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FINAL
WATERSHED PLAN
and
ENVIRONMENTAL IMPACT STATEMENT
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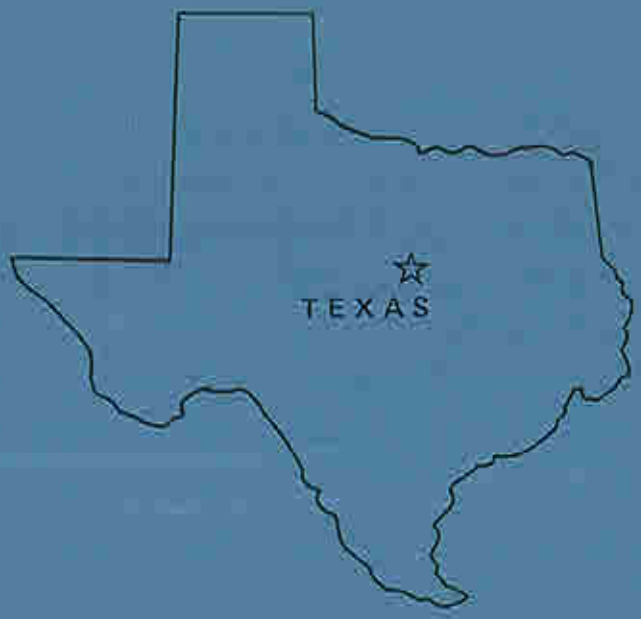
HAMILTON CREEK WATERSHED

BURNET COUNTY, TEXAS



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE, TEXAS

FEBRUARY 1979

WATERSHED PLAN
AND
ENVIRONMENTAL IMPACT STATEMENT

HAMILTON CREEK WATERSHED
Burnet County, Texas

Prepared under the Authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 USC 1001-1008) and in accordance with Section 102(2)(C) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 4321 et seq).

Sponsoring Local Organizations

Hill Country Soil and Water Conservation District
The Commissioners Court of Burnet County
City of Burnet

Prepared By:

U. S. Department of Agriculture, Soil Conservation Service
Temple, Texas

PREFACE

Enclosed are two documents: the Watershed Plan and the Environmental Impact Statement for Hamilton Creek Watershed, Texas.

The watershed plan is the basis for the authorization of federal assistance to implement the proposed project in accordance with the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 USC 1001-1008).

The environmental impact statement has been prepared by the U.S. Department of Agriculture, Soil Conservation Service in compliance with Section 102(2)(C) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 4321 et seq).

The environmental impact statement contains the detailed information on project area, planned project, problems, impacts, alternatives, and other pertinent information.

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ENVIRONMENTAL IMPACT STATEMENT

Hamilton Creek Watershed Plan
Burnet County, Texas

SUMMARY AND DESCRIPTION*

This plan for watershed protection and flood prevention for the Hamilton Creek watershed was prepared by the Hill Country Soil and Water Conservation District, the City of Burnet, and the Burnet County Commissioners Court, who are sponsoring the project. Technical assistance was provided by the Soil Conservation Service of the U. S. Department of Agriculture. The Fish and Wildlife Service of the U. S. Department of the Interior collaborated with the Texas Parks and Wildlife Department in the preparation of a reconnaissance report of the fish and wildlife aspects of the watershed. Archeological information was developed by the Institute for Environmental Studies of North Texas State University and the Soil Conservation Service.

Hamilton Creek watershed lies within the northern part of the Hill Country of Texas. It comprises an area of 52,995 acres, or 82.81 square miles, in Burnet County, Texas. The central portion of the watershed is about 45 miles northwest of Austin and 60 miles southwest of Temple. The town of Burnet, Texas, with a 1970 population of 2,864, is in the upper portion of the watershed (U.S. Water Resources Council, 1972). Burnet is an agriculturally oriented rural community.

The main problem identified in the watershed is flooding within the corporate limits of Burnet. The 100-year flood event will inundate a total of 807 acres, of which 231 acres are urban land, 76 acres are cropland, and 500 acres are pastureland or rangeland. Investigations indicate that 58 houses on Daugherty Branch, 5 houses on Haynie Branch, and 58 houses and businesses on Hamilton Creek are subject to floodwater damage from the 100-year flood event. Twenty-six homes are flooded by the 5-year flood event. A storm of this approximate magnitude occurred on November 5, 1974, and caused estimated damages of $50,000. A 100-year flood event would cause about $743,450 in direct damages at the present level of urban development. (See Appendix G for the location of the urban area subject to floodwater damage.) Without the project, average annual direct floodwater damages amount to $58,260 to urban properties and $3,950 to agricultural land and crop production.

Project objectives are the protection of human lives from the threat of floodwater, the reduction of flood damage to residential and agricultural areas, the protection of the natural resource base (including wildlife habitat) from flood damage, and the reduction of economic losses resulting from flooding.

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* All information and data in this watershed plan, except as otherwise noted by reference to source, were collected during watershed planning investigations by the Soil Conservation Service, U.S. Department of Agriculture.

This plan, which will accomplish the sponsors' objectives, proposes structural and nonstructural measures. The principal elements of the plan are the construction of three floodwater retarding structures, regulation of future development of the flood plain in Burnet, and a public information program. The project installation period will be four years.

The project, when completed, will reduce the effect of a 100-year flood event by eliminating the threat of loss of life and reducing the number of residences or businesses flooded from 121 to 38. Floodwater depths will be reduced in the ground floor of structures from a maximum of 3.2 feet to a maximum of 1.3 feet and floodwater velocities will be less than one foot per second. Buildings with remaining hazards from the 100-year flood event are located on reach 1, between valley cross sections 20 and 22; on reach 2, between valley cross sections 12 and 19; and on Haynie Branch (Appendix E).

Installation of the project will require the use of 172 acres, of which 29 acres will be used for dams and emergency spillways, 38 acres for sediment pools, and 105 acres for detention pools.

The existing vegetation will be destroyed on the 27 acres of land needed for construction of dams and emergency spillways and on most of the 37 acres of land needed for the sediment pools. Two acres of an existing pond will be covered by a dam and emergency spillway. The dams, emergency spillways, and other land areas disturbed during construction will be revegetated to control erosion, provide wildlife food and cover, and enhance the visual appearance of the landscape. Portions of the sediment pool areas of floodwater retarding structures Nos. 2 and 3 (Appendix H) will be fenced and managed for optimum use by wildlife.

The City of Burnet will be responsible for the operation and maintenance of the project. Funds for this purpose will be made available from the general operating funds of the city. The estimated average annual cost of operation and maintenance is $970.

The ratio of total average annual benefits ($69,050) resulting from the installation of project measures to the average annual cost ($47,460) is 1.5 to 1.0.

PLANNED PROJECT

The environmental impact statement attached to this watershed plan provides detailed information about all elements of this project and how and where they will be located. It includes a description of the environmental setting, problems, impacts, and alternatives studied in the development of this plan.

The project consists of a public information program, flood plain land use regulation within the city of Burnet, and three floodwater retarding structures.

The watershed project is to be carried out by the sponsoring local organizations with assistance from the USDA, Soil Conservation Service, under the authority of Public Law 566, 83rd Congress, 68 Stat. 666, as amended, for the purpose of watershed protection and flood prevention.

Nonstructural Measures

The City of Burnet is a participant in the National Flood Insurance Program, and, as such, has adopted flood plain regulations that will, as a minimum, preclude future urban expansion or major modification of existing improvements below the 100-year, with-project floodwater elevation along Hamilton Creek and its tributaries within the corporate limits of the city. Burnet County is not a participant in the National Flood Insurance Program, and therefore cannot prepare or enforce county flood plain management regulations.

Growth patterns in the city do not indicate flood plain development outside the corporate area of Burnet. However, the City of Burnet and Burnet County Commissioners Court will jointly develop a public information program and publicize at least annually the areas that are still subject to flooding from the 100-year flood event.

The City of Burnet has taken the required legal and administrative actions to make flood insurance available to the developed properties in the flood plain within the city limits that are subject to flood damage under with-project conditions.

Structural Measures

The project includes three floodwater retarding structures. Two structures will be built on the upper tributaries of Hamilton Creek northwest of Burnet. The other structure will be built in the northeast corner of the city of Burnet on Daugherty Branch of Hamilton Creek. The structure on Daugherty Branch will control runoff from 1.76 square miles of the drainage area of Daugherty Branch. The two structures on Hamilton Creek will control runoff from 2.34 square miles of the drainage area of Hamilton Creek above Burnet. Average annual acres flooded will be reduced by 41 percent. (See Appendix H for location of the area benefited by the structural measures.)

Fences will be constructed at floodwater retarding structures Nos. 2 and 3 to include the major part of the sediment pools and an additional 7 acres of shoreline area that will be managed for maximum environmental quality and optimum use by wildlife. In addition, a 5-acre pecan orchard adjacent to the proposed dam at site No. 2 will be protected during construction activities and will be included within the permanent fenced area of the dam and emergency spillway.

INSTALLATION COSTS - MONETARY

Total installation cost of the project is estimated to be $675,440, of which $591,990 will be borne by Public Law 566 funds and $83,450 will be

borne by local sponsors. Public Law 566 costs for installing the structural measures include $478,000 for construction, $50,040 for engineering services, and $63,950 for project administration.

Local costs for project installation include $81,550 for the value of the land and for rerouting a low voltage transmission line at site No. 1 and removing a hunter's cabin and a vacant mobile home at site No. 2. Other local costs are $1,500 for project administration and $400 to initiate the public information program.

Construction costs include the engineer's estimate and contingencies. The engineer's estimate was based on unit cost of structural measures in similar areas modified by special conditions inherent to the site location. Ten percent of the engineer's estimate was added as a contingency to provide funds for unpredictable construction costs. No unusual construction problems are anticipated.

Engineering services and project administration costs were based on an analysis of previous work in similar areas. Engineering services costs consist of, but are not limited to, detailed surveys, geologic investigations and laboratory analyses, reports, designs, and cartographic services.

Public Law 566 project administration costs consist of construction inspection, contract administration, and maintenance of Soil Conservation Service records and accounts.

Local costs for project administration include the sponsors' costs related to contract administration, overhead and organizational administrative costs, and whatever construction inspection they desire to make at their own expense.

The value of land rights was determined by appraisal in cooperation with representatives of the sponsoring local organizations.

ECONOMIC BENEFITS

The estimated direct average annual floodwater damages (table 5) will be reduced from $62,210 to $4,520, or 93 percent. Crop and pasture damages will be reduced from $3,950 to $2,070, or 48 percent. Urban damages will be reduced from $58,260 to $2,450, or 96 percent. Indirect floodwater damages will be reduced from $12,060 to $700, or 94 percent.

The total average annual cost of the project (amortized total installation and project administration costs plus annual operation and maintenance costs) is $47,460. The measures are expected to produce average annual benefits of $69,050. The ratio of total annual project benefits accruing to the project measures to the average annual cost of the structural measures is 1.5 to 1.0 (table 6).

INSTALLATION AND FINANCING

The project installation period will be four years. The general sequence of installation is shown in the following schedule of obligations:

Schedule of Obligations

Fiscal Year	Measure	Public Law 566 Funds (dollars)	Other Funds (dollars)	Total (dollars)
First	Initiation of Flood Plain Regulation and Public Information Program	0	100	100
	Acquisition of Land Rights	0	81,550	81,550
Second	Public Information Program	0	100	100
	Floodwater Retarding Structure No. 1	240,830	500	241,330
Third	Public Information Program	0	100	100
	Floodwater Retarding Structures Nos. 2 and 3	351,160	1,000	352,160
Fourth	Public Information Program	0	100	100
Total		591,990	83,450	675,440

This schedule may be changed from year to year to conform with appropriations, accomplishments, and any mutually desirable changes. No Public Law 566 funds will be obligated until the nonstructural measures (flood insurance and flood plain regulations) are implemented.

Federal assistance for carrying out the works of improvement described in this work plan will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666), as amended.

The City of Burnet will:

1. Obtain all land rights for structural measures consistent with the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and USDA Rules and Regulations (Table 7, Part 21).

2. Provide for the change in location or modification of a low voltage power transmission line at site No. 1, two vacant structures at site No. 2, and all permits necessary for the installation of the floodwater retarding structures.

3. Determine and certify legal adequacy of easements and permits for construction of the structural measures.

4. Execute operation and maintenance agreements.

5. Execute project agreements.

All costs for necessary changes in location or modifications as listed above are land rights costs and will be borne by the sponsoring local organization.

Under present conditions, there will be no apparent displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be carried out under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat., 1894) effective January 2, 1971, and the regulations listed by the Secretary of Agriculture pursuant thereto. All relocation costs will be shared, with Public Law 566 funds providing 87.70 percent and local funds providing 12.30 percent.

The City of Burnet and the Burnet County Commissioners Court will jointly develop a public information program and publicize at least annually the areas outside the corporate limits of Burnet that are still subject to flooding from the 100-year flood event.

Funds for the local share of the cost of installing the structural measures will be provided by the City of Burnet. These funds are supported by revenue from existing tax sources and are adequate for financing the sponsors' share of project costs. The City of Burnet will be responsible for dealing with the Soil Conservation Service during installation of the structural measures.

Technical assistance will be provided by the Soil Conservation Service in preparation of plans and specifications, construction inspection, preparation of contract payment estimates, final inspection, execution of certificate of completion, and related tasks necessary to install the planned structural measures.

The sponsoring local organizations have requested the Soil Conservation Service to issue invitations for bids and award and administer the contracts for installation of the works of improvement.

In order for construction to proceed according to schedule, all land rights for the floodwater retarding structures are to be secured by the end of the first year of the installation period. The schedule will begin when the watershed plan is approved for operations.

Archeological surveys in the watershed did not identify evidence of cultural values; however, if any are discovered during detailed investigations or construction, the Heritage Conservation and Recreation Service will be notified, and the procedures outlined in Public Law 93-291 will be

followed. Inasmuch as this is a federally assisted local project, there will be no change in the existing responsibilities of the Soil Conservation Service under Executive Order 11593 with respect to archeological and historical resources.

OPERATION, MAINTENANCE, AND REPLACEMENT

The City of Burnet will be responsible for the operation and maintenance of the project. Funds for this purpose will be made available from the general operating funds of the city. The total estimated cost of operation and maintenance is $970. The estimated average annual cost of operation and maintenance of the structural measures is $870 and the estimated cost of the annual public information program is $100.

A specific operation and maintenance agreement will be prepared for the structural measures and will be executed prior to signing a project agreement and the issuance of invitations to bid on construction of the structural measures. The operation and maintenance agreement will include specific provisions for retention and disposal of property acquired or improved with Public Law 566 financial assistance. The agreement will set forth specific details on procedure in line with recognized assignments of responsibility and will be in accordance with the Texas Watersheds Operation and Maintenance Handbook.

A public information program will be developed to publicize, at least annually, the areas still subject to flooding from the 100-year flood event. Announcements will be made by local newspapers and radio stations. In addition, maps for public use will be available in appropriate city and county offices.

The floodwater retarding structures will be inspected at least annually and after each heavy rain by representatives of the City of Burnet, the Commissioners Court of Burnet County, the Hill Country Soil and Water Conservation District, and the designated Soil Conservation Service representative. A written report will be made within 10 days of the date on which the inspection was made and a copy provided to the designated Soil Conservation Service representative.

Upon completion of the floodwater retarding structures, the City of Burnet will assume responsibility for maintenance of the structures. They will perform promptly, or have performed promptly, all maintenance of the structures as determined to be needed by either the sponsors or the Soil Conservation Service, including that required to prevent soil erosion and water pollution. Specifically, the dams will be earth embankments and the emergency spillways will be excavated. A vegetative cover of grass to protect the structural components from erosion will be established by seeding or sodding. Fertilization and weed control will be carried out to establish, as well as maintain, a good vegetative cover. The structural measures will be fenced. Fences will be maintained.

Sponsors will also control the handling, use, and application of any herbicides and pesticides that may be needed for operation and maintenance of the structural measures. If the use of chemicals should be required, only approved and authorized reagents and compounds will be used. Their application will be compatible with current laws regulating their use. In addition to prudent judgment, ordinances and standards concerned with the disposal or storage of unused chemicals, empty containers, contaminated equipment, and other materials will be observed and applied.

The Soil Conservation Service will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspections and technical guidance and information necessary for the operation and maintenance program.

Provisions will be made for unrestricted access by representatives of the sponsoring local organizations and the Soil Conservation Service to inspect the structural measures and their appurtenances at any time and for the sponsors to perform operation and maintenance. Easements insuring this unrestricted ingress and egress will be furnished by the sponsors.

AGREEMENT

between the

Hill Country Soil and Water Conservation District
Commissioners Court of Burnet County
City of Burnet
(hereinafter referred to as the sponsors)
State of Texas
and the
Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the SCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsors for assistance in preparing a plan for works of improvement for the Hamilton Creek Watershed, State of Texas, under authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the SCS; and

Whereas, there has been developed through the cooperative efforts of the sponsors and the SCS this plan for works of improvement for the Hamilton Creek Watershed, State of Texas;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through the SCS, and the sponsors hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan, including the following:

1. The sponsors will acquire, with other than PL 566 funds, such land rights as will be needed in connection with the works of improvement. (Estimated Cost $81,550.)

2. The sponsors assure that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the sponsors and SCS as follows:

	Sponsors (percent)	SCS (percent)	Estimated Relocation Payment Costs (dollars)
Relocation Payments	12.30	87.70	1/ 0

1/ Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

3. The sponsors will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

4. The percentages of construction costs to be paid by the sponsors and by SCS are as follows:

Works of Improvement	Sponsors (percent)	SCS (percent)	Estimated Construction Costs (dollars)
Three floodwater retarding structures	0	100	478,000

5. The percentages of the engineering costs to be borne by the sponsors and SCS are as follows:

Works of Improvement	Sponsors (percent)	SCS (percent)	Estimated Engineering Costs (dollars)
Three floodwater retarding structures	0	100	50,040

6. The sponsors will bear the cost of the public information program, which is estimated to be $400 during the project installation period.

