, a great public servant. And the United States loses.

Because of your leadership, Mr. Chairman, we now have reports on tours that we made inspecting watersheds in various parts of the United States—the finest collection of material that points to the gravity of the problem and the importance of a program that envisions a much greater attention to the problem than we have ever considered before.

Mr. Chairman, because of your leadership, and because of the inspiration and because of the evidence we now have, evidence that will, as a result of this, grow and grow, we will yet find and the Nation will begin to realize that as we complete the program of building watersheds throughout America, and conservation programs, we will do more than any other program ever envisioned to bring about a real solution to water pollution in America, and do more to protect our ability to produce and bring happiness and well-being to our people.

I, for one, and all the members who serve you, can assure you that we will continue with a greater sense of dedication because you were among us.

As I think of this program, and other associations with you, I think of some lines written by a man born in West Virginia, a great American, an author, and this is a paraphrase:

Here is a man to hold against the world; a man to match the mountains and sea. You have been great and you will become even greater in the eyes of many. And though you may not serve here, you will serve and continue serving in the projects you have started.

It is my hope you will come back often. And in West Virginia, as in Iowa, we have a phrase, "For you, sir, the latchstring hangs out."

I yield back to you, sir.

Excuse me, I almost forgot—as a sort of appreciation from the committee, here is a copy of a watercolor by a famous artist, Paul Norton, of the Capitol Building, until we can do something better.

Mr. KEE. Thank you very much, Fred.

Any other members of the committee?

Mr. SNYDER. Mr. Chairman, I do not think there is much I can add to what I believe to be eloquent remarks of Mr. Schwengel, but certainly I want to say that I have enjoyed very much serving with you and your fine attitude and cooperation. While I was not here when your father was in Congress, I served with your mother and I learned to respect the Kee family then, and that respect and admiration carried on to you, Mr. Chairman. I was privileged to serve here under you and with you on this subcommittee.

Certainly I would want to reiterate and echo everything Mr. Schwengel has said. We are going to miss you.

Mr. KEE. Thank you very much.

Mr. BAKER. Mr. Chairman, I would echo what the gentleman from Iowa has said. In the course of our travels and looking at watersheds and projects I have been particularly impressed with the affection which you have been shown by the persons you represent in Bluefield and Princeton, W. Va., and the magnificent projects which have been developed there which have responded to your leadership in that activity.

I just wish you well and I appreciate so much your friendship and guidance in Congress.

Mr. KEE. Thank you very much. I am certainly in your debt.

Mr. ANDERSON. Mr. Chairman, I would like to say, briefly, Jim, that it has been a pleasure working with you. I know we are going to miss you, your leadership, and your great knowledge of the conservation and watershed program.

I would like to echo the remarks of my friend, Mr. Schwengel, and I would like to point out that some of the rest of us know how it feels to be defeated. I have probably been defeated for public office more than anyone else in this room—four times—twice for a different office, once for my party's nomination for another office and once for reelection.

I know how it feels, and it hurts, but I have found that one often learns more from defeat than from victory.

We hope that you will return often and share with us the benefit of your experience and knowledge.

Mr. KEE. Well, after winning 80 elections, I did not mind losing No. 81.

Mr. CAFFERY. Mr. Chairman, if I might speak briefly, I would simply say the tributes that have been paid to you this morning with affection are richly deserved. You will be with us until the end of this year, and, knowing your ability and your drive, I predict you will still carve some pretty grand monuments within this field in the ensuing months.

As our distinguished colleague from California just said, I think your years in public service in various ways may well just have started. And the monuments you created and the work you have done, the attachment you have shown to this country—to the people and to the soil and resources you have had a mighty hand in preserving—will continue through the years. And we all look to that as well as to the continuation of your friendship and the really significant contributions that you have made to the country.

I would be remiss if I did not thank you personally for all of the counsel and leadership that you have shown to me, guidance and direction that you offered through the course of years. And also, because no one else has spoken for the farmers and ranchers and people who are attached to the soil, for them I would also say, thank you.

Mr. KEE. Thank you very much. I will never lose interest.

Mr. HAAS. Mr. Chairman, my name is Joe Haas of the Soil Conservation Service. As you are aware, Mr. Hollis Williams has been ill for some weeks. Otherwise, he would be here this morning. He asked that I personally, too, extend the thanks and gratification of the Department of Agriculture, and especially for Mr. Williams, to you. Mr. Kee, for your leadership and cooperative attitude and enthusiastic spirit on this committee.

The hearings you have held throughout the country are certainly a testimonial to the watershed program. For this we are most grateful to you and the rest of the committee.

Mr. KEE. Thank you very much. You know, we work as a team and those remarks may be applied to all of the members of this committee.

Mr. SPENCE. Mr. Dorn had a 10 o'clock meeting of his own committee. He had to leave because they were waiting for him.

Mr. KEE. I might say that Mr. Dorn came early and I talked a little bit longer than I should have.

Mr. SNYDER. We did not talk as long as we should have, Mr. Chairman.

Mr. KEE. He had another meeting and he came here first. I promised him that I would recognize him first.

Our first witness, the very distinguished Member of the House of Representatives, from Nebraska, Mr. McCollister. Mr. McCollister is here on behalf of the Tekamah-Mud Creek project.

Representative McCollister, we are happy indeed to welcome you.

**STATEMENT OF HON. JOHN MCCOLLISTER, A REPRESENTATIVE IN
CONGRESS FROM THE STATE OF NEBRASKA**

Mr. McCOLLISTER. Thank you, Mr. Chairman, and gentlemen of the subcommittee.

I appear here on behalf of the citizens of Tekamah, Nebr., and the county in which Tekamah is located, to speak for the Tekamah-Mud Creek project.

Tekamah and Mud Creek form a "Y" which combines just west of the town of Tekamah, Nebr., leading through that community and through a levee system that flows into the Missouri River, about 2 miles east of the town of Tekamah.

In 1964, some 6 inches of rainfall fell within a 24-hour period and the result was extensive flooding of the farmland to the west of Tekamah, and particularly a great part of the community of Tekamah.

There is a rather substantial fall of water in this area. It is on the banks of the Missouri, of course, and over the centuries the Missouri has ground out steep slopes and leaves the community somewhat at the peril of these two creeks. It is proposed that by the expenditure of approximately \$1,200,000 Federal money, plus the local matching money, a lake can be built on the creek, thereby impounding some of those waters and regulating their flow.

One of the benefits is the reduction of sediment in the Missouri. The lake provides about 295 acres of surface water and recreational land about it to provide for that recreational opportunity there. Some 19,000 acres are included and a very unusual factor I think as to the urgency.

Nebraska, like many communities in the Midwest, has been much subject to the Dutch elm disease. The banks of these creeks are lined with dead elms. Some of them have fallen into the creekbeds and raises the great hazard of a flash flood clogging the stream and clogging the bridges which are in Tekamah, and the resulting flood of water on that community.

The community is enthusiastically behind the project and I respectfully urge your consideration of the project.

Perhaps, parenthetically, I should add that this district is in a county which borders the First Congressional District of Nebraska which my colleague of this committee, Mr. Thone, represents. In times past this county has been a part of the First Congressional District though now it is part of the Second Congressional District. Mr. Thone and I, therefore, have a very urgent interest in this project.

Thank you for your consideration.

Mr. KEE. Mr. McCollister, we are indeed grateful to you. Before we adjourn this meeting, I have every confidence that all three of these projects will be approved unanimously.

Mr. MCCOLLISTER. That is indeed good news. Thank you.

Mr. SCHWENGEL. Mr. Chairman.

Mr. KEE. Mr. Schwengel.

Mr. SCHWENGEL. There are several benefits not listed here, and one we have been campaigning for—all benefits, directly and indirectly as a result of this watershed. Earlier we commented about saving the soil and 85 percent of the silt, which is very important. It is also going to slow up the waters going into the Missouri River, and aid and abet our program of flood control. And in the process you are going to find out when this is completed the tremendous advantages we discovered in our trips—that is the prosperity—greater prosperity in these areas.

In my district, the Rocky Branch that we visited, the poverty area when I came to Congress, this committee saw the wisdom of adopting this program there and seeing over the years the production of corn has gone from 30 bushels an acre to 120. This is the kind of thing that happens when we deal with the watershed areas.

In your area you have a large percent of grass. In that area there I imagine there is a large percentage of farming. So there are some additional benefits that come with this project that I will call attention to.

Mr. THONE. Will the gentleman yield?

Mr. SCHWENGEL. Yes.

Mr. THONE. As Congressman McCollister noted, this watershed borders on my congressional district. Congressman McCollister and myself have toured the watershed.

The point that Congressman Schwengel makes and, as he knows, I am quite interested in it too—the report shows that 151,000 tons of sediment are delivered to the mouth of this watershed annually—151,000 tons.

We talk about the Clean Waters Act and, as Congressman Kee knows, that act in no way comes to grips with this fundamental problem that we have of cleaning up the rivers and harbors of our country.

As I understand, Congressman Schwengel has a bill being offered that will specifically come to grips with this problem.

Mr. SCHWENGEL. Mr. Kee and I will cosponsor the bill.

Mr. THONE. I think that that bill ought to get some real priority after we finish up with the conference report on the Clean Waters Act, Chairman Kee. But this is a fine project and at this point in the record I would like to have the 18 favorable environmental effects that are included in the Tekamah-Mud Creek watershed report we have here included in the record.

Mr. KEE. Thank you very much. Let me add at this point, this subcommittee has found that the runoff and your soil upstream does more to damage water downstream than all industries in the United States. This you will find very thoroughly documented in those hearings.

TEKAMAH-MUD CREEK WATERSHED, NEBRASKA

At this time the committee is happy to recognize Mr. Richard Parker, soil conservationist. He is going to talk on Tekamah. The documents relative to this project will appear in the record at this point.

(The documents referred to above follow:)

TEKAMAH-MUD CREEK WATERSHED, NEBRASKA

Fewer factors of agriculture production will be purchased and utilized as a result of project measures because of reduced acres available. It is further anticipated that project measures will induce net reduction in purchases of factors of production although additional inputs will be utilized on the areas benefited.

With fishing and other water-based recreation made available, increased retail sales of products associated with such recreation can be expected.

FAVORABLE ENVIRONMENTAL EFFECTS

1. Reduce erosion by about 15 percent.
2. Prevent land destruction and depreciation by gully erosion on about 1,885 acres of uplands.
3. Reduce floodwater damages to 240 urban residences and business properties by about 98 percent.
4. Reduce floodwater and sediment damages to about 20 agricultural properties by about 85 percent.
5. Essentially eliminate flood damages to roads and bridges located within the watershed that presently receive damages during flood events.
6. Reserve 330 acres of land for wildlife and recreation and provide for recreational activities in an area where such opportunity is now limited or non-existent. An estimated 27,000 visitor-days of use is expected annually, including fishing and other water sport uses indicated in No. 7.
7. Create 190 acres of water surface to be used by the public for an estimated 5,100 man-days of lake fishing in addition to swimming, boating, water skiing, etc. Migratory waterfowl will rest and feed at the water areas.
8. Create 105 acres of water surface in the sediment pools of planned structures. These pools will provide waterfowl resting and feeding areas and lake fisheries.
9. Improve maintenance of existing and development of new properties resulting in increased tax base.
10. Reduce underemployment and unemployment.
11. Make available improved environmental condition for living and encourage out migration from large urban areas.
12. Increased retail sales of products associated with recreation.
13. Encourage farm families to remain on the farm.
14. Additional factors of production (fertilizer, fuel, etc.) will be utilized on benefited areas.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

1. Agricultural and wildlife use of the 295 acres of cropland, woodland, and miscellaneous areas will be eliminated by the sediment and recreation pools of the planning structural measures.
2. Agricultural, wildlife and recreational use of cropland, pasture and woods in the 245 acres in the flood detention pool areas will be periodically interrupted by floodwaters.
3. Wildlife and agricultural use of the 38 acres to be occupied by dams, spillways and grade stabilization structures will be lost until these areas are reseeded immediately after construction. Limited grazing may be permitted after the areas are revegetated.
4. Inundation of about 8 miles of intermittently flowing streams in the pool areas of proposed structural measures.
5. Stimulate increased vehicular traffic at water areas where fishing and other recreational activities will take place.
6. Reduce net sales of agriculture production factors.

ALTERNATIVES TO THE PROPOSED ACTION

One possible alternative to the proposed action for solving the water and related land resource problems would be to eliminate all the structural measures from the plan and install only the planned conservation land treatment. Except for gullied areas, this alternative would have essentially the same beneficial effect in much of the upland areas as the proposed plan. However, the threat of

land destruction and depreciation by the headcutting gullies would still be dominant. Many land treatment practices cannot be installed without first stabilizing the gullies. Additionally, flood damages would be reduced by only 4 percent, and a reduction as nominal as this would not be sufficient to permit the agricultural flood plains to be used in accordance with its capability. Urban damages and the threat of loss of life in the City of Tekamah would continue virtually unchecked.

TEKAMAH-MUD CREEK WATERSHED

Size and Location—19,080 acres in Burt County.

Sponsors—Burt Soil and Water Conservation District and Tekamah-Mud Creek Watershed Conservancy District.

Purposes—Watershed Protection, Flood Prevention and Recreation.

Principal Measures—Soil conservation practices on farms and woodlands; and structural measures, consisting of one multiple-purpose reservoir with storage capacity for sediment, floodwater and recreation; 4 combination floodwater retarding and grade stabilization structures; and ten grade stabilization structures. The total storage capacity of the structures is 7,667 acre-feet.

ANNUAL BENEFITS

	Amount	Percent
To agricultural acreage (land and crops).....	\$27,500	25
To agricultural improvements.....	700	
To nonagriculture improvements.....	27,500	25
Indirect.....	6,100	5
Recreation.....	40,400	36
Secondary.....	9,900	9
Total.....	112,100	100

PROJECT COSTS

	Public Law 566 funds		Other funds		Total amount
	Amount	Percent	Amount ¹	Percent	
Land treatment measures.....	\$38,000	14	\$233,000	86	\$271,000
Structural measures:					
Flood prevention.....	838,000	94	58,000	6	896,000
Recreation.....	205,000	50	202,000	50	408,000
Project administration.....	154,000	95	9,000	6	163,000
Total.....	1,236,000	71	502,000	29	1,738,000

¹ For land treatment measures this is primarily the cost of applying land treatment measures by landowners. Cost sharing from funds appropriated for the rural environmental assistance program may be available if included in the county program. For structural measures this is the cost of land rights and project administration. It may also include costs for construction or engineering services for purposes other than flood prevention.

² The value of measures already installed (\$209,000) increases this to 37 percent.

Note: Benefit-cost ratio, 1.3 to 1.

SOIL CONSERVATION SERVICE—WATERSHED PLANNING DIVISION

USDA ENVIRONMENTAL STATEMENT () DRAFT (X) FINAL FOR TEKAMAH-MUD CREEK WATERSHED, NEBRASKA

Summary

1. *Name of action:* (x) Administrative () Legislative.

2. *Description of action:*

A watershed project carried out by local sponsoring organizations with Federal assistance under authority of P.L. 566. The project, located in Burt County, proposes one multiple-purpose reservoir with storage capacity for recreation, floodwater and sediment; four combination floodwater retarding-grade stabilization structures; and ten grade stabilization structures. About 600 acres of land will be purchased by the sponsors for the recreation lake and basic facilities.

3. *Summary of environmental impact and adverse environmental effects:*

Project action will: reduce erosion, prevent land destruction by gully erosion and reduce floodwater and sediment damages by about 98 percent in the City of Tekamah and by about 85 percent on the agricultural flood plain; essentially eliminate flood damage to roads and bridges; reserve 330 acres of land for wildlife and recreation; provide for an estimated 27,000 visitor days of use annually; create 295 surface acres of lake fishing, and feeding and resting places for migratory waterfowl; eliminate agricultural and wildlife use of the 295 acres in the sediment and recreation pools; inundate about 8 miles of intermittently flowing streams.