7. The sponsors and SCS will each bear the costs of project administration which it incurs, estimated to be $1,500 and $63,950, respectively.

8. The sponsors will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

9. The sponsors will be responsible for the operation, maintenance, and replacement of the works of improvement by actually performing the work or

arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work. They will also be responsible for operation of the public information program.

10. The costs shown in this plan represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

11. This agreement is not a fund obligating document. Financial and other assistance to be furnished by SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

12. A separate agreement will be entered into between SCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

13. This plan may be amended, revised, or terminated only by mutual agreement of the parties hereto except that SCS may terminate financial and other assistance in whole, or in part, at any time it determines that the sponsors have failed to comply with the conditions of this agreement. In this case, SCS shall promptly notify the sponsors in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the sponsors or recoveries by SCS under projects terminated shall be in accord with the legal rights and liabilities of the parties.

14. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

15. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any activity receiving federal financial assistance.

Hill Country Soil and Water Conservation District
Local Organization

By Don Alexander
Don Alexander
Title Chairman

P. O. Box H, Burnet, Texas 78611
Address Zip Code

Date 9-20-79

The signing of this plan was authorized by a resolution of the governing body of the Hill Country Soil and Water Conservation District adopted at a meeting held on September 20, 1979.

Arthur W. Schroeter
Arthur W. Schroeter
Secretary

P. O. Box H, Burnet, Texas 78611
Address Zip Code

Date 9-20-79

Commissioners Court of Burnet County
Local Organization

By Edward M. Yturri
Edward M. Yturri
Title County Judge

Burnet County Courthouse, Burnet, Texas 78611
Address Zip Code

Date 10-9-79

The signing of this plan was authorized by a resolution of the governing body of the Commissioners Court of Burnet County adopted at a meeting held on October 9, 1979.

Millie Williams
County Clerk, Burnet County, Texas
~~Secretary~~ (Millie Williams)

Burnet County Courthouse
Burnet, Texas 78611
Address Zip Code

Date 10-9-79

City of Burnet
Local Organization

By Howard R. Benton
Howard R. Benton
Title Mayor

127 E. Jackson, Burnet, Texas 78611
Address Zip Code

Date 10-09-79

The signing of this plan was authorized by a resolution of the governing body of the City of Burnet adopted at a meeting held on October 9, 1979.

Grace E. Kinkead
Grace E. Kinkead
Secretary

127 E. Jackson, Burnet, Tex. 78611
Address Zip Code

Date 10-09-79

Appropriate and careful consideration has been given to the environmental impact statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service

United States Department of Agriculture

Approved by:

George C. Marks

George C. Marks
State Conservationist

OCT 17 1979

Date

TABLE 1 - ESTIMATED COST

Hamilton Creek Watershed, Texas

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) 1/		
			PL 566 Funds	Other Funds	
			Non-Federal Land	Non-Federal Land	
			SCS 2/	SCS 2/	Total
NONSTRUCTURAL MEASURES					
Initiate Public Information Program			0	400	400
STRUCTURAL MEASURES					
Floodwater Retarding Structures	No.	3	528,040	81,550	609,590
Project Administration					
Construction Inspection			31,810	200	32,010
Other			32,140	1,300	33,440
Subtotal - Administration			63,950	1,500	65,450
TOTAL PROJECT COSTS 3/			591,990	83,450	675,440

1/ Price Base: 1977
2/ Federal agency responsible for assisting in installation of works of improvement.
3/ Excludes the going program - Land Treatment.

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TABLE 2 - ESTIMATED COST DISTRIBUTION

Hamilton Creek Watershed, Texas

(Dollara)[1/]

Item	Installation Cost - Public Law 566 Funds			Installation Cost - Other Funds		Total Installation Cost
	Construction	Engineering	Total PL 566 Funds	Land Rights[2/]	Total Other	
STRUCTURAL MEASURES						
Floodwater Retarding Structures Nos.						
1	197,100	18,540	215,640	52,650	52,650	268,290
2	177,800	18,100	195,900	20,100	20,100	216,000
3	103,100	13,400	116,500	8,800	8,800	125,300
Subtotal - Structural Measures	478,000	50,040	528,040	81,550	81,550	609,590
NONSTRUCTURAL MEASURES						
Public Information Program	-	-	-	-	400	400
Project Administration	-	-	63,950	-	1,500	65,450
GRAND TOTAL	478,000	50,040	591,990	81,550	83,450	675,440

1/ Price Base: 1977

2/ Includes $350 for legal fees and $1,000 for modification of improvements.

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TABLE 3 - STRUCTURAL DATA - DAMS WITH PLANNED STORAGE CAPACITY

Hamilton Creek Watershed, Texas

Item	Unit	Structure No. 1	Structure No. 2	Structure No. 3	Total
Class of Structure		C	C	C	
Drainage Area (Total)	Sq. Mi.	1.76	1.63	0.71	4.10
Curve No. (1-Day)(AMC II)		80	80	80	xxx
Elevation Top of Dam	Ft.	1347.9	1435.3	1427.4	xxx
Elevation Crest Emergency Spillway	Ft.	1339.5	1426.5	1420.0	xxx
Elevation Crest Principal Spillway	Ft.	1327.3	1411.0	1405.2	xxx
Maximum Height of Dam	Ft.	34	40	40	xxx
Volume of Fill[1/]	Cu. Yd.	176,000	148,500	81,100	405,600
Total Capacity[1/]	Ac. Ft.	604	548	233	1,385
Sediment Submerged[2/]	Ac. Ft.	89	67	26	182
Sediment Aerated	Ac. Ft.	17	4	2	23
Floodwater Retarding	Ac. Ft.	498	477	205	1,180
Surface Area					
Sediment Pool	Acre	20	13	5	38
Floodwater Retarding Pool[1/]	Acre	68	52	23	143
Principal Spillway Design					
Rainfall Volume (1-Day)	Inch	9.60	9.80	9.80	xxx
Rainfall Volume (10-Day)	Inch	15.60	16.00	16.00	xxx
Runoff Volume (10-Day)	Inch	10.65	10.75	10.97	xxx
Capacity of Principal Spillway (Maximum)	C.F.S.	104	108	108	xxx
Diameter of Conduit	Inch	30	30	30	xxx
Emergency Spillway Design					
Frequency Operation - Emergency Spillway	% Chance	1.0	0.9	0.9	xxx
Rainfall Volume (ESH)	Inch	13.20	13.20	13.20	xxx
Runoff Volume (ESH)	Inch	10.61	10.61	10.61	xxx
Storm Duration	Hr.	6	6	6	xxx
Type		Veg.	Veg.	Veg.	xxx
Bottom Width	Ft.	150	150	100	xxx
Velocity of Flow (V_e)	Ft./Sec.	6.0	6.9	7.3	xxx
Slope of Exit Channel	Ft./Ft.	.016	.034	.065	xxx
Maximum Reservoir Water Surface Elevation	Ft.	1342.0	1429.6	1422.2	xxx
Freeboard Design					
Rainfall Volume (FH)	Inch	31.00	31.00	31.00	xxx
Runoff Volume (FH)	Inch	28.18	28.18	28.18	xxx
Storm Duration	Hr.	6	6	6	xxx
Maximum Reservoir Water Surface Elevation	Ft.	1347.9	1435.3	1427.4	xxx
Capacity Equivalents					
Sediment Volume	Inch	1.13	0.82	0.74	xxx
Floodwater Retarding Volume	Inch	5.31	5.48	5.42	xxx

1/ Crest of emergency spillway.

2/ Capacity below lowest ungated outlet, excluding anticipated borrow. Capacity, including borrow, does not exceed 200 acre-feet for any of the floodwater retarding structures.

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TABLE 4 - ANNUAL COST

Hamilton Creek Watershed, Texas

(Dollars)[1/]

Evaluation Unit	Amortization of Installation Cost[2/]	Operation and Maintenance Cost	Total
STRUCTURAL MEASURES			
Three Floodwater Retarding Structures	41,960	870	42,830
NONSTRUCTURAL MEASURES			
Public Information Program	30	100	130
Project Administration	4,500	xxx	4,500
GRAND TOTAL	46,490	970	47,460

1/ Price Base: 1977
2/ 100 years at 6-7/8 percent intereat

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TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Hamilton Creek Watershed, Texas

(Dollars)[1/]

Item	Estimated Average Annual Damage[2/]		Damage Reduction Benefits
	Without Project	With Project	
Floodwater			
Crop and Pasture	3,950	2,070	1,880
Nonagricultural			
Residential	54,320	2,320	52,000
Commercial	3,940	130	3,810
Subtotal	62,210	4,520	57,690
Indirect	12,060	700	11,360
TOTAL	74,270	5,220	69,050

1/ Price Base: Current normalized prices (October 1977) for crop and pasture damages, and current (1977) prices for nonagricultural damages.

2/ Damages were calculated from all flooding up to and including the largest flood expected during the 100-year evaluation period; however, additional damages may be expected from floods in excess of this magnitude.

February 1979

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Hamilton Creek Watershed, Texas

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/	Average Annual Cost 2/	Benefit-Cost Ratio
	Damage Reduction		
STRUCTURAL MEASURES			
Three floodwater retarding structures	69,050	42,830	1.6:1.0
NONSTRUCTURAL MEASURES			
Public Information Program	xxx	130	xxx
Project Administration	xxx	4,500	xxx
GRAND TOTAL	69,050	47,460	1.5:1.0

1/ Current normalized prices (October 1977) for crop and pasture damages and current (1977) prices for nonagricultural damages.

2/ From table 4

February 1979

USDA-SCS-EIS-WS-(ADM)-78-5-(F)-TX

HAMILTON CREEK WATERSHED
Burnet County, Texas

ENVIRONMENTAL IMPACT STATEMENT

George C. Marks, State Conservationist
Soil Conservation Service

Sponsoring Local Organizations:

Hill Country Soil and Water Conservation District
P. O. Box H, Burnet, Texas 78611

The Commissioners Court of Burnet County
Burnet County Courthouse, Burnet, Texas 78611

City of Burnet
127 East Jackson, Burnet, Texas 78611

February 1979

Prepared By

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Temple, Texas 76501

USDA ENVIRONMENTAL IMPACT STATEMENT

HAMILTON CREEK WATERSHED
Burnet County, Texas

Prepared in accordance with Sec. 102(2)(C) of P.L. 91-190

SUMMARY

I. Final

II. Soil Conservation Service

III. Administrative

IV. Description of Project: The project is for watershed protection and flood prevention in Burnet County, Texas, to be implemented under authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), as amended. The plan proposes that three floodwater retarding structures be constructed during a 4-year installation period and that the City of Burnet adopt and enforce flood plain use regulations and institute a public information program.

V. Summary of Impacts:
Nonstructural measures will:

Preclude further urban expansion or major modification of existing buildings below the 100-year floodwater elevation within the corporate limits of the city of Burnet.

Structural measures will:

1. Eliminate the threat of loss of lives from floodwater in the urban area.

2. Reduce the area inundated by the 100-year flood event from 807 acres to 583 acres.

3. Provide protection from the 100-year flood event to the 58 existing urban properties on Daugherty Branch and 25 existing urban properties on Hamilton Creek.

4. Reduce significantly the depth of flooding and resulting floodwater damage to the other 33 existing urban properties on Hamilton Creek.

5. Reduce the average annual direct floodwater damages to urban properties from $58,260 to $2,450, or 96 percent.

6. Reduce the average annual direct floodwater damages to agricultural land and crop production from $3,950 to $2,070, or 48 percent.

7. Reduce the average annual indirect damages from $12,060 to $700, or 94 percent.

8. Benefit 17 farms and ranches and 116 residential and business units in the flood plain.

9. Increase activity of the local economy by creating 20 man-years of employment during construction of the structural measures.

10. Cause destruction of 37 acres of terrestrial wildlife habitat.

11. Create an additional 37 acres of surface water for fish and wildlife habitat.

12. Cause replacement of 27 acres of wildlife habitat destroyed during construction with altered habitat. (Two acres of existing pond will become part of the sediment pool area.)

13. Cause slight increase in air and water pollution during construction of the floodwater retarding structures.

14. Lengthen the period of streamflow in Hamilton Creek and Daugherty Branch through the city of Burnet after major rainstorms, but limit the flood flows.

15. Depending on the personal observation and feeling of the viewer, enhance, deteriorate, or not alter the visual aspects of the landscape affected by construction of the floodwater retarding structures.

16. Create altered sights and sounds engendered by impounded water in the sediment pools.

17. Cause an initial reduction of 0.27 percent in average annual streamflow from the total watershed.

VI. List of Alternatives Considered

1. Three floodwater retarding structures, flood plain land use regulation, and a public information program.

2. Floodproofing or relocating existing houses and businesses and changing the present land use in the flood plain to a use that is less susceptible to flood damage.

3. One floodwater retarding structure, flood plain land use regulation, and a public information program.

4. Foregoing the project.

VII. Agencies From Which Written Comments Have Been Received:

Department of the Interior
Environmental Protection Agency
Forest Service, USDA
Office of Equal Opportunity, USDA
Public Health Service, USDHEW
Budget and Planning Office (State agency designated by Governor and State Clearinghouse)
Lower Colorado River Authority
Wildlife Management Institute

USDA SOIL CONSERVATION SERVICE
DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR

Hamilton Creek Watershed, Texas

AUTHORITY

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83rd Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Hill Country Soil and Water Conservation District
The Commissioners Court of Burnet County
City of Burnet

PROJECT OBJECTIVES AND GOALS

The objectives of the sponsors are to improve the quality of the human environment by providing attractive, convenient, satisfying, safe and healthful places to live, work, and play and to improve the quality in the standard of living based on community improvement.

Within the framework of these broad objectives, the following goals were agreed upon by the sponsors and the Soil Conservation Service:

1. Protection of the natural resource base (including wildlife habitat) from flood damage.

2. Reduction of flood damage to residential and agricultural areas.

3. Protection of human life from the threat of floodwater.

4. Reduction of economic losses resulting from flooding.

PLANNED PROJECT

The elements of this plan were selected to protect human life and property from flooding in the Hamilton Creek watershed. The plan employs non-structural and structural measures needed to accomplish the goals of the project. The structural measures will reduce flooding mainly within the city of Burnet. (See Appendix H for the location of the benefited areas.) The nonstructural measures include regulation of the flood plain uses within the corporate limits of Burnet and publicizing, at least annually, the impact of floodwater damage to properties that are subject to flooding under with-project conditions.

The project, located in Burnet County, Texas, proposes that three floodwater retarding structures be installed to reduce flood damages on 231

acres of urban land in the city of Burnet and 576 acres of agricultural flood plain land. In addition, the project includes a public information program and flood plain regulation within the corporate limits of Burnet. The locations of the structural measures are shown on the project map (Appendix H).

Nonstructural Measures

The City of Burnet will institute flood plain regulations to preclude further urban expansion or major modification or reconstruction below the 100-year floodwater elevation under with-project conditions along Hamilton Creek and its tributaries within the corporate limits of the city. Such regulations will not preclude development on land fills or raised foundations which do not result in significant increase in the 100-year water surface elevation. The city will determine and furnish the minimum acceptable elevation as shown on Appendix G before construction starts on any new or modified development.

Growth patterns in Burnet do not indicate future flood plain development outside the corporate limits of Burnet. However, the City of Burnet and Burnet County Commissioners Court will jointly develop and initiate a public information program to publicize, at least annually, the areas subject to flooding under with-project conditions from the 100-year event.

The City of Burnet has taken the required legal and administrative actions to make flood insurance available on the developed properties in the flood plain within the urban area that is subject to flood damage under with-project conditions.

Structural Measures

Three floodwater retarding structures are planned for construction during the 4-year installation period. One structure will be located in the northeast corner of Burnet on Daugherty Branch and two structures will be located north of Burnet on the upper tributaries of Hamilton Creek. (See Project Map, Appendix H.) The structures will detain runoff from about 34 percent of the drainage area above Texas Highway 29, which traverses the city of Burnet.

Each floodwater retarding structure will consist of a dam or embankment with a principal spillway and plunge basin, an emergency spillway, a floodwater retarding pool, and a sediment pool. (See Figure 1.) The water in the retarding pool is released through the principal spillway during a maximum period of 3 days after inflow ceases. The emergency spillway is designed to convey runoff that exceeds the planned capacity of the retarding pool past the embankment and back to the stream channel at a non-erosive velocity. The sediment pool is the capacity below the principal spillway elevation allocated for the storage of submerged sediment. The total capacity allocated for the anticipated 100-year

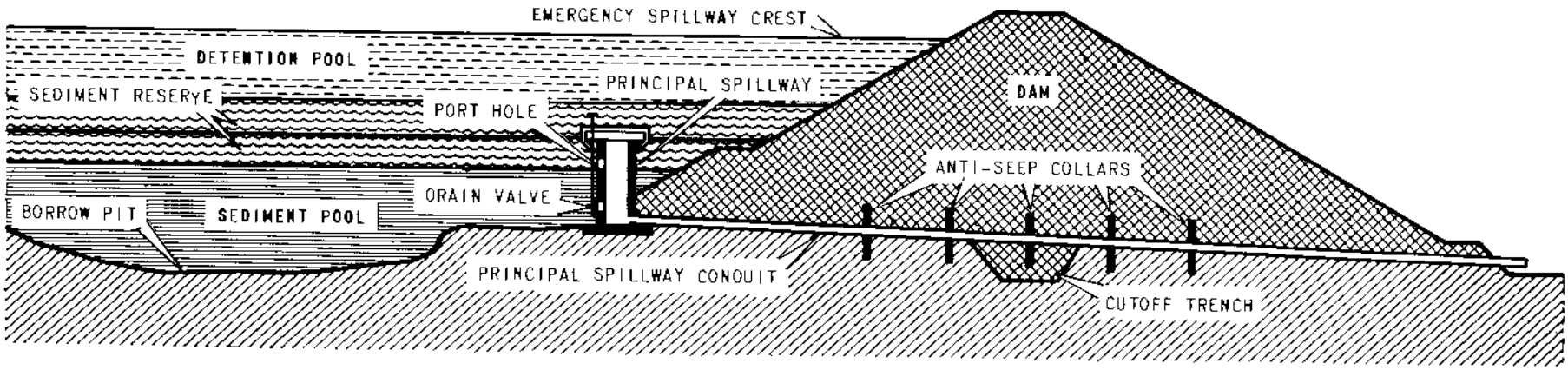

Figure 1

SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

U. S. DEPARTMENT OF AGRICULTURE, SOIA CONSERVATION SERVICE

Rev. 3-65 A-L-10,071

accumulation of submerged sediment is 182 acre-feet, with 89 acre-feet in structure No. 1, 67 acre-feet in structure No. 2, and 26 acre-feet in structure No. 3. The principal spillway crest will be set at the capacity of the 100-year sediment volume predicted to be deposited as submerged sediment. The principal spillways will be the drop inlet type with cantilever outlets. The inlets will be ungated to operate automatically, and will have provisions to release impounded water in order to perform maintenance and, if it becomes necessary, to avoid encroachment upon prior downstream water rights. The total floodwater retarding capacity of the floodwater retarding structures is 1,180 acre-feet, provided for in the space between the sediment pool and the emergency spillway crest.

Pertinent physical parameters of each floodwater retarding structure are as follows:

Parameter	Structure Number		
	1	2	3
Height of Embankment (feet)	34	40	40
Length of Embankment (feet)	2,720	1,770	1,240
Sediment Pool (Lowest Ungated Outlet-acres)	20	13	5
Floodwater Retarding Pool (acres)	48	39	18
Area in Embankment and Emergency Spillway (acres)	16	7	6
Average Depth of Sediment Pool (feet)	4.5	5.1	4.7

The geology at the structure sites is thinly bedded limestone stratified with shaly clay and gravelly to silty caliche which mantles a moderately weathered bedrock. The foundations of the floodwater retarding structures will be constructed on unyielding geologic material.

The embankment material will be excavated from areas of silty to gravelly clays which are tentatively identified as CL material according to the Unified Soil Classification System. The emergency spillways will be excavated in unclassified hard and soft layered geologic strata which underlie one to three feet of calcareous silty to gravelly clay soils.

The planned structures will be located in the upper portions of Hamilton Creek and Daugherty Branch where the streams flow only after heavy rains. Therefore, no individual Section 404 permit for dredging and filling of navigable waters is required from the Department of the Army.

Installation of the three floodwater retarding structures will affect 172 acres, which is the total area needed for the dams and emergency spillways, the sediment pools, and the floodwater detention pools. The areas needed for construction of the dams and emergency spillways (29 acres) will be cleared of all vegetation. These areas will be revegetated with adaptable multiuse plants for erosion control, food and cover for wildlife, grazing of livestock, and improvement of the esthetic

value of the landscape. The areas needed for sediment storage (38 acres) will initially store water but will fill with sediment over a period of about 100 years. The present vegetation will not be cleared from the 105 acres designated as the floodwater detention pools, but vegetation in these areas will be affected by periodic inundation. Natural plant succession will replace the intolerant species over a period of several months or years with plant species such as bermudagrass, buffalograss, vine-mesquite, annual forbs, and other species that are more tolerant to temporary inundation.

Vegetation will be cleared for a distance of 400 feet upstream from the principal spillway. About four acres of desirable woody vegetation in the upper parts of the sediment pools of sites Nos. 2 and 3 will not be disturbed during construction. Fences will be constructed at floodwater retarding structures Nos. 2 and 3 to include the major part of the sediment pools and an additional 7 acres of shoreline area that will be managed for maximum environmental quality and optimum use by wildlife. In addition, a 5-acre pecan orchard at site No. 2 will be protected during construction activities and will be included within the permanent fenced area of the dam and emergency spillway. All embankments and emergency spillways will be fenced.

The embankments, the emergency spillways, disturbed areas, and odd areas on or adjacent to the works of improvement will be vegetated according to Soil Conservation Service technical specifications. Areas subject to excessive erosion will be planted to bermudagrass and kleingrass. Other plant species will be planted to further mitigate the loss of terrestrial wildlife habitat. Multi-use species will be selected on the basis of availability and adaptability from the following: switchgrass, blackberry, white honeysuckle, woollybucket bumelia, red mulberry, live oak, pecan, etc.

Livestock will be excluded from the fenced areas except when grazing will be for the benefit and spread of the vegetation. Grazing will be by written permission of the local maintenance organization.

The environment will be protected from soil erosion and water and air pollution during construction. Contractors will be required to adhere to strict guidelines set forth in each construction contract to minimize soil erosion and water and air pollution during construction. Excavation and construction operations will be scheduled and controlled to prevent exposure of extraneous amounts of unprotected soil to erosion and the resulting translocation of sediment. Measures to control erosion will be uniquely specified at each work site and will include, as applicable, use of temporary vegetation or mulches, diversions, mechanical retardation of runoff, and traps. Harmful dust and other pollutants inherent to the construction process will be held to minimum practical limits. Haul roads and excavation areas and other work sites will be sprinkled with water as needed to keep dust within tolerable limits. Contract specifications will require that fuel, lubricants, and chemicals be adequately

labeled and stored safely in protected areas, and disposal at work sites will be by approved methods and procedures. All construction equipment will have safety and health features in compliance with the Safety and Health Act. Clearing and disposal of brush and vegetation will be carried out in accordance with applicable laws, ordinances, and regulations. Each contract will set forth specific stipulations to prevent uncontrolled grass or brush fires. Disposal of brush and vegetation will be by burying, hauling to approved off-site locations, adequately anchoring in sediment pools, or controlled burning, as applicable.

Necessary sanitary facilities, including garbage disposal facilities, will be located to prohibit such facilities being injuriously adjacent to live streams, wells, or springs in conformance with the federal, state, and local water pollution control regulations. Conformance to all environmental control requirements will be monitored constantly by a construction inspector who will be on-site during all periods of construction operation. During construction periods, the structure sites will be open and available for monitoring by federal, state, and local regulatory agencies in addition to the construction inspector to assure adequate monitoring of water and air pollution.

Efforts will be made to avoid creating conditions which will increase populations of vectors which affect public health conditions. Prevention and control measures will be implemented, if needed, in cooperation with appropriate federal, state, and local health agencies to suppress proliferation of vectors such as aquatic insects, terrestrial arthropods and rodents, etc., that could occur with installation of the structures.

The sediment pools of the three floodwater retarding structures are expected to hold water. The problems, expenses, and liability associated with the landowners' opening their property to public use limit the acceptance of this activity. The cost of additional land rights acquisition for recreational use exceeds the financial ability of the sponsors. Therefore, the sponsors do not plan to assure public access to any of the structures and public recreation use will be prohibited at all three sites. If public access is ever provided at any of the sites, the sponsors will assure that adequate sanitary facilities in compliance with public health laws are installed prior to making the areas available for public use.

A field survey and evaluation of archeological resources indicated that no significant archeological sites will be affected by installation of the structural measures. However, if archeological or historical resources not previously located and evaluated are encountered during construction, work will cease in those areas and the Service will immediately consult with the Heritage Conservation and Recreation Service to determine whether there is evidence to warrant a detailed survey and recovery. If the evidence is substantive, the Heritage Conservation and Recreation Service will undertake immediate surveys and recovery. Should the evidence be inconclusive, construction will continue with caution.

The minimum land rights required will be those necessary to construct, operate, maintain, and inspect the works of improvement; to provide for flowage of water in or upon or through the structures; and to provide for the permanent storage and temporary detention, either or both, of any sediment or water.

In order to install the floodwater retarding structures, it will be necessary to relocate a low-voltage electric transmission line at site No. 1 and a vacant mobile home and a camp house at site No. 2.

The City of Burnet will be responsible for these modifications of existing improvements. The modifications are minor in scope and will not result in any significant adverse environmental impacts.

Under present conditions, there will be no apparent displacements or relocations of persons, businesses, or farm operations as a result of installation of the project. If relocations or displacements become necessary, they will be carried out under the provisions of Public Law 91-646, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Operation and Maintenance

The City of Burnet will be responsible for the operation and maintenance of the floodwater retarding structures and operation of the public information program. Funds for this purpose will come from the general funds of the city. These general funds are supported by existing taxes and are adequate and available for this purpose.

Immediately following completion of the structures by the contractor, the sponsors will be responsible for and will promptly perform, or have performed, without cost to the Service, all maintenance of the structural measures as determined to be needed by either the sponsors or the Service. The sponsors will be responsible for maintenance of vegetation associated with structural measures after the initial vegetation work is adequately completed, as determined by the Service, but no later than three years following completion of each structural measure.

The sponsors will make an inspection of the structural measures annually and after unusually severe floods or other events of nature that may adversely affect the structures. The Service will participate in the inspections for the first three years following installation of each structure and as often as it elects to do so after the third year. Inspection items are those items which may need maintenance. Items of inspection and maintenance will include, but will not be limited to, condition of principal spillways, earth fills, emergency spillways, vegetative cover, fences, gates, and vegetative growth in reservoirs. Also, the structures will be monitored to determine that there are no water pollution problems being created by livestock watering, etc.

Operation of the public information program will consist of at least annual newspaper and radio announcements of the areas that are still subject to flooding from the 100-year flood event. In addition, maps for public use will be available in appropriate city and county offices.

Sponsors will control the handling, storage, and application of herbicides and pesticides that may be necessary for operation and maintenance of the structural measures. Only approved and authorized reagents and compounds will be used. These applications will be compatible with current laws regulating their use. In addition to sound and prudent judgment, ordinances and standards concerned with the disposal or storage of unused chemicals, empty containers, contaminated paraphernalia, etc., will be observed and applied.

Provision will be made for free access of representatives of the sponsoring local organizations and of federal representatives to inspect and provide for maintenance of the structures and their appurtenances at any time.

The City of Burnet will prepare a report of all maintenance inspections. A copy of this report will be submitted to the Service representative. The city will keep summary control records in support of proper maintenance having been performed on these works of improvement.

An operation and maintenance agreement will be executed by the parties hereto prior to the signing of the initial project agreement and the issuance of invitations to bid on construction of the structural measures. The agreement will set forth specific details on procedure in line with recognized assignments of responsibility and will be in accordance with the Texas Watersheds Operation and Maintenance Handbook. An operation and maintenance plan will be prepared for each structural measure. The operation and maintenance agreement will include specific provisions for retention and disposal of property acquired or improved with Public Law 566 financial assistance.

Project Costs

The estimated costs for installation of the project are presented in the following tabulation:

Installation Cost Item	Estimated Cost (Dollars) 1/		
	PL-566 Funds	Other Funds	
	Non-Federal Land SCS 2/	Non-Federal Land SCS 2/	Total
Structural Measures			
Construction	478,000	-	478,000
Engineering Services	50,040	-	50,040
Project Administration	63,950	1,500	65,450
Land Rights	-	81,550	81,550
Nonstructural Measures			
Public Information Program	-	400	400
TOTAL PROJECT	591,990	83,450	675,440

1/ Price Base: 1977
2/ Federal agency responsible for assisting in installation of works of improvement.

The estimated average annual cost of operation and maintenance of the three floodwater retarding structures is $870. The estimated average annual cost of operating the public information program is $100. The total average annual cost of the project (amortized total installation and project administration costs plus annual operation and maintenance costs) is $47,460.

The ratio of the average annual benefits to the average annual cost is 1.5 to 1.0.

ENVIRONMENTAL SETTING*

Physical Resources

Location and Size

Hamilton Creek watershed lies within the northern part of the Hill Country of Texas. It comprises an area of 52,995 acres, or 82.81 square miles, in Burnet County, Texas. The central portion of the watershed is about 45 miles northwest of Austin and 60 miles southwest of Temple. The largest town in the watershed is Burnet with a population of 2,864 (U.S. Water Resources Council, 1972). Marble Falls, with a population of 2,855, lies outside of the watershed about 5 miles west of the mouth of Hamilton Creek. The watershed is a rural area which is sparsely populated south of Burnet, but more densely populated north of Burnet.

* All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigation by the Soil Conservation Service, U. S. Department of Agriculture.

The watershed is about 15 miles long and averages about 6 miles in width. Burnet is in the upper part of the watershed.

Hamilton Creek heads about 3 miles northwest of Burnet. Flowing in a southerly direction, it enters the headwaters of Lake Travis on the Colorado River about 12 miles south of Burnet. Daugherty Branch is a tributary of Hamilton Creek that heads about 1 mile northeast of Burnet and flows in a southwesterly direction through the northern part of Burnet. It joins Hamilton Creek in the western edge of Burnet. Haynie Branch is a small tributary that heads in the eastern part of Burnet and joins Hamilton Creek in the southwest part of Burnet. Other tributaries that join Hamilton Creek south of Burnet are Delaware Creek, Honey Creek, and Hairston Creek. The 100-year flood plain in Burnet ranges from about 200 to 1,650 feet wide. From a point about 3 miles south of Burnet to Lake Travis, the streamflow of Hamilton Creek is contained within the stream channel and the flood plain is very narrow or lacking.

Flooding occurs on 807 acres of flood plain land on Hamilton Creek and its tributaries. There are 231 acres of urban land and 121 houses and businesses within the flood plain. There are 58 houses on Daugherty Branch, 5 houses on Haynie Branch, and 58 houses and businesses on Hamilton Creek. Associated facilities, such as utilities and roads, are also in the flood plain. Most of the remaining 576 acres of flood plain is used for agricultural production.

The watershed is in the central Colorado River Basin, which lies in the Texas Gulf Water Resource Region (USDA, Soil Conservation Service, 1971).

Climatic Features

The average annual rainfall is 28 inches. The wettest months are usually April, May, and June. The average length of the growing season is 249 days, extending from March 16, the average date of the last killing frost in the spring, to November 20, the average date of the first killing frost in the fall. The average January temperature at Burnet is 49.5° F. and the average July temperature is 84.1° F. The mean annual temperature is 67° F. Prevailing winds are from the south. The strongest winds are associated with thunderstorms. The strongest persistent winds occur in March and April (U.S. Department of Commerce, 1971).

Geology

The watershed is underlain by rocks of the Cambrian, Ordovician, Cretaceous, and Quaternary ages. The Cambrian and Ordovician rocks occur in the western and lower parts of the watershed and consist mainly of hard limestone and dolomite with some sandstone and soft shale. The Cretaceous rocks occur over the upper central and eastern parts and consist of soft shale and sandstone and hard limestone. The Quaternary strata, which consist of sandstone, silt, and clay, occur in narrow bands as alluvium along the streams and as terrace deposits along the Colorado River.

The structure of the Cambrian and Ordovician rocks is directly related to their position on the northeastern flanks of the Llano Uplift. The beds dip to the northeast and faulting occurs in these beds southwest of Burnet. The trends of these faults are generally northeast to southwest with displacement of up to 800 feet or more. Cretaceous beds were deposited on the eroded surface of these rocks. The structure of these Cretaceous beds is simple, with the dip being southeast at less than 100 feet per mile.

Elevation, Topography, and Slope

The topography is gently rolling in the central part with prominent ridges occurring along the northwestern, northern, and eastern watershed divide. The lower portion of the watershed is deeply incised by the streams to form a scenic topography of narrow ridges and deep valleys which slope toward the Colorado River. The flood plain is well developed in the central and upper parts near the Burnet area, where widths of up to 1,650 feet occur. The lower 10 miles of Hamilton Creek have no flood plain as the flows are contained within the present channel. Elevations range from 680 feet above mean sea level in the channel of lower Hamilton Creek to slightly over 1,600 feet at the northwestern watershed divide.

Soils

The watershed is in the Grand Prairie Land Resource Area which is an extensive gently rolling prairie in Central Texas. About 90 percent of the soils in the watershed are shallow over limestone. Most of the other soils are deep or moderately deep valley soils. The major soil series that occur in the watershed are Brackett, Tarrant, Hensley, Denton, and Krum. For a more detailed description of the soils, see the Soils Handbook of Burnet County which is available at the Soil Conservation Service office in Burnet.

Mineral Resources

The central mineral region of Texas (Llano Uplift area), which produces many types of mineral products, lies immediately west of the watershed. The only mineral being excavated within the watershed now is dolomite, which is mined from a quarry about 3 miles south of Burnet. Hard limestone, dolomite, and fine-grained, even-textured sandstone occur in other parts of the watershed, but are not now being mined. Minerals being mined a few miles outside of the watershed are: graphite, west of Burnet; granite, near Marble Falls; and pure limestone, south of the Colorado River. Lead, zinc, copper, fluorite, guano, sand, gravel, vermiculite, argillaceous limestone, and asphaltic limestone have been mined in Burnet County in this century. Asphaltic limestone was mined in Burnet County in the early 1920's and the mid-1930's. A potentially valuable outcrop of asphaltic limestone occurs between Farm-to-Market 936 and floodwater retarding structure No. 1, extending for about 1,000 feet south of and possibly under the proposed dam and impoundment area.

Water Resources

The water supply for Burnet and water for rural residents, livestock, and irrigation are obtained from ground water sources. Porous limestone and dolomite of the San Saba Limestone Member of the Wilberns Formation of the Cambrian System is the most productive aquifer (Mount, 1962).

After the city of Burnet experienced domestic water supply problems during the drought of 1956, the city officials requested the Texas Water Commission to assist them in determining the adequacy of ground-water supplies in the vicinity of Burnet. Data from the ground-water studies was furnished the city by the Texas Water Commission in Memorandum Report No. 62-01, Ground-Water Conditions In The Vicinity of Burnet, Texas, February 1962. At that time, aquifers in the Burnet area indicated adequate potential for supplying water for public supply.

Surface Water

Hamilton Creek heads about 3 miles northwest of Burnet. It flows in a southerly direction through the western edge of Burnet and enters Lake Travis about 5 miles east of Marble Falls. Two tributaries, Daugherty Branch and Haynie Branch, flow through Burnet. Other tributaries of Hamilton Creek downstream from Burnet are Delaware, Honey, and Hairston Creeks.