4. *List of alternatives considered:*

- A. Conservation land treatment alone.
- B. Less intensive use of flood plain areas.
- C. Flood proofing and channel improvement in the urban areas.
- D. Flood plain zoning.
- E. Numerous combinations of structural works.

5. *List of Federal, State and local agencies from which comments have been received:*

Environmental Protection Agency.
 U.S. Department of the Army, Corps of Engineers.
 U.S. Department of Health, Education and Welfare.
 U.S. Department of the Interior.
 Governor of Nebraska.

6. *The Draft Environmental Statement was made available to the Council on Environmental Quality on May 24, 1971.*

U.S. DEPARTMENT OF AGRICULTURE—SOIL CONSERVATION SERVICE

USDA ENVIRONMENTAL STATEMENT

(Prepared in accordance with section 102(2)(C) of Public Law 91-190)

Date: November 1971.

Title of Statement: Tekamah-Mud Creek Watershed, Nebraska.

Authority for Project: Public Law 566, 83rd Congress, 68 Stat. 666, as amended.

Sponsoring Local Organizations: Burt Soil and Water Conservation District and Tekamah-Mud Creek Watershed Conservancy District.

Nature of Action:

A watershed project to be carried out by the sponsoring local organizations with Federal assistance under the provisions of Public Law 566 in accordance with a work plan for the Tekamah-Mud Creek Watershed, Nebraska.

Nature of Project:

The watershed, located in Burt County, covers an area of 19,080 acres with approximately 19 percent used for pasture and range, 71 percent for cropland, 2 percent for woodland, 4 percent for urban, and about 4 percent for miscellaneous uses. There are 75 farm units in the watershed. Livestock production and the growing of corn, grain sorghum, alfalfa and soybeans are the primary source of income. The average size farm is about 255 acres and the average annual gross income is about \$21,500. Approximately 54 percent of the needed land treatment is now on the land.

The 745 acre flood plain of the watershed is subject to frequent flooding, with some flooding occurring on an average of once each year. Roads and bridges at 13 stream crossings are subject to flood damage. Approximately \$4.9 million worth of urban property is subject to damage from a 100-year frequency storm event. Floods pose a threat to human life in the City of Tekamah. The average annual floodwater damage to Tekamah urban property is estimated to be \$23,000. Total floodwater damages are about \$70,000 annually.

Erosion is moderate throughout the area with about 151,000 tons of sediment delivered to the mouth of the watershed annually to flood plain lands from sediment deposition and the scouring action of floodwater.

Gully erosion is a major problem in the watershed. Intensive land use and the lack of conservation practices have resulted in an acceleration of the erosion cycle. Gully channels deepen and widen as successive waves of channel overfalls migrate upstream. Roadside gullies often damage or destroy adjacent road beds. It is estimated that severe gully erosion eventually will destroy about 260 acres of cropland and significantly reduce the productive capability of an additional

1,625 acres of cropland unless corrective action is taken. Active gully erosion on upland farms is causing almost \$17,000 in land damage annually. Average annual gross erosion from gullies is estimated to be about 15 tons per acre over the entire watershed.

Existing water-based recreational facilities are inadequate to meet needs. Nebraska's "Comprehensive Plan for Outdoor Recreation" (1968) identifies 14 socio-economic areas in the State. This watershed is in the Omaha socio-economic area. The Comprehensive Plan indicates an existing deficiency of 22,550 acres of land and 121,830 acres of water developed for outdoor recreational activities. These deficiencies are expected to increase to 71,900 acres of land and 326,900 acres of water by the year 2000.

Habitat for quail, pheasant, squirrel, rabbit, deer, fox, coyote, beaver, muskrat, mink and songbirds is of high value. The only available fishery is farm ponds, thinly scattered throughout the area. Streams are intermittent and do not support a fishery habitat. Waterfowl occasionally use the streams during migration.

The project provides for conservation land treatment over the entire watershed. About 5,000 acres will become adequately treated during the 5-year project installation period. This will bring the total area adequately treated in the watershed to 14,500 acres or 76 percent. Land treatment practices include: conservation cropping systems, diversion terraces, field border planting for erosion control and wildlife habitat, minor grade stabilization structures, field terraces, and grassed waterways and outlets. The project also includes: one multiple-purpose reservoir (Summit Lake) with storage capacity for floodwater, sediment and public recreation. At this site about 600 acres will be purchased to be used as follows: 190 acre-lake, 80 acres in dam, spillway and detention pool and about 330 acres to be set aside for the installation of recreation facilities. The project also includes four combination floodwater retarding-grade stabilization structures and ten grade stabilization structures.

All construction areas will be revegetated with appropriate grasses to control erosion after construction. These areas are now being used for pasture, range and cropland. Additional vegetative plantings will be made on the approximately 330 acres to be designated as a recreation area. This area surrounds the Summit Lake reservoir and will be fenced. The plantings will be selected where possible from grass species that have value for wildlife food and cover.

The sediment pools of four floodwater-retarding structures will be used for fishing and other recreational activities until they are filled with sediment. Sponsors will advise landowners at these sites of the need to install adequate sanitary facilities in accordance with Nebraska and Burt County health regulations. Sanitary facilities will be installed at Summit Lake (multiple purpose site 5-A) in accordance with these health regulations.

Thirty acres of trees and shrubs of proven wildlife value will be planted to mitigate woody habitat unavoidably destroyed during the construction of structural measures. These plantings will be made as close as possible to the place where the habitat loss occurs.

Contractors will be required to adhere to strict guidelines for minimizing soil erosion, and water and air pollution during construction.

Guidelines issued by the U.S. Public Health Service will be used in the design of project measures to minimize vector borne disease problems.

The National Park Service has indicated that significant archeological remains are probably present within the project area. The Soil Conservation Service will keep the National Park Service informed of the progress of the project so that archeological surveys and any necessary salvage can be carried out prior to the beginning of construction.

The estimated total installation cost for this project is \$1.7 million with local funds paying \$0.5 million. It is estimated that \$1.30 will be realized in benefits for each dollar of cost.

STATEMENT

(i) *Environmental Impact*

Conservation land treatment will reduce average annual gross erosion and sediment production in the watershed by about 15 percent.

The volume of sediment leaving the watershed will be reduced from about 151,000 tons to about 70,000 tons annually. This will result in a reduced annual cleanout in the channel from the mouth of this watershed to the Missouri River, by an estimated 57 percent.

The threat of destruction of 260 acres of cropland and depreciation of another 1,625 acres of cropland will be virtually eliminated by installation of major grade stabilization structures. Minor grade stabilization measures, as a part of the conservation land treatment program, will reduce average annual gully erosion rates by an estimated 37 percent.

Floodwater and sediment damage to 745 acres of agricultural flood plain lands will be reduced by about 85 percent. Owners and operators of about 20 farms will receive flood damage reduction benefits. Roads and bridges at the 13 stream crossings will be protected from flood damage and the threat of bridge washouts removed.

An estimated 200 residences and 40 businesses will receive protection from a flood that might occur on an average of once in 100 years. Damages from a storm similar to the one on June 11, 1944, with the project installed, would be reduced from an estimated \$1.2 million to about \$20,000, most of which would be agricultural damage outside the Tekamah City limits.

Construction of Summit Lake (multiple purpose site No. 5-A) will provide a 190-acre lake for recreational use. Basic recreational facilities in the 330 acres to be purchased around the lake will provide for activities that include: camping, swimming, nature walks, picnicking, sailing, hunting and ice skating. It is estimated that about 5,100 man-days of lake fishing will be provided each year. The total of all recreational activities is an estimated 27,000 visitor-days annually.

The sediment pools of the four combination floodwater-retarding and grade control structures will provide about 87 acres of lake fishery until they are filled with sediment over their 100-year life. Another 18 acres of lake fishery will be available at the planned grade stabilization structures until they fill with sediment. These newly created water surfaces are scattered over the watershed and will support about 1,300 man days of lake fishing and provide feeding and resting places for migratory waterfowl.

The water areas of the fifteen structural measures will eliminate agricultural and wildlife use of 295 acres. The present land use in these areas is: 188 acres of cropland, 43 acres of pasture, 46 acres of woods, and 18 acres of gullies and other miscellaneous uses.

The floodwater detention pools will occupy about 245 acres and periodically interrupt agricultural and wildlife use of 158 acres of cropland, 38 acres of pasture, 37 acres of woods and 12 acres in gullies and other miscellaneous uses. Future use of the detention pools for agriculture and wildlife will be similar to the present use, except for the Summit Lake reservoir. The 80 acres in the detention pool of this reservoir will be used for primitive camping, nature studies and wildlife habitat.

Construction of dams, spillways, and grade stabilization structures will eliminate agricultural and wildlife use of about 38 acres including 14 acres of cropland, 14 acres of pasture, 8 acres of woods, and 2 acres of miscellaneous uses. These areas will be revegetated immediately after construction.

The present land use of the 330 acre recreational area of the Summit Lake recreational development is 112 acres of cropland, 162 acres of pasture, 45 acres of woods, and about 10 acres of miscellaneous uses. After project installation, the 330 acres will be used exclusively for recreational and wildlife purposes. About 130 acres of the 330 acres will be occupied by basic facilities and the remainder will be used for primitive camping, nature studies and wildlife habitat.

Approximately 8 miles of intermittent stream channels will be inundated by the planned structural measures.

Secondary impacts of the project on the environment include: increased business activity in the area; increased income from transporting, processing and marketing of goods and services; and increased vehicular traffic in the vicinity of the lake and pool areas used for fishing and other recreational activities.

This project will assist to induce an atmosphere conducive for the maintenance of existing and developing of new residential, industrial and commercial properties in the Tekamah community by increasing a "sense of security" from reduction of the flood hazard and providing additional recreational opportunities. This would increase the tax base and better enable the community to provide adequate public services.

Families will be encouraged, as a result of this project, to establish permanent residence in Tekamah or to establish "second" homes in the vicinity of Summit Lake due to the resultant improvement of environmental conditions such as available outdoor recreation, rural living, etc. Other than benefits to the com-

munity of Tekamah, the encouraging of families to live in rural areas tend to alleviate problems created by migration to urban areas.

Underemployment and unemployment in the community will be reduced. (1968 per capita income in Burt County was \$2,725 as compared to the U.S. at \$3,159.) Project measures will create conditions encouraging retainment of existing and establishment of new businesses capable of employing both unskilled and semi-skilled labor from the community. Operation and maintenance of the project measures will create at least one man-year of employment.

Structural measures will reduce acres available for production on 15 farm units and stabilize agriculture income on all or part of 25 farm units. Such will encourage non-agricultural development which will tend to encourage families to continue living on the farms.

Fewer factors of agriculture production will be purchased and utilized as a result of project measures because of reduced acres available. It is further anticipated that project measures will induce net reduction in purchases of factors of production although additional inputs will be utilized on the areas benefited.

With fishing and other water-based recreation made available, increased retail sales of products associated with such recreation can be expected.

(ii) *Favorable Environmental Effects*

1. Reduce erosion by about 15 percent.
2. Prevent land destruction and depreciation by gully erosion on about 1,885 acres of uplands.
3. Reduce floodwater damages to 240 urban residences and business properties by about 98 percent.
4. Reduce floodwater and sediment damages to about 20 agricultural properties by about 85 percent.
5. Essentially eliminate flood damages to roads and bridges located within the watershed that presently receive damages during flood events.
6. Reserve 330 acres of land for wildlife and recreation and provide for recreational activities in an area where such opportunity is now limited or non-existent. An estimate 27,000 visitor-days of use is expected annually, including fishing and other water sport uses indicated in No. 7.
7. Create 190 acres of water surface to be used by the public for an estimated 5,100 man-days of lake fishing in addition to swimming, boating, water skiing, etc. Migratory waterfowl will rest and feed at the water areas.
8. Create 105 acres of water surface in the sediment pools of planned structures. These pools will provide waterfowl resting and feeding areas and lake fisheries.
9. Improve maintenance of existing and development of new properties resulting in increased tax base.
10. Reduce underemployment and unemployment.
11. Make available improved environmental condition for living and encourage out migration from large urban areas.
12. Increased retail sales of products associated with recreation.
13. Encourage farm families to remain on the farm.
14. Additional factors of production (fertilizer, fuel, etc.) will be utilized on benefited areas.

(iii) *Adverse Environmental Effects Which Cannot Be Avoided*

1. Agricultural and wildlife use of the 295 acres of cropland, woodland, and miscellaneous areas will be eliminated by the sediment and recreation pools of the planning structural measures.
2. Agricultural, wildlife and recreational use of cropland, pasture and woods in the 245 acres in the flood detention pool areas will be periodically interrupted by floodwaters.
3. Wildlife and agricultural use of the 38 acres to be occupied by dams, spillways and grade stabilization structures will be lost until these areas are reseeded immediately after construction. Limited grazing may be permitted after the areas are revegetated.
4. Inundation of about 8 miles of intermittently flowing streams in the pool areas of proposed structural measures.
5. Stimulate increased vehicular traffic at water areas where fishing and other recreational activities will take place.
6. Reduce net sales of agriculture production factors.

(iv) Alternatives to the Proposed Action

One possible alternative to the proposed action for solving the water and related land resource problems would be to eliminate all the structural measures from the plan and install only the planned conservation land treatment. Except for gullied areas, this alternative would have essentially the same beneficial effect in much of the upland areas as the proposed plan. However, the threat of land destruction and depreciation by the headcutting gullies would still be dominant. Many land treatment practices cannot be installed without first stabilizing the gullies. Additionally, flood damages would be reduced by only 4 percent, and a reduction as nominal as this would not be sufficient to permit the agricultural flood plain to be used in accordance with its capability. Urban damages and the threat of loss of life in the City of Tekamah would continue virtually unchecked.

Land use in the 745-acre agricultural flood plain is 590 acres in cropland, 100 acres in grassland, 50 acres in woods and about 5 acres in miscellaneous uses. An additional 210 acres in the flood plain is in houses, businesses and other urban properties in the City of Tekamah. To lessen the potential for flood damages by changing to such less intensive uses as pasture and woods would not be practical and the cost for land purchase to accomplish this would be prohibitive due to the degree of development already existing. Flood plain zoning in the undeveloped urban areas would curtail future development in these areas, but would not provide protection to the existing homes and commercial properties. Sponsors have been encouraged to institute zoning of the undeveloped flood plain within the City of Tekamah.

A system of fewer, but larger, floodwater-retarding structures is not practical since they would inundate a large part of the bottomland cropland and pasture they are designed to protect and would inundate a railroad and a State highway. Conversely, the selected structures cannot be replaced by larger numbers of smaller floodwater-retarding structures except at greater construction cost.

Channel improvement through the Town of Tekamah in lieu of floodwater retardation upstream would require moving homes, businesses, schools, government buildings, a hospital, at least one rest home and many other costly improvements. It is estimated that the cost of channel improvement including land rights would be in excess of \$2.4 million. Flood proofing of existing properties would also be more costly than the planned project.

Any alternative system of structural works must include grade stabilization of the head-cutting gullies in the upland sections of the watershed. For the present and projected future intensity of use, agreement was reached between the sponsors and the Soil Conservation Service on an objective that would: provide protection from a 135-year frequency storm in the urban flood plain, reduce damages on the agricultural flood plain by about 65 percent, reduce land destruction and depreciation by gully development to a practical minimum and provide a recreation lake with associated facilities.

Alternative sites could be developed for a recreational lake. Because of topographic limitations, location of fixed improvements, the location with respect to population centers, and the savings made possible by multiple purpose development, no other suitable sites could be agreed upon by the sponsors.