The upper tributaries of Hamilton Creek and Daugherty Branch, where the three floodwater retarding structures are planned, do not contain flowing water except for short periods immediately after rainstorms. A few potholes in Hamilton Creek from about one mile north to three miles south of Burnet contain water during most years. Hamilton Creek, from about 3 miles south of Burnet to Lake Travis, has perennial streamflow because of three large springs which flow continuously.

Air Quality

Air quality within the watershed is excellent and there are no known problems. The metropolitan area of Austin is about 45 miles southeast and contributes only marginal influence because of prevailing southwesterly winds.

Land Use

Land use within the 52,995-acre watershed and the use expected in the future (20 years) are given in the following tabulation:

Land Use	Present (acres)	Percent	Future (20 Years) Without Project (acres)	Percent	Future (20 Years) With Project (acres)	Percent
Cropland	2,026	4	1,600	3	1,550	3
Pasture	875	2	1,301	2	1,330	2
Rangeland	48,362	91	47,862	91	47,845	91
Urban and Built-up	1,000	2	1,500	3	1,500	3
Other 1/	732	1	732	1	770	1
Total	52,995		52,995		52,995	

1/ Other land includes: water areas, farmsteads, roads, railroads, and miscellaneous land uses.

The major land use changes that will occur as a result of installation of the project will be those associated with the installation of the floodwater retarding structures.

Present and Projected Populations

The population of the city of Burnet is assumed to increase by approximately 11 percent each decade to the year 2020 (U.S. Water Resources Council, 1972). This would result in an estimated population of about 4,780 in the year 2020.

Year	Estimated Projected Population	Percent Increase
1970	2,864 (actual population)	-
1980	3,130	9.4
1990	3,490	11.4
2000	3,850	10.3
2010	4,280	11.3
2020	4,780	11.6

Economic Resources

The original settlers in the region were mainly farmers but the rocky and shallow soils were best suited and used for raising livestock which continues to be the main agribusiness. According to the Texas Crop and Livestock Reporting Service, 90 percent of the cash receipts from farm marketings in 1975 in Burnet County came from livestock and livestock products and 10 percent came from crops. The major crops produced are small grains and forage sorghums. Agriculture accounts for about 21 percent of the total employment and 15 percent of all income in the county.

There are approximately 112 farm or ranch units wholly or partially within the watershed. These units average about 430 acres in size and range from less than 10 acres to more than 6,000 acres. There is no public-owned land in the watershed other than highways, schools, playgrounds, etc. Agricultural land values range from $350 to $800 per acre, depending on soil capability and location. Urban land values range from a few hundred dollars to several thousand dollars for a city lot.

Major highways that traverse the watershed are U.S. 281 and Texas 29. Farm-to-Market Roads 963 and 1431 and Park Road 4 also run through the watershed. There are about 10 miles of federal paved highways, 9 miles of state paved highways, 19 miles of county paved highways, and 12 miles of other roads in the watershed.

In 1934, the Lower Colorado River Authority was created and began construction of a series of dams on the Colorado River. The dams, and the lakes they created, have done much for the regional economy because they are used to produce electricity, supply domestic water, and provide areas for water sports. These lakes are called the Highland Lakes and have become a major tourist and vacation center.

Animal Resources

Game animals that presently inhabit the watershed are the white-tailed deer, fox squirrel, wild turkey, bobwhite quail, mourning dove, and some waterfowl. Furbearing animals are the raccoon, ringtail cat, opossum, skunk, fox, coyote, and bobcat. The principal game animal from an economic standpoint is the white-tailed deer. Population densities range from about one deer per 20 acres north of Burnet to one deer per 10 acres south of Burnet. Hunting leases for deer and turkey, and to a lesser extent for dove and quail, are a major economic consideration for many landowners in Burnet County. Leasing is very limited in the northern portion of the watershed but an estimated 50 percent of the land south of Burnet is leased. The average cost of a lease for deer and turkey hunting is about $175 per gun.

The wild turkey is found throughout the watershed in suitable habitat. The habitat south of Burnet is generally of higher quality than that north of the city. During the spring and summer the birds disperse widely, while in winter they tend to concentrate where there are suitable large roosting trees near permanent water. One such roost, which averages about 200 birds, is south of Burnet in the vicinity of Mormon Mill and along the tributaries entering Hamilton Creek from the east.

The bobwhite quail and mourning dove population is moderate to high throughout the watershed. Upland game birds receive moderately heavy hunting pressure within the county. Squirrels occur in moderate numbers in the bottomlands with a density of about one per 10 acres.

Fishery Resources

Fishery resources within the watershed consist of farm ponds and about the lower 10 miles of Hamilton Creek. There are about 50 farm ponds in the watershed that average 1/3 to 1/2 surface acre in size. About half of these are stocked with largemouth bass, channel catfish, and various species of sunfish and provide suitable fishery habitat. The remainder of the ponds do not retain sufficient water to support fish during dry periods or are not managed for fishery habitat.

The lower 10 miles of Hamilton Creek south of Burnet are fed by three large springs located about 3 miles south of Burnet. These springs provide streamflow generally throughout the year and enable potholes to retain water year-round. Gamefish present are largemouth bass, channel catfish, flathead catfish, white bass, crappie, and several species of sunfish.

Most farm ponds and reaches of Hamilton Creek that have fishery resources are accessible to the public on a fee or permission basis. Landowners limit public access to their land because of damage to livestock, littering, fires, and vandalism that often result from uncontrolled public access.

Endangered or Threatened Species

Endangered or Threatened Flora

The U. S. Fish and Wildlife Service has developed a list of threatened or endangered plants which was published in the Federal Register on July 16, 1976. There are no species on the list whose known range of occurrence includes the project area and no identification of these plants has been documented. A detailed survey of the floodwater retarding structure sites by Soil Conservation Service biologists in the spring of 1977 did not record the presence of any species on the threatened or endangered list.

Endangered or Threatened Fauna

Criteria for determining whether or not a particular species can or does exist in a certain area depends largely on the presence of a specific habitat; i.e., the occurrence of a natural home or food source.

The U. S. Fish and Wildlife Service recognizes two species of endangered animals whose natural range extends over and throughout the project area of the watershed. These two species are birds, the southern bald eagle and the American peregrine falcon.

Presently, habitat in the watershed is not suitable for inducing or sustaining a population of these birds. It is within their range of migration, but offers neither preferred nesting sites nor a sustained

food source. A checklist of birds in Burnet County published by the National Audubon Society in April 1975 does not record the sighting of either of these birds.

Recreational Resources

The recreational facilities available in or near the watershed are many and varied. User-oriented areas, those areas located in close proximity to the homes of the users, are numerous in Burnet. Tommy White Park, Burnet City Park, and schoolgrounds offer public use of facilities such as playgrounds, ball fields, tennis courts, and swimming pools. A golf course is also available for use in Burnet.

Natural environmental areas provide recreational opportunities for activities such as camping, picnicking, hiking, bird watching, cave exploration, hunting, and boating, fishing, and other water sports. Recreational areas which provide these types of activities are plentiful near Burnet, which is sometimes called "The Land of the Lakes."

Five major lakes and recreational areas are within 25 miles of the watershed. These five lakes have a combined conservation surface area of 49,948 acres of water. In addition, 12 major lakes and recreational areas are within 100 miles of the watershed. These 12 lakes have a combined conservation surface area of 92,605 acres of water.

In addition to these lakes and recreational areas, several state parks, such as Longhorn Cavern, Pedernales Falls, Lyndon B. Johnson State Park, and Blanco State Park, are within 100 miles of the watershed. These areas provide ample recreational opportunities for public enjoyment.

Archeological, Historical and Unique Scenic Resources

There are no known sites within the watershed either listed in, or in process of nomination to, the National Register of Historic Places. Mormon's Mill, located downstream of Burnet near a waterfall having about 30 feet fall on Hamilton Creek, and Fort Croghan, near Burnet, are historical sites of local significance. Archeological sites undoubtedly occur along the springfed segments of Hamilton Creek from the vicinity of Burnet downstream to the Colorado River, but none have been identified and investigated (McCormick and Filson).

During July 1975, an archeological survey of potential floodwater retarding site locations in the watershed was conducted by the Institute for Environmental Studies at North Texas State University for the Soil Conservation Service under contract No. AG-48-SCS-02849. This survey and additional studies made by archeologists of the Soil Conservation Service indicate that archeological resources near the potential sites are of no significant importance. The State Historic Preservation Officer has concurred in these determinations.

Pollution Sources

There are no known point sources suspect water within the drainage area above the planned floodwater retarding structures.

Soil, Water, and Plant Management Status

There are presently 63 soil and water district cooperators in the watershed whose conservation plans with the Hill Country Soil and Water Conservation District cover 35,892 acres. Nearly 70 percent of the rural lands are covered by soil, water, and plant conservation plans. It is estimated that the soil, water, and related plant resources on approximately 84 percent (42,530 acres) of the agricultural land are adequately protected from deterioration, either naturally or by action of the land user. It is estimated that 80 percent (40,503 acres) of the agricultural land is adequately treated. This level of conservation treatment describes land that is used within its productive capability and on which conservation practices essential to its protection and planned improvement have been applied.

Under normal growing conditions, 84 percent of the rangeland in the watershed is providing at least 60 percent of its potential forage production (about 1,800 lbs./ac. air dry weight). Consequently, wind and water erosion is at a minimum. By the end of the project installation period, it is anticipated that on-going programs will provide essential land treatment to at least 85 percent of all rangeland in the watershed.

The quality of forage plants for livestock on the range is satisfactory. During the past 100 years, heavy continuous grazing by sheep, goats, cattle, and deer has greatly reduced or almost eliminated from the range many of the perennial forbs such as engelmanndaisy, maximilian sunflower, and fern acacia. Choice browse plants such as kidneywood, bernardia, and evergreen sumac have been greatly reduced. Also, much of the woody plant production below four feet has been reduced due to excessive browsing by goats and deer. Woody plants of less value for browse, such as mesquite and juniper, have increased but much of this has already been reduced by land users carrying out brush management practices.

About 2,000 acres, or 4 percent of the watershed, are used for cropland. The following tabulation shows the land treatment measures applied on cropland:

Land Treatment Measure	Unit	Total Needs	Applied To Date	Percent Applied
Conservation Cropping System	Ac.	1,600	1,206	75
Contour Farming	Ac.	1,250	1,250	100
Crop Residue Management	Ac.	1,600	1,280	80
Terraces	Mi.	83	83	100

About 875 acres, or 2 percent of the watershed, are used for pastureland. The following tabulation shows the land treatment measures applied on pastureland:

Land Treatment Measure	Unit	Total Needs	Applied To Date	Percent Applied
Pasture and Hayland Management	Ac.	1,301	943	72
Pasture and Hayland Planting	Ac.	1,301	987	76
Pipelines	Ft.	17,506	12,000	69
Trough or Tank	No.	20	15	75

About 48,000 acres, or 91 percent of the watershed, are used for rangeland. The following tabulation shows the land treatment measures applied on rangeland:

Land Treatment Measure	Unit	Total Needs	Applied To Date	Percent Applied
Brush Management	Ac.	35,895	27,010	75
Ponds	No.	75	67	89
Deferred Grazing	Ac.	44,862	30,000	69
Proper Grazing Use	Ac.	47,862	40,000	84
Range Seeding	Ac.	1,200	1,060	88
Wildlife Upland Habitat Management	Ac.	20,000	12,580	63

There are adequate assistance programs to make it possible and feasible for land users to apply needed conservation treatment and effect needed land use changes. By the end of the 4-year project installation period, the on-going program of technical assistance to land users provided by the Soil Conservation Service will increase the amount of land adequately treated to 84 percent. This high degree of conservation is considered adequate to protect the natural resource base.

Projects of Other Agencies

There are no known existing or soon to be constructed water resource development projects within the watershed which have a direct relationship to the works of improvement in this project.

WATER AND RELATED LAND RESOURCE PROBLEMS

The main problem in the watershed is the frequent and major damage caused by floodwater to property in the developed area of Burnet. Flooding is also a threat to the safety of residents. Other potential problems studied that would affect project formulation and action were erosion, sedimentation, streamflow, visual aspects, water quality, air quality, and social and economic conditions. None of these other potential problems were found to be of significance to project formulation.

Floodwater Damage

The 100-year flood event will inundate about 231 acres of urban land. Flooding on the agricultural flood plain damages 76 acres of cropland and 500 acres of pastureland and rangeland. Moderate damages occur on the agricultural flood plain.

Investigations indicate that there are 58 houses on Daugherty Branch, 5 houses on Haynie Branch, and 58 houses and businesses on Hamilton Creek in Burnet which are subject to floodwater damage from the 100-year flood event. The acres inundated and the monetary damage caused by floods of average recurrence intervals of 5-, 25-, and 100-years are shown in tabular form under the impact section of this report.

Appendix E shows the flood plain that is subject to flood damage. The urban area of the city of Burnet and upper part of the agricultural flood plain that will be damaged by the 100-year frequency flood are shown in more detail in Appendix G. The agricultural flood plain below Burnet is shown in Appendix F.

The most recent flood occurred on November 5, 1974, and resulted in estimated direct floodwater damages of about $50,000. It is estimated that a flood with a 100-year recurrence interval would cause about $750,000 in direct floodwater damage at the present level of urban development. Damages can be expected to increase significantly in the future as the result of a continued increase in property values in the urban area.

Flooding on the agricultural flood plain results in moderate damages because the major use of the flood plain is pastureland and rangeland.

Floods are caused by runoff from high intensity storms. Because of the rapid runoff and comparatively small watershed size, people have little or no notice of severe flooding and insufficient time to remove property, and perhaps their persons, to safety. Floodwater depths of up to 3.2 feet can be expected in some residences and businesses. Such depths of rapidly flowing water are a serious hazard to life.

Under nonproject conditions, the estimated average annual direct floodwater damage of urban properties is $58,260. The estimated average annual direct monetary damage by floodwater to crops and pastures is $3,950.

Indirect damages such as interruption of travel, losses sustained by businesses, evacuation of premises when floods threaten, and similar losses are estimated to average $12,060 annually.

RELATIONSHIP TO LAND USE, PLANS, POLICIES, AND CONTROLS

The City of Burnet will institute flood plain regulations to preclude further urban expansion or major modification or reconstruction below

the 100-year flood plain elevation under with-project conditions within the corporate limits of the city.

The city will also enter into the flood insurance program administered by the Federal Insurance Administration, U. S. Department of Housing and Urban Development, which requires controls to prevent unwise development in the flood plain. Flood insurance will not reduce damages sustained by these properties, but will reduce the financial impact of flood damage by spreading the cost over a longer period of time.

ENVIRONMENTAL IMPACTS

Nonstructural Measures

The flood plain regulation and public information program of the sponsoring local organizations will preclude further urban expansion or major modification or reconstruction of buildings below the 100-year floodwater elevation under with-project conditions along Hamilton Creek and its tributaries within the corporate limits of the city.

The flood insurance program which was initiated as a result of project planning will reduce the economic impact of flood damages.

Structural Measures

The installation of the structural measures will reduce the area inundated by the 100-year flood event by the following amounts: total acres inundated will be reduced from 807 acres to 583 acres; flooding on Hamilton Creek will be reduced from 698 acres to 557 acres (reaches 1, 2, and 3, Appendix E); and flooding of 83 acres on Daugherty Branch (reach 4, Appendix E) will be eliminated. Flooding on Haynie Branch (reach 5, Appendix E) will not be reduced. A total of 781 acres of the 807 acres in the flood plain will benefit from installation of the floodwater retarding structures either by elimination of inundation or a reduction of floodwater velocities and depth. The locations of the areas to be benefited as a result of reduced flooding are shown in the following tabulation and in Appendices F and G:

Acres Inundated

Evaluation Reach (Appendix E)	Average Recurrence Interval: 5-Year: Without Project	5-Year: With Project	25-Year: Without Project	25-Year: With Project	100-Year: Without Project	100-Year: With Project
1	125	92	179	141	233	175
2	49	32	83	55	111	77
3	138	113	300	219	354	305
4	20	0	63	0	83	0
5 1/	18	18	23	23	26	26
TOTAL	350	255	648	438	807	583

1/ Area on Haynie Branch not benefited by structural measures.

Appendix G shows the urban area of Burnet that will be inundated by the 100-year frequency flood for without-project conditions and by the 100-year and 500-year frequency flood for with-project conditions.

The total area affected by installation of the three floodwater retarding structures is 172 acres. The following tabulation shows the present land use of the area which will be affected:

Item	Present Land Use				Total
	Cropland	Rangeland	Ponds	Pecan Grove	
	(acre)	(acre)	(acre)	(acre)	(acre)
Dams and Emergency Spillways	10	16	2	1	29
Sediment Pools	8	29	1	-	38
Detention Pools	32	72	1	-	105
Total	50	117	4	1	172

The 29 acres needed for construction of the dams and emergency spillways will be cleared of all vegetation. These areas will be revegetated after construction with selected multiuse plants. The 38 acres needed for sediment storage will initially store water but will fill with sediment over a period of about 100 years. These sediment pool areas will be cleared for a distance of 400 feet upstream of the principal spillway. The present vegetation will not be cleared from the 105 acres designated as the floodwater detention pools, but vegetation in these areas will be affected by periodic inundation.

Installation of the three structures will cause a change in the flow regime of Daugherty Branch and Hamilton Creek. During periods of runoff, the depth, velocity, and duration of out-of-channel flows will be reduced downstream from the structures. The duration of the low flows (within channel) will be increased. This change in flow regime will reduce downstream flooding and associated flood damages. The project will cause an initial reduction of 0.27 percent in average annual streamflow from the total watershed. These estimates are based on an anticipated 7.6 percent reduction in average annual streamflow at the structure sites, which will control 4.95 percent of the drainage area of the watershed. The magnitude of the 7.6 percent reduction at the structure sites will diminish downstream from the structures because part of the flow is lost into the streambed. The channel loss factor is estimated to be 0.73. This estimated reduction in flow is an average and would be somewhat more pronounced during periods of drought.

The proposed floodwater retarding structures will be constructed on clayey soils underlain with limestone. There will be little or no recharge to the ground water by percolation from the pool areas.

Installation of the structures should have a slight effect on water quality. Water quality will be improved because of the sediment trapped in the sediment pools. Present sources of pollution in the watershed are associated with urban growth. Effluent from the Burnet city sewage treatment plant flows into Hamilton Creek below the city. The flood prevention structures proposed in this project will be built on ephemeral streams above Burnet and will control about 29 percent of the watershed above the south part of Burnet (valley cross section 12, Appendix E). At that point, the reduction in average annual streamflow is estimated to be 1.63 percent. Because of this minor reduction in streamflow, the project will have insignificant impact on the waste assimilation capacity of Hamilton Creek. Water passing the structures will be changed in quantity and timing. Flood flow into the structures will be detained and released over a longer period of time. Initially, it will require a total of about 182 acre-feet of water to fill the sediment pools.

The minor reduction in average annual streamflow, because of project installation, will not significantly effect the downstream water rights and water quality of Lake Travis.

Water quality in the sediment pools is not expected to be significantly different from other impoundments in the watershed. There are no mine or excessive animal wastes which will drain directly into the structures. It is not anticipated that any health or water quality problems will arise in the sediment pools. Installation of the structural measures should have no effect on the water resources or the water quality of the other tributaries.

During construction of the structural works of improvement, air and water pollution will increase from dust and sediment inherent to the construction process. This increase will be kept within tolerable limits. Permanent vegetation for erosion control will be established on the embankments and any disturbed areas not permanently inundated by water in the sediment pools.

About 64 acres of upland wildlife habitat will be destroyed or significantly altered. Construction of the dams and emergency spillways will require 29 acres, which consists of 4 acres of a mixed woody association with 30 percent canopy cover, 2 acres of an existing farm pond, 1 acre of a native pecan grove, 10 acres of cropland, and 12 acres of open rangeland in poor condition. The existing vegetation will be destroyed and replaced with vegetation that is suitable for erosion control, grazing use, and wildlife food. The sediment pools will require 38 acres, which consists of 12 acres of mixed woody association with 5 percent canopy, 11 acres of mixed woody association with 30 percent canopy (4 acres of which will not be cleared), 8 acres of cropland, 6 acres of open rangeland in poor condition, and 1 acre of an existing farm pond. The resulting water areas will furnish good quality fish habitat and feeding and resting areas for migrating waterfowl, shorebirds, wading birds, and a few native species, such as killdeer, great blue heron, etc.

Installation of the project will not affect any known rare or endangered flora or fauna.

Economic and Social

The reduction of damages will provide for a higher quality of living and social upgrading by residents of the flood plain.

Crop and pasture damages will be reduced by 48 percent and urban damages will be reduced by 96 percent. Indirect damages will be reduced by 94 percent.

The project will benefit directly the owners and operators of 17 farms and ranches in the agricultural land of the flood plain and the owners and operators of 116 residential and business units within the corporate limits of Burnet. There will be no remaining threat of loss of human life from floodwater.

Minority racial groups comprise 9.9 percent of the population of Burnet County. According to Burnet city officials, 31 Mexican-Americans and 26 Blacks reside within the 100-year flood plain. These minorities will be benefited, or not affected, by project action to the same extent as other flood plain residents. No minorities will be adversely affected by project action.

It is estimated that 20 short-term, semi-skilled jobs will be created by project action. All federal contracts for construction of the project will be awarded to equal opportunity employers which will assure equal participation by the minority population in job opportunities.

The planned project will provide protection from the 100-year event to the 58 existing urban properties on Daugherty Branch (reach 4) and 25 existing urban properties on Hamilton Creek (reaches 1 and 2). Depth of flooding to the other 33 existing urban properties on Hamilton Creek will be reduced by 1.0 to 2.2 feet. (See Appendix G.) Floodwater depths of 1.0 foot to 1.3 feet will occur in seven existing urban properties. Fifteen properties will be flooded to depths of 0.5 foot to 1.0 foot. Eleven properties will be flooded to depths of 0.5 foot or less. The maximum depth of flooding in any existing urban property will be 1.3 feet. Haynie Branch (Reach 5) will receive no flood protection from the structural measures. Structures with remaining hazards from the 100-year flood event are located near valley cross section 21 and between valley cross sections 12 and 17 (Appendix E).

Hazard classification of structures depends on the damage that might occur with failure. The three structures are considered high hazard (class c) structures due to their location upstream of the urban area. They are therefore designed so that overtopping of the dam will not be caused by the maximum rainfall event that can be expected (Probable Maximum Precipitation). The risk cf failure is minimal.

The estimated average annual monetary damages will be reduced from $74,270 to $5,220, or 93 percent. The following tabulation shows the reduction of damages by reach:

Average Annual Damages and Benefits

Evaluation Reach (Appendix E)	Total Average Annual Damage: Without Project (dollars)	With Project (dollars)	Benefits (dollars)	Reduction (percent)
1	11,920	3,400	8,520	71
2	13,850	1,080	12,770	92
3	1,050	610	440	42
4	47,280	0	47,280	100
5	170	130	40	24
TOTAL	74,270	5,220	69,050	93

The following tabulation shows the actual floodwater damages by reaches for the selected recurrence intervals:

Direct Monetary Floodwater Damages

Evaluation Reach (Appendix E)	Average Recurrence Interval: 5-Year: Without Project (dollars)	5-Year: With Project (dollars)	25-Year: Without Project (dollars)	25-Year: With Project (dollars)	100-Year: Without Project (dollars)	100-Year: With Project (dollars)
1	1/ 4,570	1/ 3,160	52,660	1/ 11,660	120,760	11,260
2	1/ 0	1/ 0	77,270	1/ 0	253,770	39,560
3	1,170	860	2,740	1,860	3,590	2,940
4	1/ 50,050	1/ 0	163,930	0	362,980	0
5	1/ 0	1/ 0	960	850	2,350	2,040
TOTAL	55,790	4,020	297,560	14,370	743,450	55,800

1/ No damage occurred within the area flooded.

During the construction stage of the proposed project, additional requirements for building materials, petroleum products, and other necessities will stimulate the economy. This construction will create approximately 20 man-years of short-term employment, which will further strengthen the economy during the construction phase.

There is no known mineral mining activity that will be affected by the installation of the floodwater retarding structures.

There are no known locations of historical significance in the watershed that would be affected by installation of the project.

A field survey and evaluation of archeological resources which will be affected by the floodwater retarding structures was carried out by the Institute for Environmental Studies at North Texas State University and

the Soil Conservation Service. As a result of these surveys, it was determined that one archeological site consisting of a modern trash dump containing early-day relics may be either inundated or disturbed by installation of the structural measure. These investigations and subsequent testing indicated that the site was not eligible for nomination to the National Register of Historic Places. The State Historic Preservation Officer has concurred in these determinations.

When constructed, floodwater retarding structure No. 1 can be seen from Farm-to-Market Road 963. Structure No. 2 can be seen from a gravel county road. Visual aspects of the watershed may be enhanced, deteriorated, or unchanged, depending upon the personal observation and feeling of the viewer. However, the presence of a body of impounded water may give the observer an esthetically pleasing feeling. The intangible senses of pleasing sights and sounds serve to promote a tranquil atmosphere and enhance a quality environment.

FAVORABLE ENVIRONMENTAL IMPACTS

Nonstructural measures will:

1. Preclude further urban expansion or major modification of existing buildings below the 100-year floodwater elevation within the corporate limits of the city of Burnet.

2. Inform land users, at least annually, of the areas that are still subject to inundation from the 100-year flood event.

Structural measures will:

1. Eliminate the threat of loss of lives from floodwater.

2. Reduce the area inundated by the 100-year flood event from 807 acres to 583 acres.

3. Eliminate damage from the 100-year flood event to the 58 existing urban properties on Daugherty Branch and 25 existing urban properties on Hamilton Creek.

4. Reduce significantly the depth of flooding and resulting floodwater damage to the other 33 existing urban properties on Hamilton Creek.

5. Reduce the average annual direct floodwater damages to urban properties from $58,260 to $2,450, or 96 percent.

6. Reduce the average annual direct floodwater damages to agricultural land and crop production from $3,950 to $2,070, or 48 percent.

7. Reduce the average annual indirect damages from $12,060 to $700, or 94 percent.

8. Benefit 17 farms and ranches and 116 residential and business units in the flood plain.

9. Increase economic activity of the local economy by creating 20 man-years of employment during construction of the structural measures.

10. Create an additional 37 acres of surface water for fish and wildlife habitat. (One acre of existing farm pond at floodwater retarding structure No. 2 will remain as fish habitat.)

11. Lengthen the period of streamflow in Hamilton Creek and Daugherty Branch through the city of Burnet after major rainstorms, but limit the flood flows.

12. Enhance or not alter the visual aspects of the landscape affected by construction of the floodwater retarding structures, depending on the personal observation and feeling of the viewer.

13. Create altered sights and sounds engendered by impounded water in the sediment pools.

ADVERSE ENVIRONMENTAL IMPACTS

Installation of three floodwater retarding structures will:

1. Cause agricultural production and associated terrestrial wildlife habitat to be lost on 37 acres of land in the sediment pools. This area is comprised of 8 acres of cropland and 29 acres of rangeland. (One acre of the sediment pool area is an existing farm pond.)

2. Change the present vegetation on 27 acres by installation of the dams and emergency spillways. This area is comprised of 10 acres of cropland, 16 acres of rangeland, and 1 acre of pecan trees and will be planted to selected multiuse plants. (Two acres needed for the dam are an existing farm pond.)

3. Cause periodic, short-term inundation of 32 acres of cropland and 72 acres of rangeland in the detention pool areas when the structures function at the emergency spillway crest level. (One acre of the detention pool area is an existing farm pond.)

4. Partially destroy one poorly preserved archeological site consisting of a modern trash dump containing early-day relics which is not eligible for nomination to the National Register of Historic Places.

5. Cause a slight increase in air and water pollution during the construction process of the floodwater retarding structures.

6. Deteriorate or not alter the visual aspects of the landscape affected by construction of the floodwater retarding structures, depending on the personal observation and feeling of the viewer.

7. Cause an initial reduction of 0.27 percent in average annual streamflow from the total watershed.

ALTERNATIVES

Alternatives considered during the formulation of the selected plan were of two basic types: (1) those which would accomplish the goals of the local sponsoring organizations and other interested publics for national economic development (NED) and environmental quality (EQ) and (2) those which would further reduce or eliminate adverse impacts to the environment resulting from the selected plan. The identified goals are:

National Economic Development

1. Reduce flood damage to residential and agricultural areas of the flood plain.

2. Reduce the economic impact of flood damage.

3. Eliminate the threat of loss of life in the residential area of the flood plain.

Environmental Quality

The protection of the natural resource base and wildlife habitat from flooding.

Plan elements considered in formulating the selected plan were: accelerated land treatment, floodwater retarding structures, channel work, flood plain use regulations, flood-proofing, changing the present use of the urban flood plain, a public information program, and a program of flood insurance. The environmental assessment showed that 80 percent of the natural environment of the watershed is adequately protected by conservation land treatment measures. The on-going program of technical assistance by the Soil Conservation Service will provide land users with the needed help to sustain the high level of conservation treatment of the land.

The study by economists, hydrologists, and engineers indicated that the cost of flood-proofing the existing houses and businesses in the flood plain would exceed the value of many of the structures. Floodwater depths in the escape routes from many residences after a 100-year flood

event would be a threat to the safety of residents. Changing the use of the flood plain would necessitate the relocation of houses or businesses in the flood plain. Relocation costs, in addition to the environmental disturbance at the new locations, made this plan element inexpedient.

Channel work was dropped from consideration due to excessive costs (both installation and operations and maintenance) in relationship to the potential benefits. The excessive cost was mainly because the channel would, by necessity, be through the urban area and would cause the destruction or relocation of a number of houses.

Preliminary investigations located six possible sites for floodwater retarding structures. Each site was analyzed to determine if it merited further consideration. Three sites were eliminated because of factors such as excessive costs, storage limitations, and land rights involvements.

Several combinations of structural measures were studied in arriving at plans which optimized contributions to national economic development and environmental quality plans and the selected plan which reflects various trade-offs between the two broad objectives.

Six alternative systems of floodwater retarding structures were analyzed. The number of structures in each combination ranged from 1 to 3. Sites included in each alternative system were selected based on an analysis of cost and location in relationship to the projected benefits, and environmental factors. Environmental assessments indicated that the impacts for each different combination would be essentially the same for all combinations, varying only in quantity and location. The reduction in average annual damages ranged from a low of 78 percent to a high of 96 percent.

An alternative consisting of floodwater retarding structure No. 1 (on Daugherty Branch) and a program of flood-proofing or relocating houses and businesses with the most serious flood hazard was considered. This alternative would require flood-proofing or relocating 5 businesses and 57 houses at an estimated cost of $915,000. Relocation of the houses and businesses would cause an undetermined impact on the environment at the relocation site. The cost of implementing this alternative is greater than the cost of the selected plan and had no expressed support by an organized public body.

The alternatives considered in greatest detail during planning are described below. Economic, environmental, and social impacts believed to be of greatest significance to decisionmaking are presented in the Summary Comparison Table.

Alternative 1 - This alternative is the selected plan for Hamilton Creek. It consists of three floodwater retarding structures, flood plain land use regulation, and a public information program. Details with respect to the proposed work and its environmental impacts are contained in the "Planned Project" and "Environmental Impacts" sections of this report.

Alternative 2 - This alternative optimizes contributions to the environmental quality objective. It consists of flood-proofing or relocating the existing houses and businesses in the flood plain and changing the flood plain use to one less susceptible to flood damage.

Alternative 3 - This alternative optimizes contributions to national economic development and consists of one floodwater retarding structure, flood plain land use regulation, and a public information program.

Alternative 4 - This alternative consists of foregoing implementation of the project.

After analyzing all of the possible combinations of plan elements, it was determined that only alternative 1 was viable. A viable alternative is one which is within SCS jurisdiction and for which a public body has expressed a capability to implement. Alternative 2 had no expressed support by an organized public body. Alternative 3 was not acceptable to USDA nor the project sponsors because it left a major threat of the loss of human lives from the 100-year flood event. Plan selection was made by the project sponsors following a public meeting during which all alternatives were presented. Appendix B shows a comparison of the four alternatives.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Land use trends within the watershed include the conversion of marginal cropland and some of the rangeland to pastureland, and the slow expansion of the urban areas of Burnet into the agricultural areas. The rising cost of producing crops on small units of msrginal land and the more favorable economic returns from producing beef and animal products are the primary reasons for converting cropland to pastureland. This project is expected to have little or no effect on this trend.

The flood plain use regulation will prevent urban development and buildup within the flood prone land in the corporate limits of the city of Burnet.

The Hamilton Creek project is within the Colorado River Basin. The Colorado River is the longest river wholly within Texas. Rising in Dawson County, the Colorado flows about 600 miles to Matagorda Bay on the Gulf of Mexico. Its drainage area is 39,900 square miles. Its runoff reaches a volume of more than 2,000,000 acre-feet near the Gulf. The river flows through a rolling, usually prairie terrain to the vicinity of San Saba County where it enters the rugged Hill Country and Burnet-Llano Basin. It flows through a picturesque series of canyons until it passes the Balcones Escarpment at Austin and flows across the Coastal Plain to the Gulf. A series of reservoirs has been built on the Colorado River in the vicinity of Burnet County. The two largest reservoirs are Lake Buchanan in Burnet and Llano Counties and Lake Travis in Travis County. Between these reservoirs in Burnet County are three smaller reservoirs: Inks, Johnson, and Marble Falls. Below Lake Trsvis is the

older Lake Austin, largely filled with sediment, whose dam maintains a head for production of power from water flowing from the lakes above. This area is known as the Highland Lakes Country (Dallas Morning News).

In the middle section of the Colorado River, and northwest of the Hamilton Creek watershed, is the Middle Colorado River Project which was authorized by Congress in the Flood Control Act of 1944. Within this authorized project area, there are about 7,200 square miles comprising 18 subwatersheds areas delineated by the Soil Conservation Service for the purpose of watershed plan development. As of October 1976, work plans had been developed on 17 subwatersheds, comprising an area of 3,725,896 acres. About 94 percent of the planned land treatment measures have been applied on 5,943 farm and ranch operating units. Construction has been completed on 264 floodwater retarding structures and two miles of channel work.

Hamilton Creek enters Lake Travis on the Colorado River. The effects resulting from the installation of the planned project on Hamilton Creek watershed on the streamflow of the Colorado River will be small. The long-term cumulative impacts of the project to the Colorado River basin and the region will contribute to conservation, development, and productive use of the soil, water, and related resources. The project will restrict the use on the land needed for installation of the works of improvement. Until impounded water is displaced by sediment, vegetation will be destroyed on areas to be dedicated to sediment storage. Vegetation will be temporarily disturbed on areas needed for construction of dams and emergency spillways. This will adversely affect the wildlife in the immediate site areas. However, the overall habitat conditions are expected to become more favorable as a result of a more dependable food and water supply and better management techniques. The additional 37 acres of surface water that will be created by this project can be used for lake fisheries and waterfowl resting areas, as well as wildlife water supply.

The long-term habitability and contribution to the economic well-being of the area will be improved with only minimal detriment to a few features of the existing environment. In total, the natural environmental and esthetic values of the area will be benefited over those that would exist in the long-term without project measures.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Installation of the structural measures will require the commitment of 172 acres of land. The use of this land is as follows:

Present Land Use

	Crop-land (acres)	Range-land (acres)	Pecan Grove (acres)	Pond (acres)	Total (acres)
Dams and Emergency Spillways	10	16	1	2	29
Sediment Pools	8	29	-	1	38
Detention Pools	32	72	-	1	105
Total	50	117	1	4	172

The 29 acres of land committed to the dams and emergency spillways can still be used for limited grazing by livestock and by wildlife. The 104 acres which will be subject to temporary inundation in the detention pools can still be used for pastureland, rangeland, parks, and other similar open space purposes, but cannot be used for residences, businesses, or similar activities.