If the planned project were not implemented, it is estimated that approximately \$25,000 in average annual net benefits would be foregone. Additionally, an estimated \$70,000 damage to flood plain lands would continue to occur annually and an estimated 1,880 acres of upland would be rendered essentially useless by the head-cutting gullies. A higher out-migration will also occur in the Tekamah community (with resultant losses of wholesale, retail and service trades) because the flood hazard will continue and outdoor recreation will not be made available.

A delay in project implementation of two years would result in the foregoing of an estimated \$3,500 in agricultural and \$4,000 in recreation benefits, the permanent loss of about two acres of land due to head cutting and the community of Tekamah would continue to feel threatened by the flood hazard.

(v) Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Most of the land in the watershed is primarily devoted to agricultural production and is not expected to change. During the installation period of project measures, the temporary storage of construction equipment, and clearing and

reshaping of land areas are considered as short-term uses of man's environment. These areas will be revegetated to restore essentially the same long-term productivity. Installation of the project will reduce erosion, flooding and sedimentation and will provide recreational opportunity for the immediate and more distant future. Current productivity will be maintained and improved. Even after the designed life of the project of 100 years, the project will still be effective in conserving the land and water resources of the watershed.

(vi) *Irreversible and Irrecoverable Commitments of Resources*

About 320 acres of the 330 acres to be purchased for recreation facilities now in cropland, pasture and woods, will be changed to recreation and wildlife uses. Agricultural and wildlife use of cropland, grassland and woodland in the 295 acres to be inundated by the sediment and recreation pools will be eliminated. Flooding of the 245 acres in the flood detention pools will periodically interrupt wildlife and agricultural use of these areas. The 38 acres to be occupied by dams, spillways and grade stabilization structures will be lost for wildlife use until the areas are revegetated after construction. An estimated 8 miles of intermittent stream channels will be inundated by the planned structural measures.

Consultation—General

The application for assistance for the Tekamah-Mud Creek Watershed was submitted to and approved by the Nebraska Soil and Water Conservation Commission Board. The plan for solving water and related land resource problems was developed in full consultation with Federal, State and local agencies as well as with watershed residents. Prior to preparation of the final work plan, an informal field review was held in the watershed at which time interests were invited to present their views and recommendations either orally or in writing. The plan and environmental statement have also been reviewed by the Governor of Nebraska and various Federal departments. This environmental statement and work plan have been prepared in consideration of comments and recommendations provided as a result of these reviews.

Comments and Recommendations Made by Reviewing Federal, State and Local Agencies

The Department of the Army commented that no conflict with any projects or current proposals were foreseen regarding this work plan.

The Department of Health, Education and Welfare reviewed the health aspects of the environmental impact statement and the work plan and offered no comments.

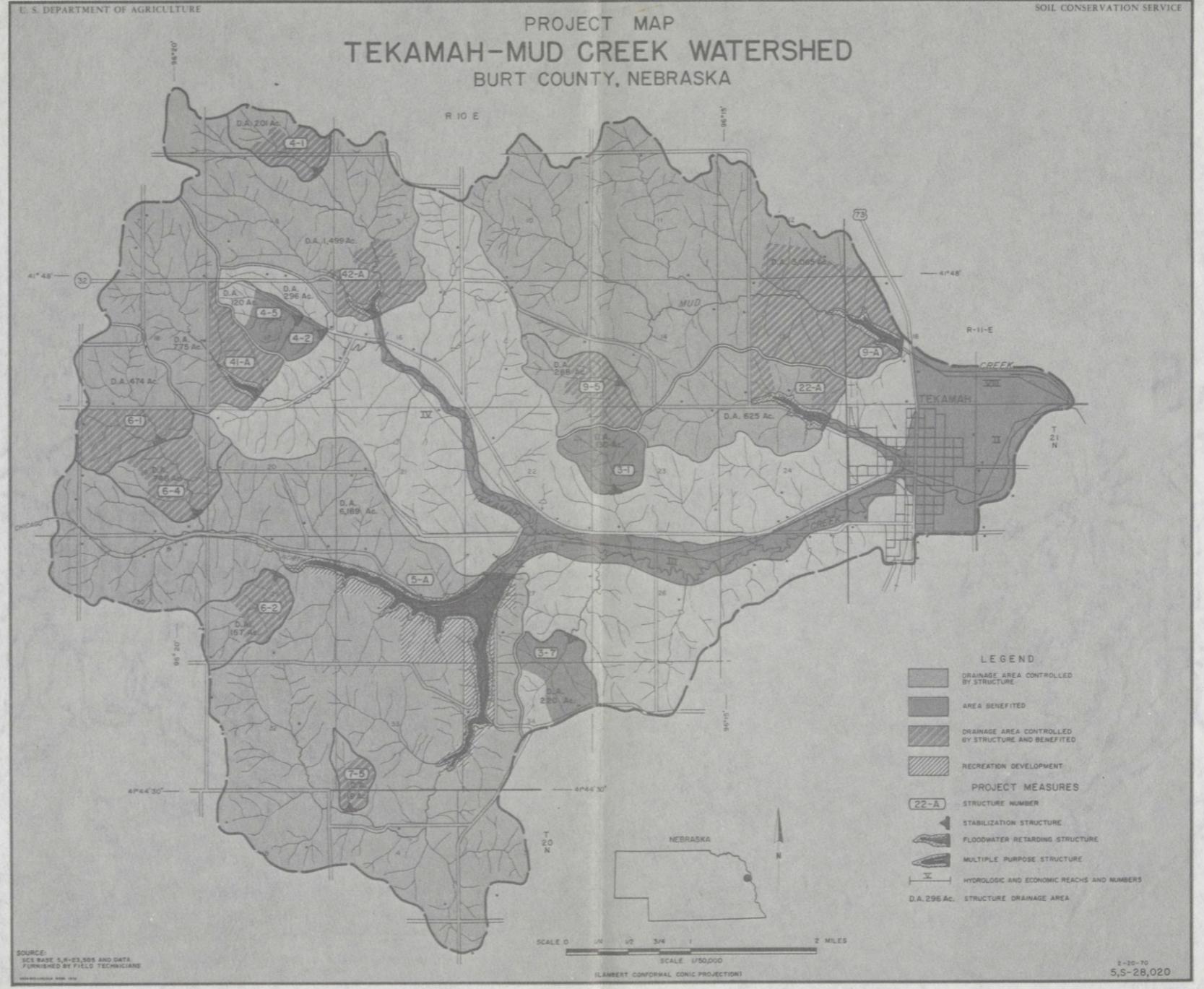
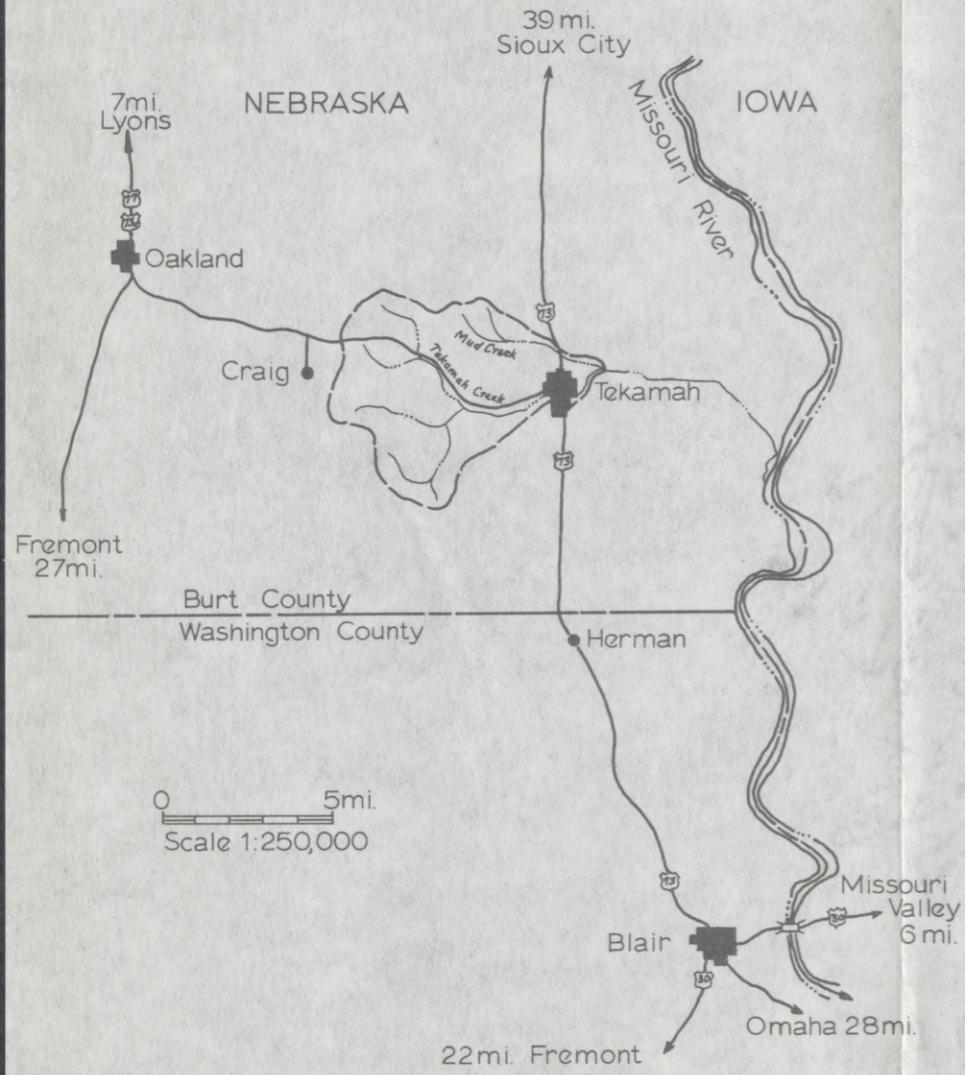
The Environmental Protection Agency raised several questions particularly regarding water quality. These questions are discussed as follows:

1. Since this project is located in a feed grain-livestock feeding agricultural community, it was pointed out that there may be potential for organic and bacterial contamination of surface runoff upstream from impoundments and that effluents from barnyards, feedlots and domestic sewage systems may enter some impoundments and such sources should be identified and discussed. Such potential was discussed at various meetings with local sponsors during the planning of this project. Investigations revealed that although scattered farmsteads do exist throughout the watershed, a threat to water quality appeared very unlikely. This primarily would be due to the lack of large feedlots above structural measures, the relatively small numbers of farmsteads and the existing laws regarding treatment of effluent from both human and animal waste.

2. Because of the possibility of chemical contamination of impounded water from intensive use of agricultural chemical pesticides, herbicides and fertilizers, it was suggested that this possibility be discussed in the work plan and further recommended that local sponsors be urged to encourage landowners to properly use such chemicals. The Soil Conservation Service is and has been actively engaged in the encouragement of proper use of all chemicals. The possibilities of contamination of water impoundments was investigated as part of the normal planning process. Due to the lack of such contamination in existing small impoundments, experience in construction of similar impoundments in similar areas and comments furnished from fish, wildlife and health agencies, a discussion of such possibility appeared unnecessary and was not included.

3. It was noted that this project should be constructed, developed and operated to conform with Nebraska State water quality standards and that contractors be required to adhere to guidelines for minimizing soil erosion and air pollution.

PROJECT LOCATION MAP
TEKAMAH-MUD CREEK WATERSHED
 BURT COUNTY, NEBRASKA

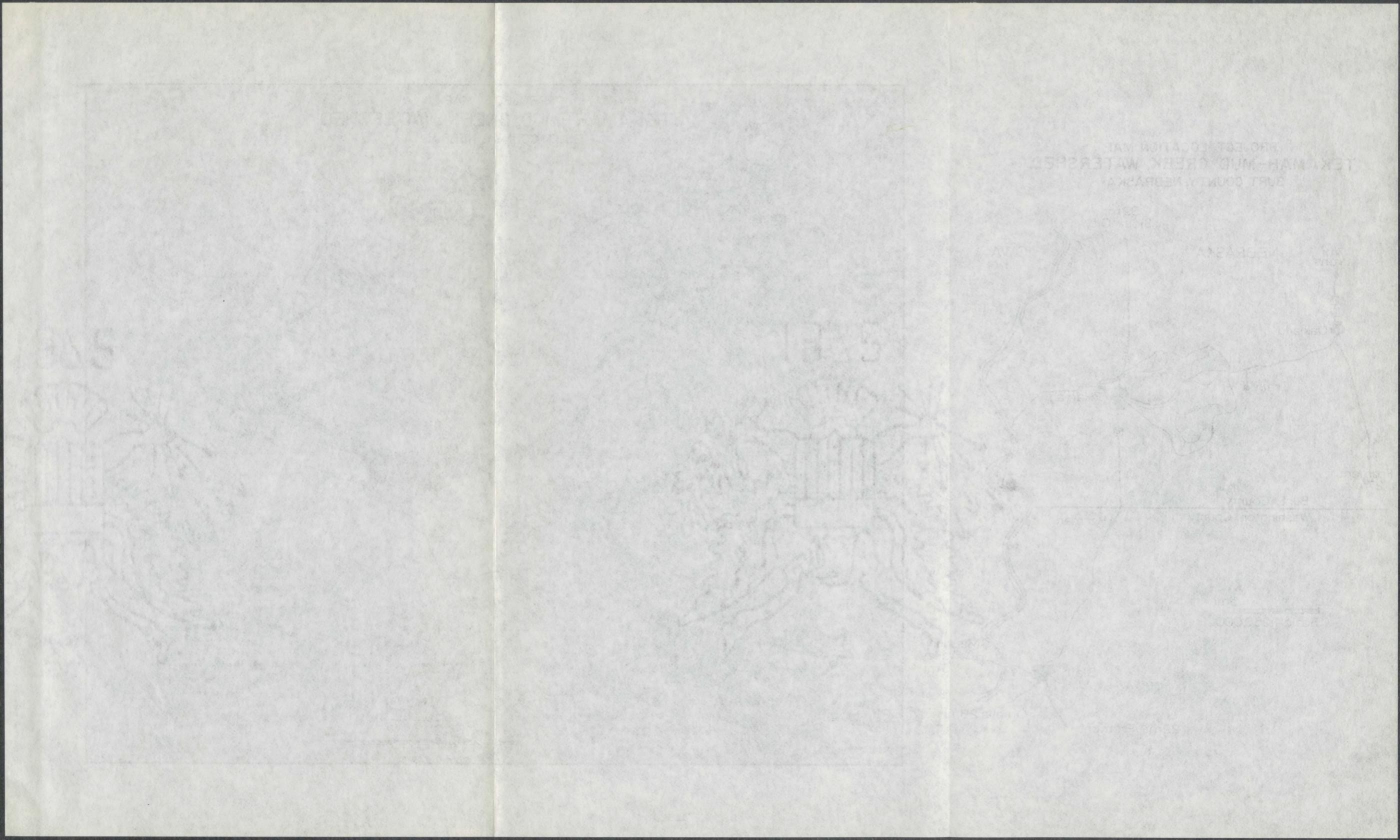


PROTECTED AREA MAP
TEKAMAH-MUD CREEK WATERSHED
SURT COUNTY, NEBRASKA

NEBRASKA

TEKAMAH

1:250,000



These are normal contract and operation procedures that are followed in all such projects in Nebraska. A statement at the top of page 5 of this Environmental Statement makes clear that such will be required.

Comments received from the Department of the Interior contained several suggestions and offered no objections to authorization of the project provided their recommendations were given consideration. Recommendations included removal of native stream fish populations upstream from the proposed impoundments, retention of standing timber in arms of the multiple purpose reservoir, erection of wood duck nesting boxes, and public access to the four floodwater retention reservoirs. Renovation of streams to remove undesirable fish populations can be accomplished from services available through the Nebraska Game and Parks Commission. The sponsors plan to apply for such services in that area associated with the recreation structure in order to provide desirable fish for public fishing. Other impoundments will be renovated only if desired by local landowners. Such action is encouraged for proper fish management by the Soil Conservation Service.