The commitment of labor, material resources, and energy required for construction will be irretrievable.

ACTIONS TO MITIGATE ADVERSE IMPACTS

The following is a summary of actions taken during the planning process to mitigate the adverse impacts of the project. These specific actions are in addition to the benefits of the project.

1. Floodwater retarding structure No. 2 was moved about 200 feet upstream to avoid destruction of several large pecan trees.

2. Floodwater retarding structure No. 3 was moved about 200 feet upstream to avoid destruction of identified areas of mature ashe juniper, spanish oak, and live oak trees.

3. About seven acres adjacent to the sediment pools of floodwater retarding structures Nos. 2 and 3, and five acres adjacent to the dam at floodwater retarding structure No. 2 will be fenced and managed for optimum environmental benefit and wildlife habitat.

4. Additional areas of about four acres of woody vegetation have been identified within the sediment pools and will be protected from clearing during the construction period.

5. Brush cleared from the construction sites will be disposed of as appropriate by anchoring in the sediment pool areas to serve as fish attractors.

6. All disturbed areas will be planted with species selected specifically for environmental benefit and/or optimum wildlife use.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

An application for assistance from the U. S. Department of Agriculture, Soil Conservation Service, on the Hamilton Creek watershed was made in May 1967 at the request of the Hill Country Soil and Water Conservation District, the Commissioners Court of Burnet County, and the City of Burnet.

A field examination was made in September 1968, and the project was determined feasible in October 1968. A preliminary investigation was made in May 1973. Authorization for planning assistance was given in May 1973 to develop a watershed work plan under authority of the Watershed Protection and Flood Prevention Act. Planning began in July 1973 with a public hearing in the district courtroom at Burnet to solicit inputs from the public. Preliminary plans were presented in a meeting at Burnet in November 1975.

In June 1974, an environmental assessment was made by an interdisciplinary team including a soil conservationist, a resource conservationist, an agronomist, a biologist, and a range conservationist. A cooperative study of the biological aspects of the watershed was conducted by representatives of the U. S. Department of the Interior, Fish and Wildlife Service, the Texas Parks and Wildlife Department, and the Soil Conservation Service in February 1974 and in September 1977.

The U. S. Department of the Interior, Fish and Wildlife Service, with concurrence from the Texas Parks and Wildlife Department, made recommendations for minimizing adverse effects to fish and wildlife habitat. The recommendations were considered in the development of the plan and were incorporated to the extent that they were feasible and necessary to accomplish the objectives of the project and were implementable under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, and the National Environmental Policy Act of 1969, Public Law 91-190.

The recommendations to reduce impacts of project construction on fish and wildlife resources made by the USDI, Fish and Wildlife Service and the Texas Parks and Wildlife Department and a summary of the disposition of each recommendation made during project planning is as follows:

Recommendation 1: Stock the sediment pools of the project reservoirs with fish and manage according to recommendations of Texas Parks and Wildlife Department biologists. This service is available on a fee basis for private water bodies within the State of Texas.

Disposition: The floodwater retarding structures will include an area designed to trap sediment over a 100-year period. Until these areas are filled with sediment, they may or may not hold water for prolonged periods. Water captured in these sediment pools is incidental to the project. If a fishery resource is created in these sediment pools, the landowners will use their discretion in stocking and managing the areas. The landowners will be encouraged to consult Texas Park and Wildlife Department biologists in this activity.

Recommendation 2: Maintain the quality of impounded water and fence the reservoir sites to exclude livestock and protect surrounding vegetation.

Disposition: Portions of the sediment pool areas of floodwater retarding structures Nos. 2 and 3 (Appendix H) will be fenced and managed for optimum use by wildlife.

It was agreed by the sponsors that livestock will be excluded from the fenced areas except during periods when proper grazing will be beneficial to the maintenance of an adequate cover of vegetation.

When grazed, by written permission of the local maintenance organization, it will be for the benefit and spread of the vegetation.

Recommendation 3: Reduce erosion and provide wildlife food and cover in areas disturbed by project construction by revegetating as quickly as possible with such species as bristlegrass, kleingrass, clover, vetch, live oak, pecan, greenbrier, wild grape, and others which are of value to wildlife.

Disposition: The embankments, the emergency spillways, disturbed areas, and odd areas on or adjacent to the works of improvement will be vegetated according to Soil Conservation Service technical specifications. Areas subject to excessive erosion will be planted to bermudagrass and kleingrass. Other plant species will be planted to further mitigate the loss of terrestrial wildlife habitat. Multi-use species will be selected on the basis of availability and adaptability from the following: switchgrass, blackberry, white honeysuckle, woollybucket bumelia, red mulberry, live oak, pecan, etc.

Recommendation 4: Remove borrow material entirely from sediment pool areas, if possible, and only from detention pool areas

to the extent necessary. If borrow material must be obtained from other areas, the Texas Parks and Wildlife Department and the Fish and Wildlife Service should be consulted.

Disposition: Preliminary investigations indicate that sufficient borrow material is available within the designated sediment pool areas. Should additional material be needed, a site selection will be made based on an interdisciplinary assessment of the impacts.

Recommendation 5: Leave all trees in detention pool areas and sediment pool areas except where these would interfere with the removal of borrow material or the functioning of the flood control structures.

Disposition: This recommendation is in accordance with Soil Conservation Service policy. See page E-7 for a more complete description of the areas to be protected from project action.

Recommendation 6: Utilize woody vegetation cleared from the construction sites to create brush piles for wildlife cover.

Disposition: Experience in the field by Soil Conservation Service biologists has proven that brush piles outside of the permanent water areas have only temporary value for wildlife cover and do not warrant the expense of project action.

Recommendation 7: Construct and arrange fish shelters formed from woody vegetation or other materials on the basis of recommendations of Texas Parks and Wildlife biologists. These should be anchored in the sediment pool areas prior to reservoir filling in such a manner as to avoid interference with reservoir operation.

Disposition: Construction of fish shelters is outside the purpose of the project; however, an acceptable method of brush disposal by anchoring brush within the sediment pool areas has been included in the planned project. These brush piles will be designed to serve as fish attractors.

Recommendation 8: Encourage landowners to implement land treatment measures which consider the needs of wildlife. Although land treatment programs would not be accelerated or increased as a result of this project, the Soil Conservation Service should advise the landowners and project sponsors of the basic guidelines presented in this report.

Disposition: Landowners are encouraged to implement land treatment measures which consider the needs of wildlife. This is being accomplished by the on-going technical assistance program of the Soil Conservation Service through the Hill Country Soil and Water Conservation District.

Recommendation 9: Consult the Fish and Wildlife Service and the Texas Parks and Wildlife Department prior to actual construction to discuss the implementation of fish and wildlife protection and enhancement measures.

Disposition: Fish and wildlife enhancement is not included as a purpose in this project because no organized sponsor expressed a willingness to cost-share enhancement measures. Mitigation measures and measures to minimize adverse environmental impacts have been included in the project in accordance with Soil Conservation Service policy. The Soil Conservation Service has always appreciated cooperation of the Texas Parks and Wildlife Department and the Fish and Wildlife Service.

During July 1975, an archeological survey of portions of the watershed was conducted under contract by the Institute for Environmental Studies at North Texas State University for the Soil Conservation Service. Additional studies were made by archeologists of the Soil Conservation Service in August 1977. No sites were found to be eligible for nomination to the National Register of Historic Places. The State Historic Preservation Officer has concurred in the findings of these surveys.

The public was involved throughout the planning process. Newspapers serving the watershed area have published articles announcing public meetings and have reported information and conclusions resulting from these meetings. Follow-up articles which have generated public awareness have been published. Meetings with the sponsors were held during the planning process to coordinate, evaluate, exchange information, and reach agreements on measures that would serve the needs of the people and the watershed resources.

The following agencies, groups, and interested individuals were requested to review and submit comments and recommendations:

Federal
- Department of Agriculture
- Department of the Army
- Department of Commerce
- Department of Health, Education, and Welfare
- Department of the Interior
- Department of Transportation
- Environmental Protection Agency
- Federal Power Commission
- Office of Equal Opportunity, USDA
- U.S. Coast Guard

State and Other

Budget and Planning Office (State agency designated by Governor and State clearinghouse)
Capitol Area Planning Council (Regional clearinghouse)
Environmental Defense Fund
Friends of the Earth
Lower Colorado River Authority
National Audubon Society
National Resources Defense Council
National Wildlife Federation
Texas Committee on Natural Resources
Wildlife Management Institute

The following agencies submitted comments and recommendations on the draft document:

Federal

Department of the Interior
Environmental Protection Agency
Forest Service, USDA
Office of Equal Opportunity, USDA
Public Health Service, USDHEW

State and Other

Budget and Planning Office (State agency designated by Governor and State Clearinghouse)
Lower Colorado River Authority
Wildlife Management Institute

DISCUSSION AND DISPOSITION OF EACH COMMENT ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

Department of the Interior

Comment: The Department stated that the plan adequately describes the problems and needs of the area according to the sponsors' goals.

Response: Noted.

Comment: The Department stated that the lack of mitigation for unavoidable impacts on fish and wildlife resources is a serious omission and makes the plan unacceptable to our Fish and Wildlife Service.

Response: Consideration was given to all recommendations to mitigate the unavoidable impacts on fish and wildlife resources made by the USDI Fish and Wildlife Service and Texas Parks and Wildlife Department. The nine specific recommendations are included in the final environmental impact statement. A discussion of the consideration given and the extent of inclusion of each recommendation have also been added.

Comment: The Department stated: "Distances in feet to which clearing of vegetation within the sediment pool will extend should be clearly set forth. This clearing should be no more than the minimum as required by current SCS guidelines."

Response: A more detailed description of the areas to be cleared of vegetation, the areas to be fenced, and the areas of vegetation to be left undisturbed has been added to the final environmental impact statement under the "Structural Measures" section.

Comment: The Department stated: "Dams, emergency spillways, and detention pools should be fenced to exclude grazing by livestock, as required by Supplement No. 1 of the SCS Technical Standards and Specifications for Establishment of Wildlife Habitat on or Adjacent to Watershed Works of Improvement."

Response: Reference to Supplement No. 1 of the SCS Technical Standard and Specifications for Establishment of Wildlife Habitat On or Adjacent To Watershed Works of Improvement has been removed from the final environmental impact statement and replaced with a more complete description of plant species and grazing management to be used in connection with this project. Project sponsors have agreed that livestock will be excluded from the fenced areas except during periods when proper grazing will be beneficial to the maintenance of an adequate cover of vegetation. When grazed, by written permission of the local maintenance organization, it will be for the benefit and spread of the vegetation.

Comment: The Department stated: "Vegetation cleared from the sediment pools should be used to construct wildlife brush piles within the fenced detention pools and fish attractors within the sediment pools on the basis of recommendations of the Texas Parks and Wildlife Department. This would act to further offset the unavoidable losses to habitat replacing some cover lost in construction activities and inundation."

Response: Experience in the field by Soil Conservation Service biologists has proven that brush piles have only temporary value for wildlife cover and do not warrant the expense of project action. Fish shelters will be formed from woody vegetation as recommended in all sediment pools if suitable vegetation is available at the construction site. A method of brush disposal consisting of anchoring brush within the sediment pool areas will provide fish attractors.

Comment: The Department stated: "All areas denuded by construction activities, with the exception of dam faces and sediment pools, should be revegetated in accordance with guidelines set forth in Supplement No. 1. Suggested plants to be used include

bristlegrass, kleingrass, clover, blurstems (sic), switchgrass, vetch, liveoak, pecan, greenbrier, and wild grape. Plant species to be used in revegetation should be clearly identified within the watershed plan. Bermuda grass should be used to revegetate the dam faces only if the aforementioned grasses are not suitable for erosion control purposes."

Response: The embankments, the emergency spillways, disturbed areas, and odd areas on or adjacent to the works of improvement will be vegetated according to Soil Conservation Service technical specifications. Areas subject to excessive erosion will be planted to bermudagrass and kleingrass. Other plant species will be planted to further mitigate the loss of terrestrial wildlife habitat. Multi-use species will be selected on the basis of availability and adaptability from the following: switchgrass, blackberry, white honeysuckle, woollybucket bumelia, red mulberry, live oak, pecan, etc.

Comment: The Department stated: "Only borrowed material needed for construction of dams should be removed from sediment pool areas. Any additional material needed should be taken from areas outside the sediment pool which have low value as wildlife habitat. Identification of such areas should be made on the basis of recommendations of the Texas Parks and Wildlife Department."

Response: Preliminary investigations indicate that sufficient borrow material is available within the designated sediment pool areas. Should additional material be needed, a site selection will be made based on an interdisciplinary assessment of the impacts.

Comment: The Department stated: "With the creation, on January 25, 1978, of the Heritage Conservation and Recreation Service (HCRS), numerous National Park Service functions dealing with archeological, cultural, and historic preservation were transferred to HCRS. The statements...regarding the encountering of archeological or historical resources during construction and the contacting of the National Park Service to 'determine whether there is evidence to warrant a detailed survey and recovery', should be corrected. The statement should read that HCRS will be contacted."

Response: The statements have been changed as suggested.

Comment: The Department stated: "A plan for the mitigation of unavoidable impacts on fish and wildlife resources should be included in the final environmental statement. Our Fish and Wildlife Service will provide assistance in this planning effort on request."

Response: A section entitled ACTIONS TO MITIGATE ADVERSE IMPACTS has been added to the final environmental impact statement.

This section summarizes the special features for mitigation incorporated into the planned project during the planning process.

Assistance by the Fish and Wildlife Service and Texas Parks and Wildlife Department in planning elements of this project which will avoid unnecessary impacts on fish and wildlife resources was requested. A detailed discussion of the nine specific recommendations made by the USDI Fish and Wildlife Service and concurred in by the Texas Parks and Wildlife Department has been added to the section on CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS. It must be recognized that all features must be within the constraints of PL 566 and have the necessary local implementing support before they can be included in the planned project.

Comment: The Department stated: "The statement is very general in its treatment of mineral resources. The report does not discuss the asphaltic limestone deposits that occur south of and probably extend under the dam and impoundment area of site #1 on Daughtery (sic) Branch. The asphaltic limestone bed outcrops for about 1,000 feet between road FM 963 and site #1. Although the size and economic worth of this asphaltic resource is unknown, it was mined in the early 1920's and mid-1930's. We suggest that it be identified as a potentially valuable resource in the statement."

Response: The section on mineral resources has been revised to include a description of the potentially valuable asphaltic limestone resource which outcrops in the vicinity of floodwater retarding structure No. 1.

A letter from USDI Bureau of Mines to Soil Conservation Service (August 7, 1978) states: "We could not determine if the outcrops of these deposits (Rosebud Formation) on Daugherty Branch coincide with the floodwater retarding structure proposed for that stream." The letter also stated: "There would appear to be no significant impact on mineral availability resulting from this project."

Comment: The Department suggested that the reference to garnets and pearls being found in the watershed be deleted.

Response: The reference has been deleted.

Comment: The Department stated: "We are pleased to note that the Soil Conservation Service has taken steps to identify historic and archeological resources in the project area. However, we would like clarification of the following statement: 'Archeological sites undoubtedly occur along the springfed segments of Hamilton Creek from the vicinity of Burnet downstream to the Colorado River, but none have been identified

and investigated.' This does not seem to coincide with later statements that discuss the archeological survey that was conducted in 1975, along with later investigations in 1977. Do these statements refer to pre-1975 information, or to the scarcity of knowledge that still exists following archeological work?"

Response: McCormick and Filson (see bibliography) conducted an archeology survey under contract by the Soil Conservation Service of the potential floodwater retarding site locations. The contract did not specify detailed studies of other parts of the watershed that would not be disturbed by project action. However, the library search and reconnaissance survey made by McCormick and Filson led them to the conclusion that archeological sites undoubtedly occur on Hamilton Creek below Burnet.

Comment: The Department stated that the final environmental statement should document the concurrence of the State Historic Preservation Officer that although there will be impacts to known historic and archeological resources, the resources are not significant enough to warrant further consideration.

Response: The impacts on archeological sites is described on page E-26 under the "Environmental Impacts" section. This section of the Environmental Impact Statement also documents concurrence of the State Historic Preservation Officer.

Comment: The Department stated: "The statement should assess the possibility of beneficial or adverse effects on groundwater levels as a result of the impoundments in the sediment pools."

Response: An assessment of project impacts on ground water has been added to the "Environmental Impacts" section.

Comment: The Department stated: "The impacts on fish and wildlife resulting from the cessation of over-the-bank flows in Hamilton Creek downstream from the proposed sites should be discussed in more detail. These over-the-bank flows are important in that many species of fish (i.e., catfish and carp) use these overflow areas for both spawning and foraging. Therefore, the cessation of over-the-bank flows would result in a decrease in productivity of the fishery of Hamilton Creek."

Response: Our knowledge of the physical characteristics of streams such as Hamilton Creek lead us to question the utilization of over-the-bank flow areas for foraging and spawning. A study of the biological aspects of the Hamilton Creek watershed was conducted in 1974 (report dated February 1, 1974) by biologists of the Soil Conservation Service and Bureau of Sport Fisheries (now USDI Fish and Wildlife Service). This report stated: "Fisheries resources within the watershed consist of farm ponds and the

lower reaches of Hamilton Creek....The remainder do not retain sufficient water to support fish during periods of dry weather. About five miles of Hamilton Creek below Mormon Mill has sufficient streamflow to support a fisheries resource." The U.S. Fish and Wildlife Service Stream Evaluation Project, July 1977, shows Hamilton Creek, starting about 4 or 5 miles below Burnet, to be classified as type 2 (High Priority fishery resources). Soil Conservation Service hydrologic investigations concluded that there is no over-the-bank flows on Hamilton Creek from the 100-year storm event below a point about 3 miles south of Burnet (see Problem Location Map, Appendix E). Since there is no over-the-bank flow on that portion of Hamilton Creek that has a fishery resource, there would be no impacts from the cessation of over-the-bank flow to the fishery resource.