It is recognized that improved fish habitat can result from the retention of standing timber in arms of lakes. This was discussed with project sponsors but such action was not desired at this location due to hazards that can result during boating and water skiing from floating limbs and logs from such areas.

Public access to floodwater retarding structures and the erection of wood duck nesting boxes can be and is encouraged by the Soil Conservation Service.

Other suggestions were provided and taken into consideration, and such suggestions will be provided to local sponsors.

The State of Nebraska recommended that local sponsors be made aware of potential vector control problems so that adequate precautions may be taken during operation and maintenance of the project and urged that the project be implemented as rapidly as possible. The vector control problem was discussed with local sponsors and as the plan mentions, they are aware of the available technical assistance regarding such problems.

Approved:

KENNETH E. GRANT,
Administrator.

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES—TEKAMAH-MUD CREEK WATERSHED,
NEBRASKA

[In dollars]

Evaluation unit	Average annual benefits ¹				Average annual cost ²	Benefit-cost ratio
	Damage reduction	Recreation	Secondary	Total		
10 grade-stabilization structures, 4 combination floodwater and grade-stabilization structures and 1 multi-purpose structure.....	61,800	40,400	9,900	112,100	78,200	1.4:1.0
Project administration.....					8,410	
Grand total.....	³ 61,800	40,400	9,900	112,100	86,610	1.3:1.0

¹ Price base adjusted normalized.

² From table 4.

³ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$3,050 annually.

STATEMENT BY RICHARD PARKER, SOIL CONSERVATIONIST

MR. PARKER. Mr. Chairman and members of the committee, at the risk of repeating what has already been said here—or maybe I should have your feelings as to whether I should repeat in other lengthy testimony on what has been said already on this project.

MR. KEE. The floor is yours to use as you so desire.

MR. PARKER. I would like to say to Mr. Thone that 151,000 tons sediment, this project will reduce it 50 percent, which is quite a bit. It has a big effect.

I think that rather than restate figures that have already been stated, the project does have a favorable cost-benefit ratio of 1.3 to 1, and it is a good project.

Mr. Chairman and members of the committee, the Tekamah-Mud Creek watershed project is located in Burt County, along the Missouri River bluffs of eastern Nebraska. It is about 39 miles south of Sioux City, Iowa, and 43 miles north of Omaha, Nebr. The watershed contains about 19,000 acres and is made up of 71 percent cropland, 19 percent grassland, 2 percent woodland, and 8 percent urban and miscellaneous uses. The city of Tekamah is located within the watershed and is the county seat of Burt County.

The economy of the area is based primarily on the production of cash-grain crops and livestock enterprises. The major crops are corn, grain sorghum, wheat, alfalfa, soybeans, and grasses. There are 75 farm units in the watershed with an average size of 255 acres. Land values range from about \$250 per acre for upland, and from \$300 to \$450 per acre for flood plain land.

The 745-acre flood plain is subject to frequent flooding, with some flooding occurring on an average of once each year. In addition to severe damages to crops during flood events, about 200 homes and 40 businesses in the city of Tekamah are subject to substantial damages. The threat to human life also exists. A life was lost when a home in Tekamah was destroyed during the 1944 flood. Gully erosion is also a major problem in the watershed. If the gullies are not stabilized many roads will be destroyed and about 1,880 acres of cropland will be lost or its use severely impaired.

The planned project consists of conservation land treatment practices supplemented by a multiple-purpose reservoir for flood prevention and recreation, four combination floodwater retarding and grade stabilization structures and 10 grade stabilization structures.

Installation of the project is expected to result in about an 85-percent reduction of floodwater and sediment damages to farmlands.

The city of Tekamah will receive flood protection from storms up to and including those that might occur once in a hundred years. The threat of destruction or depreciation of the 1,880 acres of cropland by gully erosion would be virtually eliminated. In addition, the multiple-purpose reservoir will provide a 190-acre lake for recreational use.

Recreational facilities adjacent to the lake will provide for such activities as camping, swimming, picnicking, boating, and fishing. It is estimated that this development will attract about 27,000 visitors annually.

The total project costs are estimated to be \$1,738,000 with Federal assistance amounting to about \$1,236,000 or 71 percent. Benefits resulting from the project are estimated to be \$112,100 annually, with a resultant benefit-cost ratio of 1.3 to 1.

Mr. KEE. Mr. Parker, these hearings will clearly show when these projects came up, say like 1.3 cost-benefit ratio, we were delighted to find in our hearings throughout the United States, North, South, East, and West, that the benefit-cost ratio runs as high as 5 to 1 and 7 to 1. That testimony is right in here.

You have no problem on that.

Any questions?

Mr. CAFFERY. Mr. Chairman, I have one question. How many people are affected by this watershed?

Mr. PARKER. Mr. Caffery, there are 75 farming units in this watershed. They average about 255 acres in size. The flood plain area is about 745 acres in size. The city of Tekamah is subject to a lot of damage here. There are 200 homes and about 40 businesses that are subject to flood damages and will be benefited by it. In fact, a life was even lost in Tekamah in a recent flood, so it is serious there.

Then gully erosion, as you see on that map, the sort of cross-hatched yellow and green areas. The gully erosion, of course, is a major problem in this watershed. There are about 1,880 acres of cropland that will be lost or its use severely impaired without this project. This is where a lot of this sediment comes down to the mouth of the watershed.

Mr. KEE. Thank you very much, Mr. Parker for your excellent presentation.

Mr. PARKER. Thank you, Mr. Chairman.

SUGAR RIVER WATERSHED, NEW HAMPSHIRE

Mr. KEE. The next witness is Mr. James Bean, soil conservationist. He will speak on Sugar River, N.H. That has a benefit-cost ratio of 1.7 to 1.

At this point our distinguished member of the Public Works Committee, Representative James C. Cleveland, has submitted a statement and, without objection, I ask unanimous consent that his statement be included in the record at this point, and also, for the record, the work plan and environmental statement on the Sugar River watershed, New Hampshire.

(The documents referred to follow:)

STATEMENT OF HON. JAMES C. CLEVELAND, A MEMBER IN CONGRESS FROM THE STATE OF NEW HAMPSHIRE

Mr. Chairman, I appreciate having this opportunity to present some comments in support of the Sugar River Watershed project in my district.

This plan provides for accelerating land treatment measures for better land use on 164,000 acres and the construction of ten floodwater retarding structures. Six of these structures include water resource improvements for recreation, and will provide nearly 1200 acres of surface waters.

The sponsors of this project signed the Work Plan Agreement in September 1969. Since then, it has been repeatedly held up by the Federal bureaucracy. First, Congress passed the National Environmental Policy Act which required an environmental impact statement. This was fully complied with, and was followed by another delay as the sponsors and the Department of Interior worked to reach agreement on the amount of water which the sponsors would at all times release below the dams. The purpose of this was to provide new fishing streams, to compensate for those inundated by the dams.

Then, Mr. Chairman, with all of these problems surmounted, the sponsors were confronted with a new Relocation Assistance Act. More delay so that this could be fully complied with.

All of these obstacles are now past. The need for this project continues, for flood protection, recreation, and land and water conservation. The project has been well developed, and has strong local support. The need has been demonstrated. The time has come to move forward.

The total cost of the project is \$7,999,000, with a federal cost of \$4,232,000. Thank you, Mr. Chairman.

SUGAR RIVER WATERSHED

Size and Location.—176,000 acres in Grafton, Merrimack and Sullivan Counties, New Hampshire.

Sponsors.—Towns of Croyden, Goshen, Grantham, Lempster, Newport, the City of Claremont, the Sullivan and Merrimack County Conservation Districts, and the New Hampshire Water Resources Board.

Purposes.—Watershed Protection, Flood Prevention and Recreation.

Principal Measures.—Soil conservation practices on farms and woodland; and structural measures consisting of 4 floodwater retarding structures and 6 multiple-purpose flood prevention and recreation reservoirs. The total storage capacity of the structures is 36,231 acre-feet.

	Dollars	Percent
Annual benefits—		
To agricultural acreage (land and crops).....	2,000	..
To nonagricultural improvements.....	206,400	46
Recreation.....	118,000	27
Indirect.....	22,300	5
Redevelopment.....	60,100	14
Secondary.....	35,700	8
Total.....	444,500	100

PROJECT COSTS

	Public Law 556 funds		Other funds		Total dollars
	Dollars	Percentage	Dollars ¹	Percentage	
Land treatment measures.....	388,000	12	2,836,000	88	3,224,000
Structural measures:					
Flood prevention.....	2,971,000	92	260,000	8	3,231,000
Recreation.....	592,000	47	665,000	53	1,257,000
Project administration.....	281,000	98	6,000	2	287,000
Total.....	4,232,000	53	3,767,000	247	7,999,000

¹ For land treatment measures this is primarily the cost of applying land treatment measures by landowners. Cost sharing from funds appropriated for the agricultural conservation program may be available if included in the county program.

For structural measures this is the cost of land rights and project administration. It may also include costs for construction or engineering services for purposes other than flood prevention.

² The value of measures already installed (1,497,000) increases this to 55 percent. Benefit-cost ratio—1.7 to 1.

U.S. DEPARTMENT OF AGRICULTURE—SOIL CONSERVATION SERVICE

USDA ENVIRONMENTAL STATEMENT () DRAFT (X) FINAL FOR SUGAR RIVER WATERSHED, NEW HAMPSHIRE

Summary

1. *Name of Action:* (X) Administrative () Legislative

2. *Description of Action:*

The Sugar River Watershed project includes land treatment on about 80,000 acres of the 176,000 acres in the watershed. The project also includes the installation of six multipurpose structures and four single purpose structures. The combined land treatment and structural measures will reduce annual flood damages by 94.6% and will provide 55,000 user days of recreation.

3. *Summary of Environmental Impact and Adverse Environmental Effects:*

This project will reduce flood stages on 957 acres of flood plain lands containing 150 residences, 35 commercial establishments, 10 industries and 40 agricultural enterprises. The project will also provide a sediment storage volume of 765 acre-feet in ten structures, six of which will create 1,148 surface acres of new lakes with public access. A release of 0.25 csm is planned from these structures for augmentation. These structures will inundate an additional 1,020 acres and 4.4 miles of stream at flood stages. About 2.2 miles of these streams are cur-

rently flooded by beaver flowage. Most of the beaver flowages will be inundated and lost behind the structures.

4. *List of Alternatives Considered:*

- (a) Sixteen sites were studied at different levels and for different purposes with ten sites being selected.
- (b) Channel improvements in three areas was studied but not selected.
- (c) Municipal water supply was considered in one site.
- (d) Land treatment alone was analyzed as a possible solution.
- (e) Public access and recreational use of existing lakes was considered.
- (f) Flood plain regulation was considered and it is a part of this plan.
- (g) Flood proofing was considered as a solution.

5. *Agencies From Which Comments Have Been Requested:*

- (a) Department of the Army, Corps of Engineers
- (b) Department of Health, Education and Welfare
- (c) Department of the Interior
- (d) U.S. Forest Service
- (e) Federal Power Commission
- (f) Governor of New Hampshire

6. *The Draft Environmental Statement Was Made Available to the Council on Environmental Quality on:*

Views of federal, state and local agencies were obtained during the review of the plan beginning in January 1970. The review was not duplicated by circulation of a draft environmental statement.

UNITED STATES DEPARTMENT OF AGRICULTURE—SOIL CONSERVATION SERVICE

USDA ENVIRONMENTAL STATEMENT

(Prepared in accordance with section 102(2)(C) of Public Law 91-190)

Title of Statement: The Sugar River, New Hampshire, Watershed Project.

Authority for Project: Public Law 566, 83rd Congress, 68 Stat. 666, as amended.

Sponsoring Local Organizations: Towns of Croydon, Goshen, Grantham, Lempster, and Newport; City of Claremont; Sullivan County Conservation District; Merrimack County Conservation District; and the New Hampshire Water Resources Board.

Nature of Action: A watershed project to be carried out by the sponsoring local organizations with Federal assistance under the provisions of Public Law 566 in accordance with a work plan for the Sugar River Watershed. Land treatment will be applied to 80,000 acres; and six multiple purpose floodwater retarding and recreation structures and four single purpose floodwater retarding structures will be installed.

Environmental Setting: The Sugar River Watershed encompasses an area of 275 square miles. It is located in west central New Hampshire and within the Connecticut River Basin. The present land use in the watershed is: cropland 3,930 acres; pasture 6,510 acres; forest 140,360 acres; miscellaneous uses 17,205 acres; and water 7,995 acres. The flood plain benefited by this project includes 850 acres in agricultural use (125 acres of corn, 250 acres of hay, 40 acres of market gardening and 435 acres in pastureland) and 100 acres in roads and urban environs. Urban flooding is concentrated in Newport and Claremont.

The economy of the area is based on agriculture, including timber production, industry, tourism, and second home development. The agricultural and industrial enterprises are located along the Sugar River. Tourists are attracted to the 6,350 acres of scattered lake waters which include Sunapee Lake, with 4,058 surface acres. The latter has been a summer resort for over a century. Mount Sunapee State Park, which is located in the watershed, is one of two major ski areas operated by the State and attracts both summer and winter visitors.

The income level of the watershed residents is below the Connecticut River Basin average. The watershed lies within the New England Economic Development Region that was designated under Title V of PL-136.

The land values of the watershed range from \$200 per acre in the uplands which are predominantly forest land to \$300 per acre in the agricultural flood plain. In the areas where urban and industrial development is taking place, the

land values are in the \$1,000 per acre range. These areas of development are generally in or adjacent to the flood plain.

The soil and water conservation program through the Sullivan and Merrimack County Conservation Districts and the forestry program through the Extension Forestry Program cover over 50 percent of the watershed area. No areas within the watershed are recognized as critical erosion areas.

The major upland soils have developed in sandy and loamy glacial till materials and vary from well-drained sandy soils to very poorly drained soils which oftentimes have hardpan layers within two feet of the surface. The predominant use of these soils is forest land and recreation home development. In those cases where recreation home development is taking place, soil losses and the resulting sediment on a Charlton soil, 7% slope 700 feet long (a representative soil), if unprotected, can produce about 4 to 8 tons per acre per month of exposure during the construction season. These estimates are based on the Universal Soil-Loss Equation.

The terrace soils which occur between the upland and flood plain soils consist of stratified sands, silts and gravels. The primary use for these soils is forestry with a minor portion in hay and pasture.

The flood plain soils are generally loam over loose gravel. They are well drained and used for crop production even though the water table is relatively high much of the time. Their flat slopes make them appear to be attractive for commercial, industrial and urban development.

The water resources in the watershed include about 8,000 acres of lakes of all sizes. In addition, the Sugar River and its tributaries make up about 200 miles of free-flowing streams.

Water quality standards have been established by the State in accordance with the Federal Water Pollution Control Act. All the streams of the Sugar River have been classified as relatively high quality except for a reach on the main stem from Guild to the confluence of the Connecticut River. This reach is classified as lower quality due to industrial and domestic wastes being discharged into the river. Plans are already well advanced to clean up the Sugar River in the foreseeable future. A sewage treatment plant is presently under construction in Newport.

The fish and wildlife resources of this watershed are many. They include trout fishing in the North and South Branches and in several of the deeper lakes. Lake Sunapee, for example, contains land-locked salmon, rainbow and lake trout, and smelt. Historically this is one of the few lakes in New England containing the golden Sunapee trout which has almost disappeared. Introduction of other salmonoid fishes has hastened the loss of this unique species.

Warm water fishing is found in the lakes, ponds and warmer downstream reaches of the Sugar River. Typical pond and stream fishes are: large and smallmouth bass, yellow perch, chain pickerel, horned pout, suckers, fallfish and golden shiners. Horned pout are the second most heavily fished specie, after brook trout, in the watershed. Stream fishing is presently estimated at 12,000 man-days while pond and lake fishing is about 131,000 man-days per year. The polluted river below Guild offers very little fishing under present conditions.

The wildlife of the area includes deer, ruffed grouse, woodcock, snowshoe hare, gray squirrel, raccoon, bear and wild boar. There is some waterfowl hunting. According to the New Hampshire Fish and Game Department, a total of 22 bears have been killed in the last 15 years. Taking a four year average, about 700 deer are taken annually in Sullivan County. Area-wise this would give an estimated deer kill of 370 deer annually within the watershed, excluding Corbin Park, a private preserve. This amounts to 18,500 man-days of deer hunting per year.

As no surveys are available from game agencies, the actual figures can only be guessed.

The timber industry has been the largest user of the area's forest resources in the past. However, recreational use is increasing, placing additional demands for use on forest lands. There are a few commercial sand and gravel operations. These sand and gravel operations are scattered throughout the watershed and are used as fill material in construction. The construction of Interstate 89 through the northeast part of the watershed and seasonal home development have greatly increased the use of this resource. There has been limited mining of mica and feldspar but these mines are no longer in operation.

The Sugar River Watershed has produced a number of damaging floods. Major floods of record have occurred in 1927, 1934, 1936, 1938, 1950, 1953, 1955 and 1958.

Floods occur nearly every spring causing damage to 600 to 800 acres of crop and pastureland and involve one of the largest dairy farm operations in the state. A flood comparable to the 1936 storm (50-100 year frequency) would cause damage to 150 residences, 34 commercial enterprises, 10 industries, airport, sewage treatment system, municipal water supply well, golf course, and 2 athletic fields. In addition to jeopardizing the health and lives of residents of the valley, transportation routes (highways and railroad lines) would be seriously interrupted. Out-of-bank flows subject the flood plain to scouring and siltation.

The land treatment measures include conservation cropping systems, obstruction removal, diversions, waterways, brush control, grade stabilization, debris basins, ponds, access roads, wildlife wetland development, recreational trails and walkways, fish pond stocking and management, and grading and shaping.

The structural measures to be installed include six multiple-purpose floodwater retarding and recreation structures which will provide 1,148 acres of recreation water for public use and four single purpose floodwater retarding structures. All ten structures will provide approximately 19,000 acre-feet of flood retention storage.

Each structure is designed to offset losses of stream fisheries caused by the inundation of streams by the reservoirs. These measures include a cold water release from each reservoir having permanent water storage. Also included is augmented flow of 0.25 cubic feet per second per square mile from the six multiple purpose structures which will maintain and enhance the stream flow for an extended time during droughty periods. Excessive drawdown in the pools will be prevented by cutting releases at the time the pool level reaches a pre-determined elevation. Three of the four structures for single purpose flood control will have dry bed reservoirs and the principal spillway will be so designed to allow free movement of fish through the dam. The fourth single purpose structure (D-5) has a 15-acre sediment pool planned which will be utilized as a permanent lake. This structure is so designed that at any time a salmon fishery is restored to this reach of the stream, the pool can be drained and free passage of fish through the dam will be possible. During the planning of each of the multiple-purpose structures, consideration was given to the different types and quality of beneficial uses obtainable at various elevations. Pool elevations were established to take advantage of the topography and landscape. This was especially true at Site C-2 where an elevation lower than the potential maximum for the site was indicated.

The ten reservoirs will have a total sediment storage of 765 acre-feet. Special precautions will be taken during construction to prevent erosion and downstream siltation; as an example, special pollution abatement provisions will be included in the construction contract. Bare, unprotected soils in construction areas will be kept to a minimum in extent and duration. All disturbed areas will be revegetated after construction or during construction when advantageous. Prior to extended periods of shutdown, temporary seedings, mulching or other protective measures will be used. Temporary culverts will be installed in streams as needed during construction to permit equipment to cross without creating erosion and sedimentation problems. Sediment traps will be installed downstream as needed to catch any sediment which may have originated in the disturbed area.

The State of New Hampshire is involved in each of the multiple-purpose sites under authority provided by the State Legislature under RSA 481:27. This law requires the local town to provide to the state a land use plan for each site and adjacent area that will meet the minimum need for pollution control and environmental protection. Guidelines for sanitation and health standards are established by RSA 148:23, RSA 149-E, and other laws as well as by those guidelines established by individual towns.

The changed land use brought about within the construction areas will be from a forest cover to an open grass cover. The reservoir areas at six multiple-purpose sites are now covered with vegetation that ranges from cattail and alder swamps to pine and hardwood stands. In areas to be permanently flooded, woody vegetation will be removed.

Access roads will be constructed through wooded areas to the sites. The areas of public access at each of the six recreational sites will have concentrated use. The undergrowth vegetation will be reduced and trees will remain.

Areas of historical and archeological value have been located in the watershed. One of these is a recent find of Indian artifacts near the confluence of the

Sugar and Connecticut Rivers. Several points of historical interest are located in the watershed. One of the oldest homes in the area is the Tyler House in Claremont. Several old churches exist. The steeple of the South Congregational Church in Newport has the distinction of being designed by Bullfinch, a noted Boston architect.

However, no areas of historical or archeological value are known to exist in or near any of the proposed sites. Should a discovery be made, the National Park Service and New Hampshire Department of Resources and Economic Development will be notified. Planning and construction in such an area will give due consideration for evaluation and establishment of the value of any findings.

The total installation cost of land treatment and structural measures is estimated to be \$7,949,905. The average annual cost of the structural measures is estimated to be \$268,030 and the average annual benefits are \$444,455. The costs and benefits are based on an interest rate of 5%. The benefit-cost ratio of the project is 1.7:1.0.

STATEMENT

Environmental Impact

The land treatment program, which emphasizes multiple-use management, will help direct land use and resource development for the protection of the watershed and environmental values. Municipalities in the watershed will benefit from technical assistance made available for community resource planning. Landowners throughout the watershed will benefit from land treatment measures installed through the accelerated technical assistance made available by Public Law 566 funds.

With the installation of land treatment measures, hydrologic conditions in the watershed will improve, increasing infiltration and consequently decreasing runoff and erosion. Where second home developments occur, the erosion rate will increase, especially during and shortly after construction. Erosion will occur as the impoundment areas are disturbed during construction. Quick return to vegetative cover is a construction requirement and approved construction techniques for minimizing erosion will be employed.

The ten impoundments will trap sediment and reduce downstream deposition. Allowances for storage for 765 acre-feet of sediment are provided in the structures.

Floodwater damage reduction to agricultural lands of the flood plains will be reduced by 51%. The total acreage benefited by this project is 957 of which 850 are currently in agricultural use. The residential and commercial areas will receive a 93% and 97% reduction in damages respectively. The road and bridge damages below areas controlled are expected to be eliminated from storms of less than the 100-year magnitude.

Urban areas benefiting from the project include 150 residences in Newport and Claremont, 35 commercial establishments, 10 industries, and 40 agricultural enterprises. In the Newport and Claremont areas, industry is currently expanding on the fringes and, in some cases, onto the flood plain. This expansion will accelerate with the project installed and protection provided.

The project will add 1,148 acres of recreational water with public access and 22.5 miles of shoreline in the six multiple-purpose structures. Of the 1,148 acres of water, 673 acres will be salmonoid fishing habitat and 475 acres warm water fishery habitat. The additional recreational water will provide 55,000 user days each year. The Department of Interior estimates that the recreation impoundments have the potential to provide 104,000 user days annually. Access roads will be constructed to each of these sites and will open up the watershed to more intensive use of the upland areas.

The recreational pools in the six multiple-purpose impoundments will flood 4.4 miles of stream, 2.2 miles of which is currently flooded by beaver dam flowages. The total areas of beaver dam flowage is 250 acres, one-half of which is considered active.

The impoundment sites and the recreational and residential development adjacent to these water areas will have a direct effect on the use of forest land and forest resources throughout the watershed.

About 1,150 acres will be cleared to accommodate the ten structures of which 565 acres contain 462,000 cubic feet of growth stock timber. The remaining acreage to be cleared is low quality trees and brush. The area required for temporary flowage is an additional 1,020 acres. About 50 acres of open land created by the dams and spillways will make early spring feeding areas available to wildlife.

With additional public recreational waters made available, vehicular traffic will be increased and more people will be attracted to the area as tourists, second-home owners, and full-time residents. Landowners' interest will shift toward more residential and recreational considerations. Greater demands for goods and services will be placed on the business in the area resulting in greater economic activities and increased employment opportunities. The influx of non-residents to the area will create fishing and hunting competition for local people. The cleared areas for the structures and the reforming of the earth surface for the dams and spillways will open areas to scenic vistas which were previously forested. The potential for forest fires will increase with the influx of people into the watershed.

The project will assist and encourage local people to contribute over \$2.7 million toward the installation of needed land treatment measures in the watershed. The land treatment will contribute \$5,910 annually toward flood damage reduction. This is in addition to the benefits for which each practice is primarily installed. Public Law 566 is expected to contribute almost \$3.2 million for structural measures for flood control and recreation. The total structural project benefits are \$444,455 based on a 5% interest rate for a 100-year evaluation period. The average annual cost for the structural work is \$268,030 based on the 5% interest rate for the 100-year period. Included in the average annual cost is \$10,000 annually for the operation and maintenance of the structural measures.

Favorable Environmental Effects

1. Reduce soil erosion.
2. Accelerate land treatment during recreational home development.
3. Aid and encourage use of the land within existing limitations and capabilities through an accelerated land treatment program.
4. Reduce floodwater damage to 40 agricultural enterprises; 150 residential properties; 35 commercial enterprises; 10 industries and roads and bridges.
5. Trap sediment in the sediment pool of each structure.
6. Provide 1,148 acres of water with public access with both cold and warm water fisheries.
7. Provide open areas for early spring wildlife feeding and for scenic vistas.
8. Make available 55,000 water-based recreational user days each year.
9. Create six recreational lakes with 22.5 miles of shoreline.
10. Improve stream fisheries below multiple-purpose dams by augmenting stream flows and maintaining cold water releases.
11. Increase employment opportunities resulting from a need for more services and facilities.

Adverse Environmental Effects Which Cannot Be Avoided

1. Increase erosion during construction in areas of recreational home developments and impoundment. Four to eight tons of sediment can be produced per acre per month of exposure during recreational home construction.
2. Produce sediment during construction of the recreational home developments and each dam.
3. Flood 2.2 miles of stream in addition to the 2.2 which is currently flooded by beaver dams.
4. Temporarily flood up to 1,020 additional acres for floodwater storage.
5. Destroy 1,150 acres of forest wildlife habitat and 565 acres of timber resources.
6. Flood 250 acres of beaver ponds.
7. Create outside competition for use of fish and wildlife resources.
8. Increase forest fire hazard.

Alternatives to the Proposed Action

Several alternatives were considered in the development of the plan. First, consideration was given to the actual need for a plan to solve water resource problems and to develop and preserve natural resources. If no action were taken, the flood plain will continue to flood. Erosion will continue and will accelerate in areas of development. Development would continue with no positive measures to prevent continued deterioration of the natural resources. There would also be no increase in availability of water for recreation to meet the demands of increasing development in the watershed.

Second, an alternative of planned land treatment measures only without structural measures was considered; but this alternative would not provide an

effective level of flood protection. Future changes in land use alone would make it difficult to hold damages at current levels with land treatment. A major change in land use is the development of secondary homes. Many landowners are directing their efforts more toward the tourist dollar than the production dollar from the land. This type of change will require intense land treatment to provide for an orderly transition without creating undue soil erosion and water loss.

In other non-structural alternatives considered, flood proofing of existing developments in the flood plain was studied as well as flood plain land purchase. Both of these measures were discarded as not being effective in the overall program of solving the resource problems of the watershed. The primary reasons for not utilizing either of these measures were the excessive costs. A program of land use regulation and management has been included as a part of the project for the urban areas of Newport and Claremont.

In selecting alternatives which are included in the planned project, many structural alternatives were studied including a total of sixteen single and multipurpose floodwater retarding sites and three reaches of streams on the main stem and North Branch of the Sugar River. Of the sixteen sites studied, ten were included in the project plan six of which are multipurpose recreation sites and four single purpose flood prevention. Various surface areas and depths were studied at each site for recreational use by the sponsors and from these studies the six multipurpose sites were selected. Factors which influenced the selection of the sites were topographic and other physical features, the ability of the site to provide flood protection in the flood plain downstream, and, in the case of multiple use, the ability of a local sponsor to participate in the sharing of the cost to build the dam.

One site was considered as a water supply site for the city of Claremont, but during detailed study the city determined it would be more economical to use ground water.

With several ponds and lakes existing in and adjacent to the watershed, consideration was given to developing some of these bodies of water for more intensive recreational use. However, existing public access to most of these lakes is limited; and the prospects for securing additional access appear limited both due to excessive costs and unwillingness of landowners to make an access available.

Studies were made for Newport and the Beauregard Village area of Claremont for complete flood protection. Channel work was studied for these areas and found to be prohibitive compared to the minimal added level of protection provided.

Since these two urban areas will be provided only partial protection by the proposed project from the major storms, the acceptable alternative was flood plain regulations. Newport approved such zoning ordinances in 1965 for its flood prone areas. The city of Claremont is currently developing such ordinances for its flood prone areas. Each will publish annually a flood prone area map and will prohibit development or reconstruction of existing developments which might involve loss of life or high value flood damage.

The North Branch of the Sugar River has had agricultural flood damages in the past. These damages will be reduced by the project but will not be at the level normally expected for agricultural areas. Studies were made to include channel improvement with the flood control structures. The channel improvement would have been so costly that the benefits from the protected agricultural land would not justify such a plan. Such channel work would have had decisive detrimental effects on the excellent trout fishing on the North Branch. It is within this area that the state has set aside a reach of the stream for "fishing for fun." The stream is kept stocked with fish and any fish caught are returned to the stream.

Several meetings have been held with the New Hampshire Fish and Game Department and the U.S. Fish and Wildlife Service for their recommendations on the many fish and wildlife aspects of the watershed. The guidance and the recommendations of these agencies were incorporated by the sponsors into this watershed plan. Dry bed reservoirs, cold water releases and augmentation flow were some of the selected alternatives incorporated in this project plan to maintain and enhance fish and wildlife in the area.

If this project were not implemented, the annual monetary losses to the watershed would be \$444,455.

Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The land use pattern of the watershed will undergo changes during the life of this project and beyond. The recognition of this fact by the local sponsors prompted their interest in making decisions based on both the present and future watershed use by man. The increasing demand for the mountains, open space and water for recreation is coming from the entire Atlantic Seaboard megalopolis. The sponsors have proven their interest by providing for recreational water storage in six of the ten floodwater retarding structures. The State has shown its concern and interest in man's environment by agreeing to share the cost for these recreational waters. In order to preserve a desirable environment, the State requires that a land use plan be developed and approved by the State for each site in which it is involved to assure conformance to Public Health regulations. The past land use has generally been forestry on uplands and farming in the valleys. In the future sprawling developments around the lakes and on the mountainsides are anticipated. These developments will be for leisure living by people with the desire to become more closely associated with nature. The sponsors are planning to provide guidance to landowners in these land use changes in order to maintain or enhance the environmental quality of the watershed.

This project, as planned, does not foresee any short-term problems being solved that would reduce the options available for long-term uses. This is because measures planned for this project are of a long-term nature. This project will not prohibit further development and changes in land use such as are now taking place. It is compatible with the future long-term use of the land, water and other natural resources.

The designed life of the project is 100 years. It is felt that the benefits will continue far beyond that time. The project land treatment and structural measures will continue to aid in conservation of land and water resources in future centuries.