Comment: The Department stated: "The creation of 37 acres of flat water should not be included as a favorable impact for the following reasons:

a. Public access will not be permitted to this water.

b. The State of Texas, and particularly the immediate project area, already has adequate flat water resources, thus precluding the need for additional acreage of flat water.

c. Quality terrestrial habitat is becoming increasingly scarce in the State of Texas. Therefore, the trade-off of this type of habitat for already abundant flat water areas should be considered an adverse impact."

Response: The fact that the public will not have access to these water areas is irrelevant in determining the need or value of a water area. Experience of Soil Conservation Service biologists has shown that these water areas will add a dispersion effect to benefit waterfowl, create additional fishery resources, and increase the interspersion and diversity of the native vegetal communities. They will also add needed sources of livestock water.

The Soil Conservation Service questions and does not agree with the opinion of the Department of the Interior that the State of Texas has adequate flat water resources. There continues to be a critical need for additional water storage areas, especially during droughty periods.

The trade-off is not terrestrial wildlife habitat for flat water. The conflict for use of the resources is between wildlife habitat considerations and flood damage reduction, which includes the elimination of the threat of loss of human lives from the 100-year flood event in the watershed. The resulting trade-off is terrestrial wildlife habitat for three dams constructed for the purpose of reducing flood damages. The loss

of terrestrial habitat is an adverse impact. The provision of flood protection and the incidental creation of 37 acres of flat water are beneficial impacts.

Comment: The Department stated: "The impacts on fish and wildlife resources resulting from the increased duration of low flows in Hamilton Creek downstream from the proposed sites should be discussed in more detail. Hamilton Creek has been classified as a highly productive Type 2 (high-priority fishery resource) stream by the U.S. Fish and Wildlife Service Stream Evaluation Project, July, 1977. Hamilton Creek is also classified as highly sensitive because it would be difficult to either restore it to the original condition or to mitigate any damages done to it. Therefore, any adverse impacts on fish and wildlife resources in Hamilton Creek resulting from increased duration of low flows are of great concern to us."

Response: Because of this comment, we made a comparison of the duration of low-flow conditions on Hamilton Creek south of Burnet. The comparison showed the project would cause the stream to flow for 16 hours longer from a 2-year storm event. This short period of prolonged low flow conditions will have insignificant impact on the fishery resource downstream.

Environmental Protection Agency

Comment: The Agency classified the Draft Environmental Impact Statement as LO-1 and stated that they have no objection to the project as proposed and that the statement contained sufficient information to adequately evaluate the environmental impact of the project.

Response: Noted.

Forest Service, USDA

Comment: The Service stated that the watershed contains no existing or potentially commercial forest land and no on-going or accelerated program seems indicated. They also stated that there is no Forest Service administered lands in the watershed.

Response: Noted.

Comment: The Service commented that in the section entitled "Plant and Animal Resources" there is no mention of plant communities. They suggested a change in either the title or the content of the section.

Response: The title has been changed as suggested. A discussion of the plant resources is in the section titled "Soil, Water, and Plant Management Status."

Office of Equal Opportunity, USDA

Comment: The Office of Equal Opportunity stated that because of the lack of data in the Environmental Impact Statement regarding the impact of the plan on the minority population (9.9 percent in Burnet County), they are unable to properly assess the impact of the plan. They recommended for inclusion in the final statement a more detailed assessment of the effects the plan will have on the minority population.

Response: A more detailed assessment of the effects the plan will have on the minority population has been made and included in the final statement.

The minority population will be benefited, or not affected, by project action to the same extent as other watershed residents. No minorities will be adversely affected by project action.

Public Health Service, USDHEW

Comment: The Department stated that comments should be requested from state agencies with similar responsibilities to those federal agencies which are responding and also from any non-government organization who may have an interest in the proposed project.

Response: The "Draft Watershed Plan and Environmental Impact Statement" was sent to state and federal agencies and interested individuals as listed on page E-37. In addition, notices of availability of the draft Environmental Impact Statement were published in newspapers serving the watershed area and in the Federal Register.

Comment: The Department stated that although health and safety considerations are discussed within the context of the statement, they are lacking in the broad objectives listed in the first major paragraph. They suggested the statement be strengthened by adding "...safe and healthful places to live, work...."

Response: The suggested wording has been added to the Environmental Impact Statement.

Comment: The Department recognized that contractors will be required to adhere to strict guidelines to minimize soil erosion and water and air pollution during construction and suggested that the type of guidelines should be noted (Federal, State, and local) and control requirements specified for compliance.

Response: Additional wording has been added to the Environmental Impact Statement to better define the type of guidelines and control requirements which will minimize soil erosion and water and air pollution during construction.

Comment: The Department stated that appropriate monitoring by a regulatory agency should be addressed in addition to a construction inspector.

Response: Wording has been added to the Environmental Impact Statement which specifies that the construction sites will be open to federal, state, and local regulatory agencies in addition to a construction inspector to assure adequate monitoring of water and air pollution.

Office of the Governor (Budget and Planning Office)

The Office stated that the plan and Environmental Impact Statement has been reviewed by the Budget and Planning Office and interested State agencies. The comments from the reviewers and the responses made to the comments are as follows:

Texas Department of Agriculture

Comment: The Department stated that they concur with the proposed plan.

Response: Noted.

Texas Air Control Board

Comment: The Board stated that they have no comments on the document.

Response: Noted.

General Land Office

Comment: The Office stated that they concur with the implementation of this plan.

Response: Noted.

Railroad Commission of Texas

Comment: The Commission stated: "This project appears to benefit those who have already built in the 100-year floodplain of Hamilton Creek. While the Railroad Commission of Texas does not object to the construction of these structures, we emphasis (sic) that compliance with National Flood Insurance Program regulations, both here and in other parts of the State is the sanest, most effective approach to abating flood damage."

Response: The flood insurance program is designed to reduce the economic impact of flood damages. The structural program of the plan is designed to reduce floodwater damage and to eliminate the threat of loss of lives from a 100-year flood event. The

flood plain regulations adopted by the City of Burnet will preclude future urban expansion within the corporate limits of the city as described under the "Nonstructural Measures" section of the plan.

Comment: The Commission stated: "The funding for public information dispersal for the project is too low to provide sufficient input and/or documentation of the hazards of building in a floodplain to citizens of Burnet County."

Response: The value used was reassessed and the project sponsors agreed that the stated funding is sufficient to accomplish the goal as outlined.

Texas State Soil and Water Conservation Board

Comment: The Board stated:

"This agency received the application for assistance on this project on May 11, 1966. Since then we have worked with the sponsors on numerous occasions attempting to ensure that their control objectives would receive federal assistance. The members of the State Soil and Water Conservation Board personally inspected the project area and held an informal public hearing on July 15, 1970 prior to recommending that the Soil Conservation Service develop a work plan.

Our involvement with the sponsors and the Soil Conservation Service staff working on this project leads us to believe that the objectives of the sponsors will be satisfied by this work plan and that the project measures called for in the work plan are the best practicable solution to the watershed problems. We urge that all associated with the project from this point forward seek expedient implementation of the plan."

Response: Noted.

Texas Department of Water Resources

Comment: The Department stated that they concur in the proposed watershed plan, insofar as it relates to TDWR's statutory, Statewide functions and interests relative to water resources development, management, and regulation--including water quality, flood control, and soil transport and sedimentation.

Response: Noted.

Comment: The Department stated: "TDWR notes that the installed project is expected to attain significant flood hazard prevention and damage avoidance benefits while causing only a nominal, initial reduction of 0.27 percent in average annual streamflow from

the watershed. Therefore, from TDWR's basin-wide interests, the proposed plan appears to be a most valuable addition to the overall USDA-SCS Watershed Management Program in the Colorado River Basin, which is consistent and compatible with TDWR's own continuing water resources planning and development in the said basin."

Response: Noted.

Comment: The Department stated: "Our records show that as of January 1, 1976, there was about 2,052 square miles of drainage area behind 310 existing floodwater-retarding structures within the Colorado River Basin. As of January 1, 1976, an additional 40 structures, with a combined drainage area of 316 square miles were planned for construction. About 90 percent of the planned and existing structures are located within Zone 2 (i.e., middle reach) of the Colorado River Basin, and the remainder are located in Zone 3 (i.e., the lower reach). (Reference Texas Water Development Board, Continuing Water Resources Planning and Development for Texas, Volume 2, May 1977 (Draft), page IV-480). Therefore, TDWR believes that it may be desirable in the analysis of the 'Regional Development Account,' for the Hamilton Creek Watershed, presented in Appendix A, to consider the 'region' not only as Burnet County, Texas but the area of influence of the overall inter-related USDA-SCS Watershed Management Program for the Colorado River Basin."

Response: The magnitude of this project is such that the impacts and benefits become insignificant when expanded beyond Burnet County.

Comment: The Department stated that they will continue to work closely with all agencies concerned to ensure a practical degree of consistency and compatibility in all State-wide and basin-wide plans insofar as their statutory State-wide water resources functions and responsibilities are concerned.

Response: Noted.

Texas Parks and Wildlife Department (Letter of February 7, 1979)

Comment: The Department stated: "On September 5, 1978, the agency provided comments on the preliminary draft EIS for the referenced project (copy enclosed). On November 22, 1978, we received a copy of a letter to your office from the Soil Conservation Service (SCS) responding to our preliminary draft comments."

Response: Your letter of September 5, 1978, and our responses are included in the final Environmental Impact Statement.

Comment: The Department stated: "The draft EIS and the response letter do not adequately address our comments. Appropriate

changes in the draft EIS were not made. If the final EIS is not appropriately modified as recommended by us and the USFWS, the document will not adequately represent the decision-making document it is intended (by law) to be. Without modification, it would tend only to justify the project as proposed."

Response: The final Environmental Impact Statement was modified to include a discussion of recommendations made by the USFWS and the Parks and Wildlife Department.

Comment: The Department stated: "Recommendations from the USFWS and TPWD are not presented in a meaningful manner on page E-32. The EIS does not list nor describe the recommendations involved; nor does it tell which recommendations were accepted and which were rejected. Thus, the EIS fails its intended purpose of providing information necessary for final decisions to be made by those reviewing the document....If the final EIS does not include the recommendations of this agency, the document will not fulfill the requirements of NEPA and fish and wildlife resources will not have received adequate consideration."

Response: A section has been added to the final EIS entitled ACTIONS TO MITIGATE IMPACTS. In addition, a detailed discussion of the nine specific recommendations made by the USDI Fish and Wildlife Service and the Texas Parks and Wildlife Department has been added to the section on CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS.

Comment: The Department stated: "The paragraph on page E-7 which discusses potential recreational benefits further strengthens our concern that floodwater retarding structures are not single-purpose structures but are private lakes constructed at federal expense. The description of potential benefits, in our opinion, mandates that these structures be classified as multipurpose structures and their construction be cost-shared."

Response: The statement that the pools and surrounding areas have a good potential for incidental recreational use has been removed from the final Environmental Impact Statement. The element in the project which creates "a private lake constructed at federal expense" as stated in your memo is the construction of three floodwater retarding structures. These structures will include an area designed to trap sediment over a 100-year period. Until these areas are filled with sediment, they may or may not hold water for prolonged periods. The project sponsors will obtain easements for these areas to be inundated and eventually filled with sediment. Water captured in these sediment pool areas is incidental to the project. In this sense, the federal government is not constructing lakes on private property, but is constructing floodwater retarding structures to protect human lives and property from the threat of floodwater. One of the goals of the project is flood prevention and one of the elements

of the plan which will accomplish this goal is floodwater retarding structures.

Texas Parks and Wildlife Department (Letter of September 5, 1978, related to the Preliminary Draft)

Comment: The Department stated: "We concur with the findings regarding plant and animal resources."

Response: Noted.

Comment: The Department stated: "On page E-7 the statement is made that the 'pools and surrounding areas have a good potential for incidental recreational use.' While this recreational use is not cited as a project benefit (E-26), it is implied by this statement. If public access is not allowed on private lakes constructed at federal expense, these implied benefits are not realistic and the benefits should not be included or implied."

Response: Same comment and response to letter dated February 7, 1979.

Comment: The Department stated: "On page E-30 it is stated that 'A viable alternative is one which is acceptable to USDA...' This statement indicates that no other entities have decision making authority. As the State's primary conservation agency, we have the statutory responsibility for State-owned fish and wildlife resources. This agency also reserves the right to assist in the determination of viable alternatives."

Response: A viable alternative in this project is one which is within Soil Conservation Service jurisdiction under Public Law 566 and for which a public body has expressed a capability to implement.

Comment: The Department stated: "On page E-32 reference is made to recommendations from the U.S. Fish and Wildlife Service and this agency which would minimize adverse effects to fish and wildlife habitat. These recommendations should be included in the discussion of the consultation process."

Response: A detailed discussion of the nine specific recommendations made by the USDI Fish and Wildlife Service and the Texas Parks and Wildlife Department has been added to the section on CONSULTATON AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS.

Lower Colorado River Authority

Comment: The Authority stated that they do not find need for anything to be added or deleted to the statement.

Response: Noted.

Wildlife Management Institute

Comment: The Institute commended the Soil Conservation Service and local sponsors for including non-structural flood plain management measures in the favored plan and other action alternatives. They stated that the public information program to annually publicize the 100-year flood plain is especially noteworthy.

Response: Noted.

Comment: The Institute suggested that the floodwater retarding structures be developed for public recreation due to their proximity to the City of Burnet.

Response: Assessment of the recreational resources in and near the watershed revealed that there are five major lakes and recreational areas containing nearly 5,000 surface acres of water within 25 miles of the watershed. With this abundance of recreation areas available and developed for public use, the project sponsors felt that local need did not justify development of additional areas related to this project.

LIST OF APPENDICES

SELECTED ALTERNATIVE

NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

Hamilton Creek Watershed, Texas

Components	Measures of effects (Average Annual) 1/2/
Beneficial effects:	
The value to users of increased outputs and services	
Flood prevention	$69,050
Total beneficial effects	$69,050
Adverse effects:	
The value of resources required for a plan:	
1. Three floodwater retarding structures	
Project installation	$41,960
OM&R	870
2. Public Information Program	
Initiation	30
Maintenance	100
3. Project administration	4,500
Total adverse effects	$47,460
Net beneficial effects	$23,260

1/ 100 years @ 6-7/8 percent interest.

2/ Price base: 1977 for costs, current normalized prices (October 1977) for agricultural damages, and current (1977) for nonagricultural damages.

SELECTED ALTERNATIVE

ENVIRONMENTAL QUALITY ACCOUNT

Hamilton Creek Watershed, Texas

Components	Measures of effects
Beneficial and adverse effects:	
A. Areas of natural beauty.	1. Create an additional 37 surface acres of water.
	2. Inundate 29 acres of rangeland and 8 acres of cropland.
B. Quality consideration of water, land, and air resources.	1. Dust and sediment pollution will increase slightly during construction of the structural works of improvement.
	2. The project will cause an initial reduction of 0.27 percent in average annual streamflow from the total watershed.
C. Biological resources and selected ecosystems.	1. Fish and wildlife habitat will be enhanced by providing: a. potential fish habitat in the watershed consisting of an additional 37 surface acres in the sediment pools of the three floodwater retarding structures. b. an additional source of wildlife drinking water. c. nesting and resting areas for waterfowl.
	2. Inundated land areas in the sediment pools (37 acres) will be lost as upland wildlife habitat.
	3. The construction of the dams and emergency spillways will alter existing wildlife habitat on 29 acres.
D. Paleontological resources.	1. One archeological site not eligible for nomination to the National Register of Historic Places will be inundated or disturbed by installation of floodwater retarding structure No. 1.
E. Irreversible or irretrievable commitments.	1. Conversion of 18 acres of cropland to dams, emergency spillways, and sediment pools.
	2. Labor, material, and energy for construction of the project measures.

SUMMARY COMPARISON TABLE

Hamilton Creek Watershed, Texas

FACTORS	DESIRED RESULTS	ACTUAL RESULTS			
		Alt. 1 3 FRS, Flood Plain Regulation, and a Public Information Program	Alt. 2 Flood-proofing, Relocation, Changing Land Use	Alt. 3 1 FRS, Flood Plain Regulation, and a Public Information Program	Alt. 4 No Project
Economic, Environmental, and Social					
Total Installation Cost	Minimize	$675,440	$1,210,000	$268,290	0
Local Share Installation Cost	Minimize	$ 83,450	$1,210,000	$ 17,500	0
Annual O&M Cost	Minimize	$ 970	$ 12,100	$ 500	0
Annual Cost	Minimize	$ 47,460	$ 80,000	$ 18,300	0
Average Annual Benefits	Maximize	$ 69,050	$ 70,320	$ 40,610	0
Average Annual Remaining Damages	Minimize	$ 5,220	$ 3,940	$ 13,030	$74,270
Flood Damage Reduction					
Urban Property	Maximize	96%	100%	78%	0
Agricultural Production	Maximize	48%	0	19%	0
Eliminate Threat to Human Lives	Maximize	Yes	Yes	No	No
Loss of Agricultural Land	Minimize	38 Ac.	0	66 Ac.	0
Fishery Resources	Minimize Damage	+38 Ac.	No Effect	+20 Ac.	0
Wildlife Resources	Minimize Damage	-38 Ac.	No Effect	-20 Ac.	0
Endangered or Threatened Flora or Fauna	Minimize Loss	No Impact	No Impact	No Impact	No Impact

SELECTED ALTERNATIVE

REGIONAL DEVELOPMENT ACCOUNT

Hamilton Creek Watershed, Texas

Components	Measures of effects (Average Annual)	
	Region 1/	Rest of Nation 2/3/
Income:		
Beneficial effects:		
The value of increased output of goods and services to users residing in the region		
Flood prevention	$69,050	0
Total beneficial effects	$69,050	0
Adverse effects:		
The value of resources contributed from within the region to achieve the outputs		
1. Three floodwater retarding structures		
Project installation	$ 6,210	$35,750
O&M	870	0
2. Public Information Program		
Initiation	30	0
Maintenance	100	0
3. Project administration	100	4,400
Total adverse effects	$ 7,310	$40,150
Net beneficial effects	$61,740	-$40,150

1/ The region consists of Burnet County, Texas
2/ 100 years @ 6-7/8 percent interest
3/ Price base: 1977 for costs, current normalized prices (October 1977) for agricultural damages, and current prices (1977) for nonagricultural damages.