Irreversible and Irretrievable Commitments of Resources

Eleven hundred and ninety-eight acres of land and 4.4 miles of stream will be irreversibly committed by this project as they will be flooded by reservoirs or covered by dams. Another 1,020 acres of land will be affected while functioning as an area for temporary flood pools. The recreational facilities and public access is estimated to affect another 60 to 75 acres of the land resources of the watershed. The present land use of this committed area is estimated to be about 400 acres of open water, about 200 acres of agricultural land (consisting of about 100 acres of pastureland, 80 acres of hayland, 10 acres of corn and 10 acres of market garden), and the remainder covered with vegetation ranging from cattail swamp to good marketable timber.

Consultation—General

The Sugar River Watershed application was submitted in 1963 and amended in December of that year. Public information meetings were held on a number of occasions over the next seven years. From these meetings an overall general understanding of the watershed program was gained. The watershed committees and project sponsors formulated project objectives and provided local direction.

Meetings started in 1965. With general directions established by 1966, a meeting was held to interest and involve state agencies in the project. Further meetings were held with the New Hampshire Fish and Game Department in order to give maximum consideration to the fish and wildlife aspects of the watershed. The federal agencies directly interested or involved in planning were the Soil Conservation Service, Forest Service, Fish and Wildlife Service, and the Army Corps of Engineers. Other federal and state agencies were involved through the Connecticut River Basin Comprehensive Plan of which the Sugar River Watershed is a part. The State Water Resources Board controls the outlet of Sunapee Lake and therefore coordination was planned with them in this realm.

Consultation With Federal Agencies

The Secretary of the Department of Interior was asked to provide comments on the Sugar River Watershed Work Plan. In a letter dated November 20, 1970, he raised many questions associated with the environment. One such question deals with the project's impact in connection with the reference in the Connecticut River Basin Comprehensive Study, Appendix H, relative to the high present and future need in the area for public swimming, camping, picnicking and boating opportunities.

The sponsors recognized this need throughout the planning process. They extended invitations to those agencies concerned with meeting these needs to join as sponsors in this watershed project and help finance the project. However, no agency responded and the sponsors proceeded to meet as many of these needs as local financing could afford. It should be understood that these demands are not from local residents but originate from outside of the watershed.

The Secretary of Interior recommended further studies to make full use of recreation potential of each multiple-purpose site. Several levels of development were studied in project formulation to give the sponsors a basis for final decision. These levels varied from a sediment pool only to levels near the yield limit of the drainage area.

The Secretary stated that the project should preserve the stream fishing and associated environmental resources since the demand will exceed the supply by 1980.

The sponsors, with stream fishing in mind, provided for storage in each of the multiple-purpose reservoirs so that 0.25 cubic feet per second per square mile flow would be released into the stream as set aside for this purpose. This, coupled with cold water release, will preserve and enhance the stream fishery.

The Secretary recommended that the Sugar River work plan detail provisions for future water quality control releases from the project if and when required. The flow augmentation and cold water releases planned in this project will provide a source for limited water quality control. However, the New Hampshire secondary and tertiary treatment for pollution abatement. Therefore, no releases are planned for water quality control.

The Secretary requested that the work plan should be revised to include details on sanitary facilities to be installed. The State of New Hampshire under Section II, RSA 481: 27, pertaining to Public Law 566 projects will assure that the sanitary facilities are adequate to meet the planned use.

The Secretary recommends additional studies to determine the effect of muck and peat on water quality in some cities. This was considered in planning. Experience with similar sites in the state has shown that water quality will not be a serious problem. The waters are expected to be discolored perhaps for a few years and the sponsors are aware of this. Discoloration has apparently been reduced where reservoirs are drained and refilled a few times during the first year or two of use.

The Secretary also recommends that local land use regulations be considered for water quality control. Each town is making a special effort to establish its own land use regulation to direct the wise use of its resources. Each year, since the project was authorized for planning, additional towns in the watershed have adopted new land use regulations which is evidence of local progress.

The Secretary recommends that Soil Conservation Service Engineering Memorandum-66 be used to establish guidelines for minimizing pollution during construction and applicable provisions be included in the specifications for each contract. Contract specifications used by New Hampshire in Public Law 566 contracts include Engineering Memorandum-66 pollution control measures. It directs the contractors' attention to the State's pollution laws.

The Secretary recommended that the National Park Service be advised of the progress of the proposed plan to program archeological survey and necessary salvage prior to construction and flooding. The Regional Director for this region in Philadelphia will be informed on progress and any archeological finds.

The Secretary further requests that the USDA, Soil Conservation Service, consult with the Department of Resources and Economic Development, State Liaison Officer, for compliance with the provisions of the National Historic Preservation Act of 1966. This Department of state government and numerous others work together very closely in all New Hampshire Public Law 566 watershed projects.

The Fish and Wildlife Service conservation and development report contained a few comments and requests. This report stated that it is expected that the state plans to breach the two natural falls downstream from the D-5 structure to facilitate free passage of anadromous and resident fish. However, this stream channel alteration is not a part of this project plan.

The report recommended the watershed plan be subject to review and possible modification if additional low-flow augmentation for anadromous fisheries in the Connecticut River Basin is required. Plans are always subject to revision but releases beyond those included in the plans for augmentation of stream fisheries would be considered detrimental to the planned uses of the resources. Future

flows from the Sugar River for the Connecticut Basin augmentation are still a good possibility as other storage sites are still available in the watershed.

The Fish and Wildlife Service asked for a minimum instantaneous release from each multiple-purpose reservoir. These releases have been agreed upon by sponsors and representatives of the Fish and Wildlife Service. The releases requested were granted with a definite drawdown being included to protect the reservoir's resources. The drawdown below the permanent pool elevation will be two feet on sites B-2, C-7, and D-2, and one foot on sites C-2, C-9, and D-1.

The Fish and Wildlife Service requested a reservoir zoning regulation that would prohibit operation of boats having motors greater than 10 horsepower on lakes of less than 200 acres. Each of the multiple-purpose sites is located in a town in which local land use regulations are in effect or they are being drafted for local town meeting approval. Each town will make regulations to fit the site which is its concern.

The Fish and Wildlife Service also recommended that erosion and sediment control measures should be instigated at each site during construction. As mentioned above, these measures are being provided for in New Hampshire by including in each contract special provisions for pollution control.

Consultation With State and Local Agencies

At the February 20, 1964, sponsors' meeting, a request was made to amend the watershed application. The amendment was approved by local sponsors to include Claremont as a sponsor. This increased the watershed area from 142,193 acres to its present 176,000 acres. Claremont requested consideration for municipal and industrial water storage as a project purpose to meet their present and future needs.

At a sponsors' meeting in May 1964 the question of "historical flowage rights" was discussed. The reply was that these rights have been honored in the past in all Public Law 566 projects and will be honored in all future Public Law 566 projects.

At the same meeting the question was asked regarding the plans for the Claremont Dam, a Corps of Engineers project. There was no answer at that time, but since then the Soil Conservation Service has met with the Corps in their Waltham, Massachusetts, office in 1968. The compatibility of the authorized Corps project and the proposed Public Law 566 projects were reviewed. It was determined at that meeting that the two projects would be entirely compatible and generally complementary.

At a sponsors' meeting July 7, 1965, the question was asked as to what determined the suitability of sites for recreation or fish and wildlife use. The answers given were: steepness of banks, depth of permanent pool, accessibility, surrounding plant growth, as well as other factors. Most sites may be suitable for multiple-purpose use.

In June 1969 at a sponsors' meeting the question of augmentation flow was presented. At that time the sponsors took the position that such flow would be an enhancement measure—therefore, the sponsors of recreational storage should not have to pay for the water for flow augmentation.

At the informal field review the question was asked who would be responsible for the operation and maintenance of the project. A representative of the New Hampshire Water Resources Board, a sponsoring local organization, answered that the Board would operate and maintain all aspects of the structures but that the local towns would be responsible for the operation and maintenance of the recreational aspects of each multiple-purpose reservoir.

Approved:

NORMAN H. BERG,
Acting Administrator.

STATEMENT BY JAMES BEAN, SOIL CONSERVATIONIST

Mr. BEAN. Mr. Chairman and members of the committee, my name is James Bean. The Sugar River watershed is a 275-square-mile area of Sullivan, Grafton, and Merrimack Counties in west-central New Hampshire, within the Connecticut River Basin. Sugar River flows generally westerly to join the Connecticut River at West Claremont. The watershed is about 100 miles northwest of the city of Boston, Mass.

Water resources include about 8,000 acres in 38 lakes of various sizes and about 200 miles of free-flowing streams. About 80 percent of the watershed is in forest cover, 6 percent in cropland and pasture, and 14 percent in miscellaneous uses. Most of the land is used for agriculture, forestry, and recreation. There are about 177 farms with an average size of 127 acres. Dairying is the principal source of farm income, but the economy is predominantly based on tourism and manufacturing in Newport and Claremont, two cities in the watershed which have a combined population of about 20,000.

Sugar River has produced a number of damaging floods. Major floods of record have occurred in 1927, 1934, 1936, 1938, 1950, 1953, 1955, and 1958. Floods damaged nearly 900 acres of farmland and about 100 acres of urban areas in Newport and Claremont.

A flood comparable to the 1936 flood, estimated at about 50- to 100-year frequency, would damage 150 residences; 34 commercial enterprises; 10 industries; the airport; the sewerage treatment, water supply, and transportation systems; and recreational installations. Out-of-bank flows subject the flood plain to scouring and sedimentation. The average annual flood damage is estimated at over \$156,000.

There is need for lake frontage for homes and recreation. The continuing increase of vacationers in the area will create an even greater demand each year. A recent Bureau of Outdoor Recreation study has indicated a recreational need by 1980 that will not be fully satisfied by all presently proposed reservoirs.

Measures to solve these problems include land treatment measures on farms and woodlands, and structural measures consisting of four floodwater retarding and recreational structures.

The land treatment measures include such practices as conservation cropping systems, diversions, waterways, brush control, stabilization and debris basins, access roads, wildlife wetland development, recreational trails and walkways. The 10 structural measures will create 1,148 acres of recreational lakes for public use and provide about 19,000 acre-feet of flood detention capacity to control runoff from 33 percent of the watershed.

These measures will cut the peak rate of flow in half during a 100-year flood in Newport. Agricultural damages will be reduced an average of 50 percent and nonagricultural damages an average of 96 percent. All present and projected urban areas will have at least 100-year average protection from flooding except a reach in Claremont where some damage will occur in floods greater than that of 13-year frequency. Zoning ordinances will prevent further construction or reconstruction in the remaining flood prone areas.

The six public recreational lakes will have year-round use estimated at nearly 55,000 visitor-days per year. The peak daily use during summer months is expected to be about 1,100 persons. The presence of 1,148 acres of new lakes will raise the value of adjacent land and strengthen the local property tax base.

Total project installation cost is estimated at just under \$8 million of which Public Law 566 funds will bear \$4.2 million or 53 percent, and other funds will bear about \$3.8 million, or 47 percent.

With total annual benefits of \$444,500 and total annual costs of \$268,000, the estimated benefit-cost ratio is 1.7 to 1.

Gentlemen, this concludes my testimony.

Mr. KEE. Thank you, Mr. Bean, for your excellent presentation. Any questions to my right? Any questions to my left?

Mr. Bean, we certainly take this opportunity again to thank you and the Soil Conservation Service for your usual in-depth study on these projects.

I want to commend all of you for the excellent work which you have done which makes this feasible on a 1.7-to-1 benefit-cost ratio.

EIGHTEEN-MILE CREEK WATERSHED, SOUTH CAROLINA

The committee is delighted to welcome Mr. David Bowen, soil conservationist, to make his remarks on the Eighteen-Mile Creek watershed. Without objection, the work plan and environmental statement on the project will appear in the record at this point.

(Documents referred to follow:)

EIGHTEEN-MILE CREEK WATERSHED

Size and location.—35,600 acres in Pickens and Anderson Counties.

Sponsors.—Eighteen-Mile Creek Watershed Conservation District: Town of Liberty; Pickens Soil and Water Conservation District; Anderson Soil and Water Conservation District.

Purposes.—Watershed Protection, Flood Prevention and Municipal Water.

Principal measures.—Soil conservation practices on farms and woodlands; and structural measures consisting of two floodwater retarding structures, one multiple-purpose floodwater-retarding structure with storage capacity for municipal water, and about 2 miles of channel improvement.

ANNUAL BENEFITS

	Amount	Percent
To agricultural acreage (land and crops).....	\$34,100	27
To agricultural improvements.....	31,600	25
To nonagricultural improvements.....	5,000	4
Indirect.....	4,800	4
Municipal water.....	8,000	6
Incidental.....	19,900	16
Redevelopment.....	8,100	7
Secondary.....	13,700	11
Total.....	125,200	100

PROJECT COSTS

	Public Law 566 funds		Other funds		Total amount
	Amount	Percent	Amount ¹	Percent	
Land treatment measures.....	\$175,000	38	\$290,000	62	\$465,000
Structural measures:					
Flood prevention.....	612,000	73	224,000	27	836,000
Municipal water.....			98,000	100	98,000
Project administration.....	98,000	90	11,000	10	109,000
Total.....	885,000	59	623,000	² 41	1,508,000

¹ For land treatment measures this is primarily the cost of applying land treatment by landowners. Cost-sharing from funds appropriated for the rural environmental assistance program may be available if included in the county program. For structural measures this is the cost of land rights and project administration. It may also include costs for construction or engineering services for purposes other than flood prevention.

² The value of measures already installed (\$555,000) increases this to 57 percent.

Note: Benefit-cost ratio: 2.1 to 1.

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

USDA ENVIRONMENTAL STATEMENT () DRAFT (X) FINAL FOR EIGHTEEN-MILE
CREEK WATERSHED, S.C.

Summary

1. *Name of action.*—(x) Administrative () Legislative.
2. *Description of action.*—A watershed project to be carried out by the Sponsoring Local Organizations with federal assistance under authority of PL-566. The project, located in Pickens and Anderson Counties, proposes conservation land treatment over the watershed, supplemented by two floodwater retarding structures, one multiple purpose structure for flood prevention and municipal water supply, 1.9 miles of channel improvement and 650 acres of critical area stabilization.
3. *Summary of environmental impact and adverse environmental effects.*—The project will reduce floodwater and sediment damages; reduce sediment delivery into Hartwell Reservoir; stabilize about 650 acres of critically eroding land; supplement the water supply for the town of Liberty; provide lake surfaces at the sediment pools for fishing; provide a basis for land use conversions; the development of upland wildlife habitat areas; eliminate about 3 miles of stream fishery; eliminate or limit present wildlife and agricultural uses of areas to be occupied by project pools, dams and spillways.
4. *List of alternatives considered.*—Alternatives to the proposed action are based upon providing varying levels of flood protection, different flood prevention systems of structural works and other sources of water for the town of Liberty.
5. *Agencies from which comments have been requested.*—U.S. Department of the Army; U.S. Department of the Interior; U.S. Department of Health, Education and Welfare; Appalachian Regional Commission; Governor of South Carolina (Water Resources Commission); South Carolina State Planning and Grants Division (Clearinghouse).
6. *The draft environmental statement was made available to the Council on Environmental Quality on May 7, 1971.*

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE—USDA
ENVIRONMENTAL STATEMENT

(Prepared in accordance with section 102(2)(C) of Public Law 91-190)

Date.—November 1971.

Title of Statement.—Eighteen-Mile Creek Watershed, South Carolina.

Authority for Project.—Public Law 566, 83rd Congress, 68 Stat. 666, as amended.

Sponsoring Local Organizations.—Pickens Soil and Water Conservation District, Anderson Soil and Water Conservation District, Town of Liberty, and Eighteen-Mile Creek Watershed Conservation District.

Nature of Action.—This statement concerns a watershed project to be carried out by the Sponsoring Local Organizations with federal assistance under the provisions of Public Law 566, in accordance with a Work Plan for the Eighteen-Mile Creek Watershed. Project measures include 7,845 acres of conservation treatment, two floodwater retarding structures, one multiple purpose structure for flood prevention and municipal water storage, and 1.9 miles of stream channel improvement.

Environmental Setting.—Eighteen-Mile Creek Watershed covers 35,600 acres in Pickens and Anderson Counties in northwestern South Carolina. It extends from Easley, on the northeastern rim, to Hartwell Reservoir southwest of Pendleton. The watershed is twenty miles long and three miles wide. Land use in the watershed is about 60 percent woodland, 15 percent pasture and idle, 5 percent cultivated, and 20 percent urban and miscellaneous. Land use in the flood plain is about 28 percent cropland, 25 percent grassland, 44 percent woodland, and 3 percent in miscellaneous uses.

The population is 9,000 urban and 7,000 rural. The income and economy of the watershed is dependent primarily on textile manufacturing, employment by Clemson University, and farming enterprises. Most of the 175 farms are low income farms with 80 percent having sales of less than \$2,500 annually.

It is estimated that 40 percent of the needed conservation land treatment has been installed in this watershed.

The watershed stream fishery is of low value. Bullhead, sunfish and sucker are the principal species. Limited numbers of farm game consisting of quail, rabbit, and squirrel are found throughout the watershed.

There are 1,950 acres of flood plain in this watershed. Some areas flood as often as five times per year. Floodwater damages agricultural property, roads and bridges, and causes increased production costs and livestock losses. These average annual floodwater damages are estimated to be \$66,000. Sediment damages 500 acres of flood plain at an estimated \$6,700 annually. Hartwell Reservoir receives about 48,200 tons of sediment each year from Eighteen-Mile Creek.

The major streams in the watershed support a good base flow and have gone dry only on very rare occasions. Eighteen-Mile Creek is classified by the South Carolina Pollution Control Authority as "Class B", which is satisfactory for the intended uses. Oxidation pond effluent from the city of Easley which enters Eighteen-Mile Creek above Site 4 is well treated. Wastes from the town of Liberty and Woodside Mill at Liberty which enter the stream between Sites 3 and 4 are effectively treated. Sources of wastes entering Eighteen-Mile Creek above Site 2 are near Norris and very small in quantity. Other wastes entering the stream are below the proposed impoundments. The South Carolina Pollution Control Authority will enforce adequate treatment of all effluents to assure that proper quality is maintained.

Erosion in the upland areas is not serious, except in small scattered gullied areas. The gullied areas total an estimated 650 acres of critically eroding land that needs treatment and stabilization.

The town of Liberty presently requires about 1.6 million gallons of water per day. Stream flow in Eighteen-Mile Creek, the city's water source, frequently drops below this amount. An estimated 5,000 people are served by this water supply system. The future population to be served is expected to double by 1980 requiring approximately 4.0 million gallons of water per day.

The proposed project consists of conservation measures to adequately treat 7,845 acres. These measures consist of conservation cropping systems on cropland; ponds for livestock water, pasture and hayland planting and management on grassland; and tree planting, improved cutting and other management practices on woodland. There are 650 acres of critically eroding uplands that will be stabilized, 75 acres will be improved for recreation, with access roads, and 400 acres of upland areas will be developed and managed for wildlife habitat. The critical area stabilization and other conservation treatment over the watershed, although primarily installed to reduce erosion, will include vegetative plantings beneficial to wildlife habitat. (See attached project map.)

The planned structural works consist of two floodwater retarding structures, one multiple purpose reservoir providing capacity for floodwater, sediment and 800 acre feet of municipal water storage. About 1.9 miles of stream channel are to be improved through the area of intensive agricultural use downstream from U.S. Highway 76. Excavation will be accomplished so that the existing vegetation on the channel banks is disturbed as little as possible. For one-third of the length of the improvement, enlargement will be made from only one side of the existing channel, leaving the opposite bank undisturbed. Excavation from both banks will be necessary for the remaining length of the improvement. Spoil will be spread. Three temporary rock riprap chutes will stabilize the channel while vegetation is being established. Channel construction will be scheduled for completion at a time of year that will provide a full growing season immediately following construction. Seeding of disturbed areas will be done immediately after construction. Contractors will be required to adhere to strict guidelines for minimizing soil erosion and water and air pollution during construction. Sponsors will advise the concerned landowners of the need for installing adequate sanitary facilities in accordance with state and local health regulations before the sediment pools of floodwater retarding structures are used for recreation. No formal archeological investigations have been made, but inquiries have not revealed any sites of archeological or historical value will be affected by the project. The Soil Conservation Service will keep the State Liaison Officer for Historic Preservation and the State Archeologist informed of progress in the project so that desired changes or salvage may take place prior to construction. During periods of low stream flow, at least as much water as enters the reservoirs will be released as required by state law.

The total project will cost approximately \$1.5 million with the local people paying about \$0.6 million. There will be an estimated \$2.20 in benefits derived for each dollar of costs

STATEMENT

(i) *Environmental Impact.*—Conservation land treatment on about 7,845 acres of cropland, grassland, and woodland will reduce erosion, runoff and generally provide a more balanced and productive agriculture. It is estimated that about 600 acres of cropland, in land classes that should be retired from cultivation, will be converted to grass and woods as a part of the overall land treatment program. Four hundred acres in the upland areas will be developed and managed for wildlife food and cover as a part of the conservation land treatment program. Another 650 acres of land now considered as critical erosion areas will be stabilized to reduce erosion and land destruction and placed in restrictive or limited use. Limited grazing and limited selective cutting of trees will be permitted on the stabilized area.

An estimated 1,950 acres of flood plain will receive direct flood protection and reduction of flood damages. Floodwater damage to crops and pastures will be reduced about 80 percent.

Sediment delivery to Hartwell Reservoir from Eighteen Mile Creek will be reduced from 48,000 tons to 27,000 tons per year. The evaluated sediment damages on about 500 acres of the flood plain will also be reduced by about 80 percent. The approximately 600 acres of the flood plain now in cropland can be used more intensively for soybeans, corn and other feed crops after project installation. In addition to the 500 acres of flood plain now in pasture, about 200 acres now in woods are expected to be converted to high producing, improved pastures. About 650 acres of scattered small tracts in the benefited area are expected to remain in woods and to be used for pulpwood, timber production and wildlife habitat.

The project will create 225 surface acres of lake fishery which will provide approximately 17,000 man-days of lake fishing and other incidental recreation use per year. Prior to making the pools available for recreation, sanitary facilities will be installed in accordance with state and local health laws. The water system for the town of Liberty will be supplemented by the 800 acre feet of capacity provided for this purpose.

The sediment pools of the floodwater retarding structures and the municipal water pool of the multiple purpose reservoir will permanently inundate and change the use of about 225 acres including 10 acres of cropland, 15 acres of pasture, 200 acres of woodland, and 3 miles of stream channels. An additional 500 acres in the floodwater detention pools will be periodically inundated. This will change the present use from 25 acres of cropland, 25 acres of pasture and 450 acres of woodland to 50 acres of pasture and 450 acres of woodland. Although this area will be periodically inundated, agricultural and wildlife production will not be seriously curtailed. Dams and spillways will occupy about 22 acres now used for pasture, cropland, and woodland. These areas will be seeded to grass after construction and will provide some food and cover for wildlife.

There will be no significant adverse effects on the long-range ambient air quality. There may be, however, short-term adverse effects on ambient air quality from the disposal of land clearing waste materials by open burning unless this disposal is done in accordance with the applicable state and federal air pollution control regulations.

The effect of nutrients on impoundments of Structures 3 and 4 may cause taste and odor problems affecting proposed water supplies and may result in reduced incidental recreation use.

The U.S. Bureau of Sports Fisheries and Wildlife indicated that channel improvement of 1.9 miles of stream channel downstream from U.S. Highway 76 will have "few adverse effects on fish and wildlife, since the ditch will be cut through predominantly high pasturelands with no wet lands being involved." They estimated that the stream fishery will be reduced from 100 man-days to 20 man-days per year.

Secondary impacts of the project on the environment include: increased business activity in the area; increased income from transporting, processing, and marketing of goods and services; and increased vehicular traffic in the vicinity of those lakes used for fishing and other recreational activities.

(ii) *Favorable Environmental Effects:*

1. Reduce floodwater damages to crops and pasture on 1,950 acres by 80 percent.
2. Reduce sediment deposition by 80 percent on the approximately 500 acres of flood plain now being damaged.
3. Reduce sediment delivery to the Hartwell Reservoir, from this watershed, from 48,000 tons to 27,000 tons annually.
4. With greater security in production of crops and other agricultural enterprises on the flood plain, farmers will be able to institute needed land use adjustments on more than 600 acres of upland which should be retired from cultivation.
5. Reduce sediment production from and land damages on 650 acres of critically eroding uplands.
6. Provide 800 acre feet of water to supplement the supply for Liberty. This will provide a dependable supply for the population expected by 1980.
7. Create 225 surface acres of lake fishery in the pools for an estimated 10,000 man-days lake fishing annually.
8. Provide 17,000 visitor days of lake fishery and incidental recreation use annually.
9. Develop 400 upland acres for wildlife habitat.
10. Secondarily, increase business activity and income from transporting processing, and marketing goods and services.

(iii) *Adverse Environmental Effects:*

1. Stream fishery in the 3 miles of channel to be inundated by the pool areas of the proposed structural measures will be eliminated. Stream fishery in the section of channel to be improved will be reduced from 100 man-days to 20 man-days per year.
2. Agricultural and wildlife use of the 225 acres in cropland, pasture and woodland to be inundated by the sediment and municipal water pools will be eliminated.
3. Agricultural and wildlife use of the 506 acres to be in grassland and woodland in the detention pools will be periodically interrupted by floodwaters.
4. Wildlife and agricultural use of the 22 acres to be occupied by dams and spillways will be lost until these areas are reseeded, after which limited grazing may be permitted.
5. Secondarily, increase vehicular traffic at water areas where fishing and other recreational activities will take place.
6. The conversion of 200 acres in the flood plain from woods to improved pasture will reduce woodland production and wildlife habitat.
7. Nutrients may cause taste and odor problems in Structures 3 and 4.

(iv) *Alternatives to the Proposed Action.*—Land use in the flood plain is expected to remain essentially as it is at present, except for about 200 acres of woodland to be converted to grassland. The projected future flood plain use is 30 percent cropland, 36 percent pasture, 32 percent woodland and 2 percent miscellaneous.

Among the possible alternative uses of the flood plain are the following: (1) nonagricultural, including residential, (2) less intensive uses such as retiring cropland and pasture to woodland, or (3) continuation of the present pattern of agricultural use. Due to the proximity of several towns, the possibility of urban expansion into the flood plain exists. There is, however, ample opportunity for expansion outside of the flood plain. For residential or urban development of the flood plain, a higher level of protection would be needed. This would require additional structural works of improvement with greater adverse environmental effects than the proposed plan. For these reasons, the sponsors have been encouraged to limit such development to the upland areas.

The retirement of cropland and pasture to woodland or related uses would eliminate most of the flood damage potential. This alternative, however, would not fit into the economic enterprises to which most of the present landowners are committed. Less intensive uses could, perhaps, be instituted through a public land acquisition program. This would cost more than the estimated cost of the \$1.5 million to install the planned project, with the current estimated costs for land of up to \$1,000 per acre.

The continuation of the present trend in the use of the flood plain for agricultural and woodland production, and the reduction of floodwater and sediment damages to an acceptable level for these uses, is in harmony with local desires. For the present and future intensity of use, agreement was reached between the sponsors and the Soil Conservation Service on an objective that would provide an average 60 percent reduction in floodwater and sediment damages.

Alternative means of achieving the desired level of protection for flood plain areas using more floodwater retarding structures of a smaller size was not possible because of topographic limitations. Larger floodwater retarding structures, to control the same area or greater is not practical since they would inundate a large part of the bottomland cropland and pasture they are designed to protect.

Channel improvement in lieu of floodwater retarding structures would not be a practical alternative because the nature of the soils is such that to construct a channel to convey the large volume of water necessary to provide the minimum level of protection would bring about instability. This would require excessive costs for channel stabilization and cause adverse effects on the environment. However, the elimination of all channel improvement would leave the intensively cultivated area downstream from U.S. Highway 76 without the desired level of flood protection and would allow continued flooding and loss of agricultural production.

Several alternatives were available for satisfying the need for additional water supply. Streamflow in the nearby Twelve Mile Creek is an ample source of good quality water. Because of the distance involved in moving the water to Liberty and the additional treatment facilities required, the cost was estimated to be about \$200,000 greater than the proposed plan. Treated water from the Easley-Central Water District and the City of Pickens both were ruled out because of limited capacities, distances and pumping requirements increasing the cost beyond the capability of the City of Liberty. Groundwater sources were ruled out because the nature of the geologic formations that contain water are such that the quality and quantity are not dependable.

Another possible alternative for solving the water and related land resources problems would be to eliminate all the floodwater retarding structures and channel improvement measures from the plan and install only the planned conservation land treatment. This alternative would have essentially the same beneficial effect in upland areas as the proposed plan, except that land use conversions would not materialize. There would still be a need for municipal water and floodwater damages would be reduced by only about 9 percent. A flood reduction such as this would not be sufficient to permit flood plain areas to be used in accordance with their capability.

If the project were not installed floods would continue to cause an estimated \$55,000 damage to agricultural land annually. In addition the residents in and around the City of Liberty would be left without a dependable water supply. It is estimated that approximately \$70,000 in average annual net benefits would be foregone without a project.

(v) *Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity.*—The project for Eighteen Mile Creek Watershed was formulated primarily to meet existing needs, and desires of watershed residents. The planned conservation treatment of the agricultural land will permit its continued use by this and future generations. Special emphasis has been placed on watershed treatment, flood prevention, reduction of erosion and sedimentation, providing a dependable water supply for Liberty and the surrounding area, and preserving and enhancing fish and wildlife habitat. The proposed project will protect and provide more efficient use of the resources.

(vi) *Irreversible and Irrecoverable Commitments of Resources.*—Agricultural and wildlife use of cropland, grassland and woodland will be eliminated in the 225 acres to be inundated by the sediment and multiple use pools. Flooding of the 500 acres in the flood detention pools will periodically interrupt wildlife and agricultural use of these areas. The 22 acres to be occupied by dams and spillways will be lost for wildlife use until the areas are revegetated after construction. An estimated 3 miles of stream fishery will be lost when the channels are inundated by the sediment and municipal water pools.

Consultation and Review.—This watershed was one of four in South Carolina that had water resource survey reports prepared in 1967. These were a part of the Corps of Engineers report on Water Resource Development made by the Office of Appalachia Studies. The project has been coordinated with all interested agen-

cies throughout the application and planning stages. State agencies and field offices of federal agencies were notified when planning authorization was obtained and kept informed as project formulation progressed. Several informational meetings were held to keep the general public informed. At the Informal Field Review held on November 24, 1970 there were no adverse comments presented.

Department of the Army.—The Department of the Army reported that they foresee no conflict with any projects or current proposals of their Department. The draft of the environmental statement satisfies the requirements of Public Law 91-190, 91st Congress, insofar as their Department is concerned.

Department of Interior.—Comments from the Department of Interior included a description of the project with a statement that it would have only minor adverse effects on fish and wildlife. They indicated that the environmental statement could be better analyzed if more detailed economic analyses were given for alternatives. Also, the statement should reflect consultation with National Register of Historic Places, the State Liaison Officer for Historic Preservation, and the State Archeologist. The statement has been revised to reflect this consultation.

Department of Health, Education and Welfare.—The comments from this Department included a description of the project, a statement that water supply and water quality are now the responsibility of Environmental Protection Agency, and a request to consider guidelines outlined in two publications by the Public Health Service. These guidelines have been and are being used in planning recreation areas and water resource developments.

Governor of South Carolina (Water Resources Commission).—The Water Resources Commission reviewed the Work Plan and reported that they considered it adequate in all respects and recommend its implementation. They also reviewed the draft environmental statement and made two comments for consideration. The reduction of 200 acres of woodland for conversion to pasture could be more effectively evaluated if a short phrase could be inserted describing the caliber of the 200 acres of woodlands being converted. This phrase has not been included because the information was not available from the forestry studies and is not considered significant enough to warrant additional field work.

The other comment questioned the inference that an adverse environmental effect will be automatic by the inundation of approximately 3 miles of stream channel by the proposed pool areas, also by a claim of reduction from 100 man-days to about 20 man-days per year use for the area of stream channel improvement. No change in the Environmental Statement was made since it is stated on page 2 that the stream fishery is of low value.

South Carolina State Planning and Grants Division (Clearinghouse).—The reply from the South Carolina State Planning and Grants Division only referred to the comments made by the South Carolina Water Resources Commission.

Appalachian Regional Commission.—The Appalachian Regional Commission reported that they do not find the project to be inconsistent with any Appalachian funded projects. No comments were made on the Environmental Statement.

Environmental Protection Agency.—The principal concern of the Environmental Protection Agency was in regard to maintaining the quality of water to be impounded. They feel that the effect of nutrients and other waste effluents should not be neglected. Additional explanation has been added to the Environmental Statement to reflect this.

They recommended that all upstream waste sources be given adequate treatment before construction begins. The only change made was added explanation on page 2 describing existing conditions and needed assurance for intended uses.

They recommended that during critical low flow periods reservoir releases be at least equal to the inflow. This is a requirement of state law and has been so indicated on page 3.

They recommended an assessment of solid waste disposal problems. Additional explanation was added to section (i).

Approved by Kenneth E. Grant, Administrator, December 28, 1971.

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES
EIGHTEEN-MILE CREEK WATERSHED, S.C.

[In dollars]

Evaluation unit	Average annual benefits ¹						Total	Average annual cost ²	Benefit-cost ratio
	Damage reduction	More intensive land use	Municipal water	Incidental	Secondary	Redevelopment			
Floodwater retarding structures 2 and 3, multiple purpose structure 4, and stream channel improvement.....	³ 54,000	21,500	8,000	⁴ 19,900	13,700	8,100	125,200	52,500	2.4-1
Project administration.....								5,900	
Grand total.....	54,000	21,500	8,000	19,900	13,700	8,100	125,200	58,400	2.4-1

¹ Price base: Adjusted normalized.

² From table 4.

³ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$7,600 annually.

⁴ Includes \$14,500 incidental recreation benefits and \$5,400 for increased land values adjacent to permanent pools.

STATEMENT BY DAVID BOWEN, SOIL CONSERVATIONIST

Mr. BOWEN. Thank you, Mr. Chairman and members of the committee.

The Eighteen-Mile Creek watershed covers a 35,600-acres area in Pickens and Anderson Counties in northwestern South Carolina. The elongated watershed is about 3 miles wide and 20 miles long, rising in the town of Easley about 9 miles west of Greenville, and flowing southwestward into Hartwell Reservoir, a Corps of Engineers developed multiple-purpose reservoir located on the Savannah River southwest of Pendleton, S.C.

Elevations vary from 1,300 feet above sea level in the upper part of the watershed to 665 feet at the outlet. Soil cover varies from fair to good with numerous small critically eroded areas scattered within the watershed.

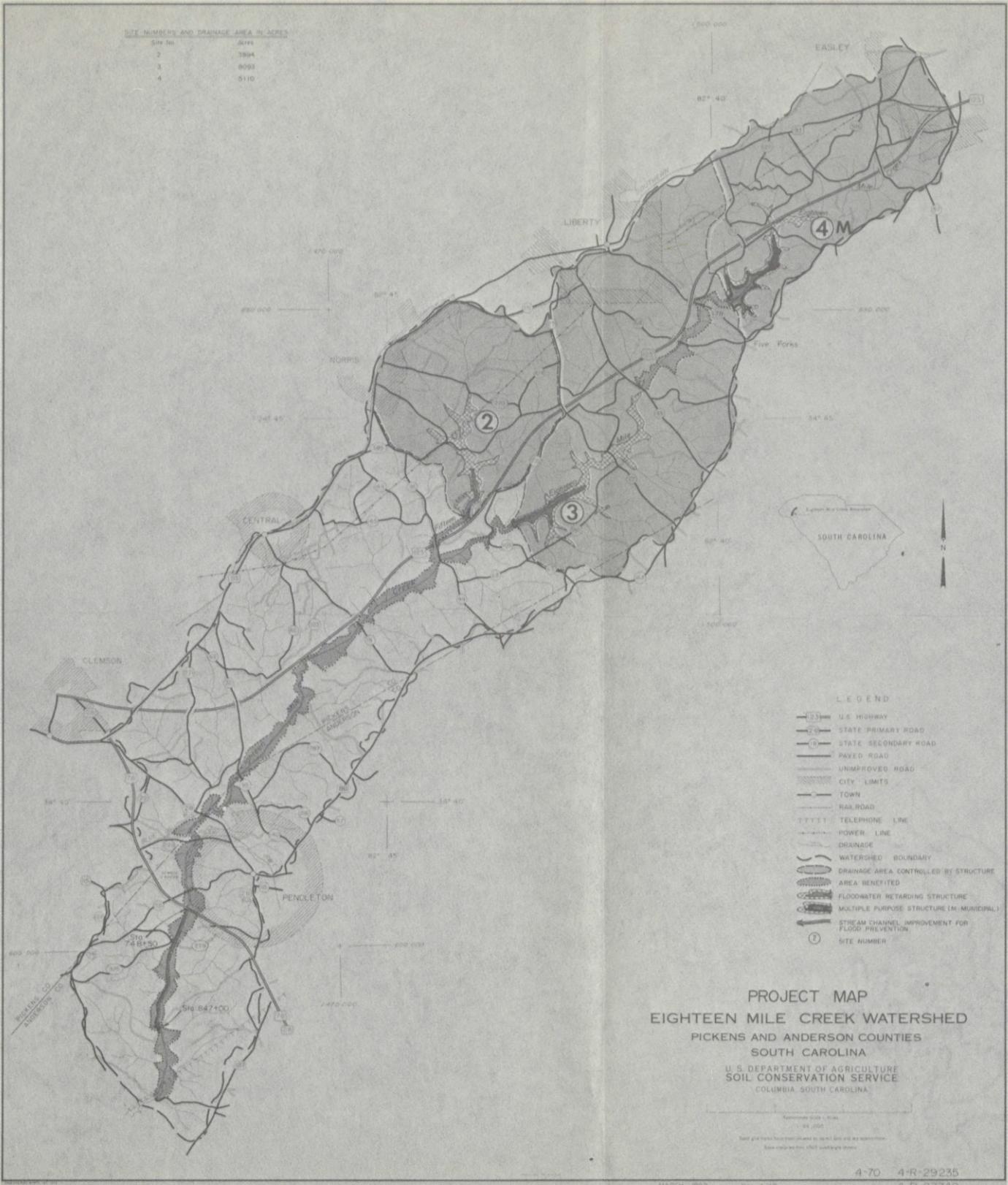
The watershed population is 16,000, divided 9,000 urban and 7,000 rural. The towns of Easley, Liberty, Central, Clemson, Norris, and Pendleton are located along the watershed boundary with part of each within the watershed.

The income within the area is derived mainly from textile manufacturing and agriculture with heavy employment by Clemson University, which is located in the lower part of the watershed. There are about 175 farms averaging about 160 acres in size. About 80 percent of the farms have annual sales of less than \$2,500. Principal farming enterprises are livestock, forest products, soybeans, and poultry. The land is privately owned except for about 3,700 acres owned and used by Clemson University for research.

Nearly 2,000 acres along Eighteen-Mile Creek and its tributaries are subject to floodwater and scour damage nearly every year. Damages to existing crops and pastures and increased agricultural production costs are significant. However, the principal damages are to fences and other fixed improvements on farms, roads and bridges, livestock, and to the Clemson University research activities. An estimate of 48,200 tons of sediment is delivered annually from the watershed to Hartwell Reservoir. The total annual flood damages are estimated at \$79,900.

SITE NUMBERS AND DRAINAGE AREA IN ACRES

Site No.	Acres
2	3994
3	6093
4	5110



LEGEND

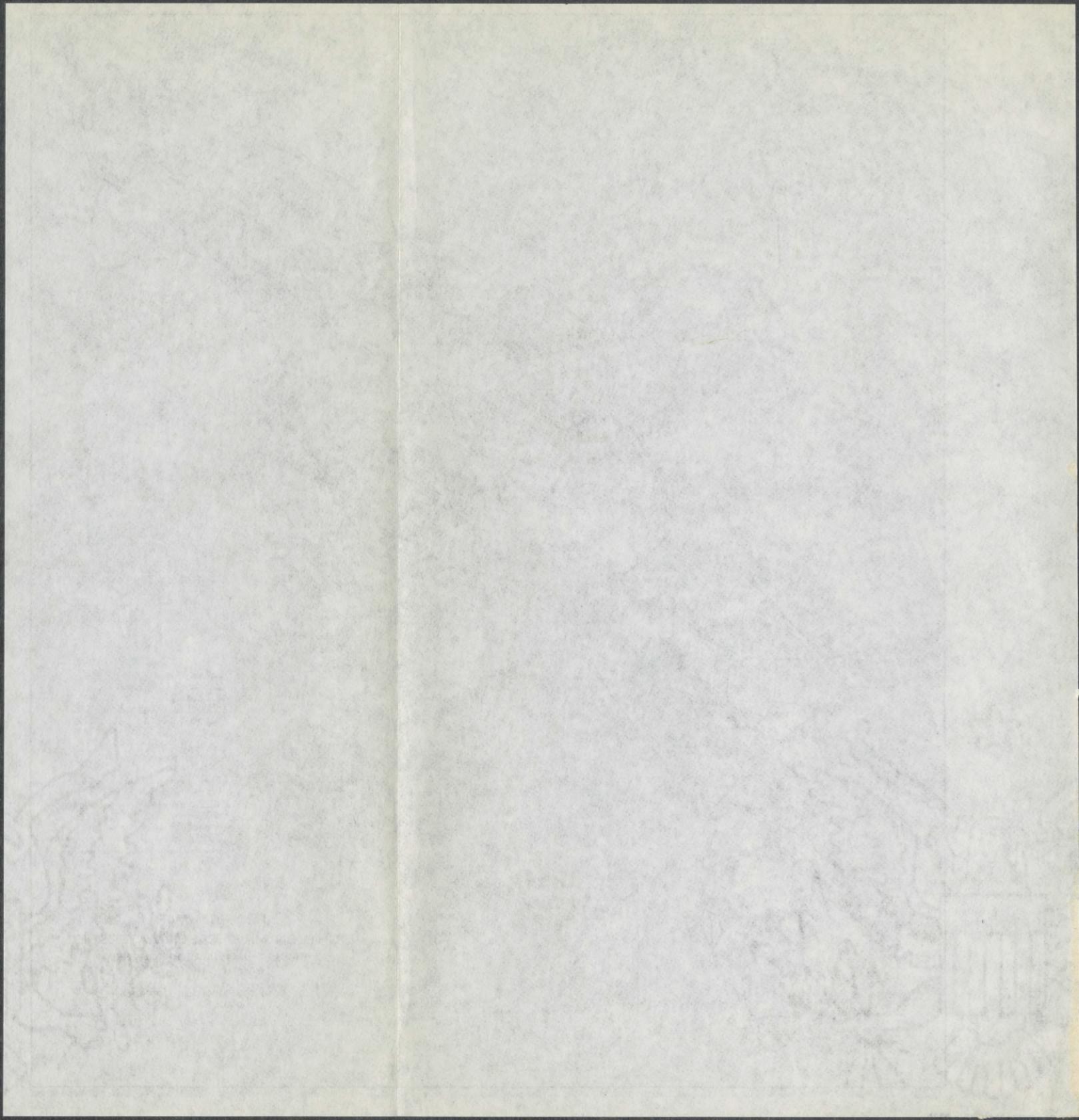
- U.S. HIGHWAY
- STATE PRIMARY ROAD
- STATE SECONDARY ROAD
- PAVED ROAD
- UNIMPROVED ROAD
- CITY LIMITS
- TOWN
- RAILROAD
- TELEPHONE LINE
- POWER LINE
- DRAINAGE
- WATERSHED BOUNDARY
- DRAINAGE AREA CONTROLLED BY STRUCTURE
- AREA BENEFITED
- FLOODWATER RETARDING STRUCTURE
- MULTIPLE PURPOSE STRUCTURE (MUNICIPAL)
- STREAM CHANNEL IMPROVEMENT FOR FLOOD PREVENTION
- SITE NUMBER

**PROJECT MAP
EIGHTEEN MILE CREEK WATERSHED
PICKENS AND ANDERSON COUNTIES
SOUTH CAROLINA**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
COLUMBIA, SOUTH CAROLINA

Scale: 1" = 1 Mile
1:62,500

Map and plans have been prepared to assist local and state agencies.
Scale maps are from 1:62,500 scale drawings.



The town of Liberty is dependent upon the flow in Eighteen-Mile Creek for water supply. The population and industrial growth of the town is expected to increase the demand for water from about 1.6 to 4 million gallons per day within the next 25 years.

Measures planned to solve these problems include land treatment and structural means. Land-treatment measures on croplands, pastures, and woodlands will be installed to retard erosion and improve infiltration. Vegetative cover will be applied to 650 acres of critically eroding areas scattered throughout the watershed.

Structural measures will consist of two floodwater retarding impoundments, structures 2 and 3, one multiple-purpose impoundment for flood prevention and municipal water, structure 4, and about 2 miles of stream channel improvement. The structures will retard runoff from 26.9 square miles or about one-half the watershed area. Structure 4 will store 800 acre-feet of municipal water for the town of Liberty, directly benefiting about 5,000 people.

The project will reduce flood damage from an average of \$79,900 to \$18,300 annually, a reduction of 77 percent. About 1,950 acres of flood plain below the structures will receive protection, increasing the income on about 70 family farms. Sediment deposition and swamping on 500 acres will be reduced 81 percent. Sediment delivery to Hartwell Reservoir will be reduced by 21,000 tons per year.

The three structures will create lakes with 225 surface acres, and will be available to the general public or organized groups, accommodating about 17,000 average annual visitor days for recreation and fishing.

The total project installation cost is estimated at \$1.5 million, of which Public Law 566 funds will bear 59 percent or \$885,000 and other funds will bear 41 percent or \$623,000.

The annual benefits of \$125,200, as compared to the annual cost of \$58,400, provide a benefit-cost ratio of 2.1 to 1.

Mr. Chairman, that concludes my testimony. I will be glad to answer any questions.

Mr. KEE. Thank you very much.

Any questions to my right?

Any questions to my left?

You know, this is the first meeting we have had without our very dear friend, Hollis Williams. I hope that you all will tell Hollis I will try to contact him myself and tell him that he was well represented. I commend each of you for your very, very thorough proposals you have presented. And I certainly, as a member of this committee, commend you because you have gone that extra step in order to determine the actual facts.

In conclusion, before we go into executive session, I would like to state that I know of no committee in the Congress of the United States where we are so completely dedicated to America today and the America of tomorrow, and there is no such thing as political differences. We have all gotten together to assume our responsibility to do the job for America.

I am indeed grateful to my colleagues on both sides of the aisle because we wanted to know the facts. We have the facts. And we do not have any political differences in any way, shape, or form.

The members of this committee have dedicated themselves to study these projects and we get together and we talk them over and figure out what is the best for America.

We have always unanimously agreed. And it is my hope and my expectation that in the 93d Congress and future Congresses to come that this same spirit will prevail. I have every confidence that it will, because we have an obligation to our Nation to do the job under which the rules of the House have been assigned to it.

Are there any questions or remarks on my right? On my left?

At this point we will now enter into executive session.

(Thereupon, at 11 a.m., the hearing was concluded.)