SELECTED ALTERNATIVE

REGIONAL DEVELOPMENT ACCOUNT
(Contd.)

Hamilton Creek Watershed, Texas

Components	Measures of effects	
	Region[1/]	Rest of Nation
Employment:		
Beneficial effects:		
Increase in the number and types of jobs		
Employment for project construction	20 short-term semi-skilled jobs	--
Total beneficial effects	20 short-term semi-skilled jobs	--
Adverse effects:		
Decrease in number and types of jobs	--	--
Total adverse effects	--	--
Net beneficial effects	20 short-term semi-skilled jobs	--

1/ The region consists of Burnet County, Texas

SELECTED ALTERNATIVE

REGIONAL DEVELOPMENT ACCOUNT
(Contd.)

Hamilton Creek Watershed, Texas

Components	Measures of effects	
	Region[1/]	Rest of Nation
Population Distribution		
Beneficial effects	Creates 20 short-term semi-skilled jobs	--
Adverse effects	--	--
Regional Economic Base and Stability		
Beneficial effects	Creates 20 short-term semi-skilled jobs	--
Adverse effects	--	--

1/ The region consists of Burnet County, Texas

SELECTED ALTERNATIVE

SOCIAL WELL-BEING ACCOUNT

Hamilton Creek Watershed, Texas

Components | **Measures of effects**

Beneficial and adverse effects:

A. Real income distribution

1. Create 20 short-term semi-skilled jobs.

2. Create regional income benefit distribution of $69,050 by income class as follows:

Income class (dollars)	Percentage of Adjusted Gross Income in Class	Percentage Benefits in Class
Less than 3,000	8	33
3,000-10,000	47	48
More than 10,000	45	19

3. Local average annual costs of $6,510 will be borne by the City of Burnet. Funds for this purpose will come from the general operating funds of the city. The general fund of the city is supported by existing taxes and is available and adequate for this purpose.

B. Life, health, and safety

1. Provide protection from the 100-year flood event to 58 existing urban properties on Daugherty Branch and 25 existing urban properties on Hamilton Creek.

2. Eliminate the threat of loss of life from floodwater.

APPENDIX C

LETTERS OF COMMENT

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-78/1195

FEB 2 1979

Mr. George C. Marks
State Conservationist
Soil Conservation Service
Post Office Box 648
Temple, Texas 76501

Dear Mr. Marks:

Thank you for the letter of November 17, 1978, requesting our views and comments on the watershed plan and environmental impact statement for Hamilton Creek Watershed, Burnet County, Texas. In reviewing the document we have noticed several areas of discussion which we feel merit re-examination and comment.

Watershed Work Plan

Although the subject watershed plan adequately describes the problems and needs of the area according to the sponsors' goals, the lack of mitigation for unavoidable impacts on fish and wildlife resources is a serious omission and makes the plan unacceptable to our Fish and Wildlife Service. As a beginning, we recommend the following changes to the proposal found on page 2, paragraph 4.

a. Distances in feet to which clearing of vegetation within the sediment pool will extend should be clearly set forth. This clearing should be no more than the minimum as required by current SCS guidelines.

b. Dams, emergency spillways, and detention pools should be fenced to exclude grazing by livestock, as required by Supplement No. 1 of the SCS Technical Standards and Specifications for Establishment of Wildlife Habitat on or Adjacent to Watershed Works of Improvement. This action would improve wildlife habitat values and partially offset overall habitat losses caused by inundation.

c. Vegetation cleared from the sediment pools should be used to construct wildlife brush piles within the fenced detention pools and fish attractors within the sediment pools on the basis of recommendations of the Texas Parks and Wildlife Department. This would act to further offset the unavoidable losses to habitat replacing some cover lost in construction activities and inundation.

d. All areas denuded by construction activities, with the exception of dam faces and sediment pools, should be revegetated in accordance with guidelines set forth in Supplement No. 1. Suggested plants to be used include bristlegrass, kleingrass, clover, blurstems, switchgrass, vetch, liveoak, pecan, greenbrier, and wild grape. Plant species to be used in revegetation should be clearly identified within the watershed plan. Bermuda grass should be used to revegetate the dam faces only if the aforementioned grasses are not suitable for erosion control purposes.

e. Only borrowed material needed for construction of dams should be removed from sediment pool areas. Any additional material needed should be taken from areas outside the sediment pool which have low value as wildlife habitat. Identification of such areas should be made on the basis of recommendations of the Texas Parks and Wildlife Department.

Page P-6, paragraph 8 - With the creation, on January 25, 1978, of the Heritage Conservation and Recreation Service (HCRS), numerous National Park Service functions dealing with archeological, cultural, and historic preservation were transferred to HCRS. The statements on pages P-6 and E-8, regarding the encountering of archeological or historical resources during construction and the contacting of the National Park Service to "determine whether there is evidence to warrant a detailed survey and recovery", should be corrected. The statement should read that HCRS will be contacted.

Environmental Impact Statement

A plan for the mitigation of unavoidable impacts on fish and wildlife resources should be included in the final environmental statement. Our Fish and Wildlife Service will provide assistance in this planning effort on request.

Page E-12, paragraph 4 - The statement is very general in its treatment of mineral resources. The report does not discuss the asphaltic limestone deposits that occur south of and probably extend under the dam and impoundment area of site #1 on Daughtery Branch. The asphaltic limestone bed outcrops for about 1,000 feet between road FM 963 and site #1. Although the size and economic worth of this asphaltic resource is unknown, it was mined in the early 1920's and mid-1930's. We suggest that it be identified as a potentially valuable resource in the statement. We also suggest that the last sentence in the paragraph on mineral resources on page E-12 be deleted because we do not believe garnets or pearls have been found in any significant quantities in the watershed area.

Page E-17, paragraph 5 - We are pleased to note that the Soil Conservation Service has taken steps to identify historic and archeological resources in the project area. However, we would like clarification of the following statement: "Archeological sites undoubtedly occur along the springfed segments of Hamilton Creek from the vicinity of Burnet downstream to the Colorado River, but none have been identified and investigated." This does not seem to coincide with later statements that discuss the archeological survey that was conducted in 1975, along with later investigations in 1977. Do these statements refer to pre-1975 information, or to the scarcity of knowledge that still exists following archeological work?

Assuming this conflict is clarified, the final environmental statement should document the concurrence of the State Historic Preservation Officer (page E-17) that, although there will be impacts to known historic and archeological resources, the resources are not significant enough to warrant further consideration.

Page E-21, IMPACTS - The statement should assess the possibility of beneficial or adverse effects on groundwater levels as a result of the impoundments in the sediment pools.

Page E-22, last paragraph - The impacts on fish and wildlife resulting from the cessation of over-the-bank flows in Hamilton Creek downstream from the proposed sites should be discussed in more detail. These over-the-bank flows are important in that many species of fish (i.e., catfish and carp) use these overflow areas for both spawning and foraging. Therefore, the cessation of over-the-bank flows would result in a decrease in productivity of the fishery of Hamilton Creek.

Page E-27, Item 10 - The creation of 37 acres of flat water should not be included as a favorable impact for the following reasons:

a. Public access will not be permitted to this water.

b. The State of Texas, and particularly the immediate project area, already has adequate flat water resources, thus precluding the need for additional acreage of flat water.

c. Quality terrestrial habitat is becoming increasingly scarce in the State of Texas. Therefore, the trade-off of this type of habitat for already abundant flat water areas should be considered an adverse impact.

Page E-28, first full paragraph - The impacts on fish and wildlife resources resulting from the increased duration of low flows in Hamilton Creek downstream from the proposed sites should be discussed in more detail. Hamilton Creek has been classified as a highly productive Type 2 (high-priority fishery resource) stream by the U.S. Fish and Wildlife Service Stream Evaluation Project, July, 1977. Hamilton Creek is also classified as highly sensitive because it would be difficult to either restore it to the original condition or to mitigate any damages done to it. Therefore, any adverse impacts on fish and wildlife resources in Hamilton Creek resulting from increased duration of low flows are of great concern to us.

We appreciate this opportunity to submit comments.

Sincerely,

Larry E. Meierotto
Deputy Assistant SECRETARY

United States
Environmental Protection
Agency

Region 6
1201 Elm Street
Dallas TX 75270

Arkansas, Louisiana,
Oklahoma, Texas,
New Mexico

EPA

December 28, 1978

Mr. George C. Marks
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 648
Temple, Texas 76501

Dear Mr. Marks:

We have reviewed the Draft Environmental Impact Statement (EIS) on the proposed watershed plan for Hamilton Creek Watershed, Burnet County, Texas. This project provides for watershed protection and flood protection for the City of Burnet, Texas. It will be implemented under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), as amended. The plan proposes that three floodwater retarding structures be constructed during a four-year installation period and that the City of Burnet adopt and enforce flood plain use regulations and institute a public information program.

We classify your Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the project as it relates to Environmental Protection Agency's (EPA) legislative mandates. The statement contained sufficient information to evaluate adequately the possible environmental impacts which could result from project implementation. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the Impact Statement at the draft stage, whenever possible.

We appreciated the opportunity to review the Draft Environmental Impact Statement. Please send our office two copies of the Final Environmental Impact Statement at the same time it is sent to the Office of Federal Activities, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely,

Ed Hinson for

Adlene Harrison
Regional Administrator (6A)

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SA

REPLY TO: 3510 Watershed Protection And
Flood Prevention (PL 566)

December 8, 1979

SUBJECT: Hamilton Creek Watershed, Texas
November 1978 Draft Watershed And EIS

TO: George C. Marks, State Conservationist
Soil Conservation Service
P. O. Box 648
Temple, Texas 76501

We have reviewed the subject draft watershed plan and environmental impact statement. The watershed area contains no existing or potentially commercial forest land, and no on-going or accelerated forestry program seems indicated. There are also no Forest Service administered lands in the watershed.

We offer only the single comment that on page E-15 there is a section entitled Plant and Animal Resources. In spite of the title, we find no mention of plant communities. We suggest a change in either the title or the content of the section.

for Keith M. Grant

M. W. KAGEORGE
Assistant Area Director
Area Planning & Management Assistance

cc: WO, AP&D
Jackson Field Office

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

OFFICE OF EQUAL OPPORTUNITY

IN REPLY REFER TO: 8140 Supplement 8

SUBJECT: Draft Environmental Impact Statement for Hamilton Creek Watershed, Burnet County, TX

TO: George C. Marks
State Conservationist

Verne M. Bathurst, Deputy Administrator
for Management, Soil Conservation Service

The Draft Environmental Impact Statement (EIS) for the Hamilton Creek Watershed Project was reviewed by this office to assess the socio-economic impact of the project on minority groups living in or near the affected area.

Because of the lack of data in the EIS regarding the impact of the plan on the minority population (9.9 percent in Burnet County) we are unable to properly assess the impact of the plan.

We recommend that you include in your final statement a more detailed assessment of the effects the plan will have on the minority population. This should be accomplished in accordance with Soil Conservation Service guidelines for preparing environmental impact statements (Federal Register Vo. 39, No. 197, June 3, 1974).

JAMES FRAZIER
Director

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333
TELEPHONE (404) 633-3311

January 10, 1979

Mr. George C. Marks
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P. O. Box 648
Temple, Texas 76501

Dear Mr. Marks:

We have reviewed the draft watershed plan and environmental impact statement for the Hamilton Creek Watershed, Burnet County, Texas. We are responding on behalf of the Public Health Service.

Comments from State agencies with similar responsibilities to those Federal agencies responding should be requested. Also, any non-government organization who may have interest in the proposed project should be requested to comment.

Although health and safety considerations are discussed within the context of the statement, they are lacking in the broad objectives listed in the first major paragraph. We suggest this statement be strengthened by adding ". . . safe and healthful places to live, work, ..."

It is stated that contractors will be required to adhere to strict guidelines to minimize soil erosion and water and air pollution during construction but the type of guidelines should be noted (Federal, State, and local) and control requirements specified for compliance. Appropriate monitoring by a regulatory agency should be addressed in addition to a "construction inspector."

The draft has also been reviewed for potential vectorborne disease impact. Serious mosquito problems as a result of this project are not anticipated.

Thank you for the opportunity of reviewing this statement. We would appreciate receiving a copy of the final statement when it is issued.

Sincerely yours,

Frank S. Lisella

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Bureau of State Services

OFFICE OF THE GOVERNOR

WILLIAM P. CLEMENTS, JR.
GOVERNOR

February 9, 1979

Mr. George C. Marks
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 648
Temple, Texas 76501

Dear Mr. Marks:

The Budget and Planning Office recently conducted a review of the Draft Watershed Plan and Environmental Impact Statement for Hamilton Creek Watershed prepared by the Soil Conservation Service.

Subsequent to the completion of that review, the enclosed comments from the Parks and Wildlife Department were received. Those comments are being forwarded to you at this time for your use in the preparation of the final watershed plan and environmental impact statement.

It is hoped that the delay in the receipt of these comments will be of no inconvenience to you.

Sincerely,

Ward C. Goessling, Coordinator
Natural Resources Section
Budget and Planning Office

Enclosure

TEXAS
PARKS AND WILDLIFE DEPARTMENT

COMMISSIONERS
PEARCE JOHNSON
Chairman, Austin
[illegible]
Vice Chairman, Lubbock
JOHN M. GREEN
Beaumont

CHARLES D. TRAVIS
EXECUTIVE DIRECTOR

4200 Smith School Road
Austin, Texas 78744

[illegible]
LOUIS H. STEPHENSON
San Antonio
JAMES [illegible]
Palestine
PERRY R. BASS
Fort Worth

February 7, 1979

Mr. Ward C. Goessling, Jr.
Coordinator
Governor's Budget and Planning Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Re: Draft Watershed Plan and Environmental Impact Statement:
Hamilton Creek Watershed, Burnet County, Texas --
U.S. Department of Agriculture Soil Conservation Service
(EIS 8-011-020)

Dear Mr. Goessling:

This agency has reviewed the referenced document and offers the following comments.

On September 5, 1978, the agency provided comments on the preliminary draft EIS for the referenced project (copy enclosed). On November 22, 1978, we received a copy of a letter to your office from the Soil Conservation Service (SCS) responding to our preliminary draft comments.

The draft EIS and the response letter do not adequately address our comments. Appropriate changes in the draft EIS were not made. If the final EIS is not appropriately modified as recommended by us and the USFWS, the document will not adequately represent the decision-making document it is intended (by law) to be. Without modification, it would tend only to justify the project as proposed.

Recommendations from the USFWS and TPWD are not presented in a meaningful manner on page E-32. The EIS does not list nor describe the recommendations involved; nor does it tell which recommendations were accepted and which were rejected. Thus, the EIS fails its intended purpose of providing information necessary for final decisions to be made by those reviewing the document. The alternatives are not adequately portrayed for the reviewer. Subsection

1500.8(4) (NEPA) states, in part, "A rigorous exploration and objective evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid some or all of the adverse environmental effects is essential. Sufficient analysis of such alternatives and their environmental risks should accompany the proposed action through the agency review process in order not to foreclose prematurely options which might enhance environmental quality or have less detrimental effects." (emphasis added)

The paragraph on page E-7 which discusses potential recreational benefits further strengthens our concern that floodwater retarding structures are not single-purpose structures but are private lakes constructed at federal expense. The description of potential benefits, in our opinion, mandates that these structures be classified as multipurpose structures and their construction be cost-shared.

If the final EIS does not include the recommendations of this agency, the document will not fulfill the requirements of NEPA and fish and wildlife resources will not have received adequate consideration.

Sincerely,

Charles D. Travis

CHARLES D. TRAVIS
Executive Director

CDT:MM:cm

Enclosure

SEP 5 1978

Mr. Ward C. Goessling, Jr., Coordinator
Natural Resources Section
Governor's Budget and Planning Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Re: Preliminary Watershed Plan and Environmental Impact Statement--
Hamilton Creek Watershed, Burnet County; USDA, Soil Conservation
Service

Dear Mr. Goessling:

This agency has reviewed the referenced document and offers the following comments.

We concur with the findings regarding plant and animal resources.

On page E-7 the statement is made that the "pools and surrounding areas have a good potential for incidental recreational use." While this recreational use is not cited as a project benefit (E-25), it is implied by this statement. If public access is not allowed on private lakes constructed at federal expense, those implied benefits are not realistic and the benefits should not be included or implied.

On page E-30 it is stated that "A viable alternative is one which is acceptable to USDA..." This statement indicates that no other entities have decision making authority. As the State's primary conservation agency, we have the statutory responsibility for State-owned fish and wildlife resources. This agency also reserves the right to assist in the determination of viable alternatives.

SIGNED AND DISPATCHED SEP 9 1978

FC 6000

On page E-32 reference is made to recommendations from the U. S. Fish and Wildlife Service and this agency which would minimize adverse effects to fish and wildlife habitat. These recommendations should be included in the discussion of the consultation process.

Thank you for the opportunity to review and comment on this document. If we can be of further assistance, please contact us.

Sincerely,

HENRY B. BURKETT
Executive Director

HBB:MM:lmw

cc: Mr. Mike Reagan
Texas Parks and Wildlife Department
Wimberley, Texas

OFFICE OF THE GOVERNOR

WILLIAM P. CLEMENTS, JR.
GOVERNOR

January 31, 1979

Mr. George C. Marks
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 648
Temple, Texas 76501

Dear Mr. Marks:

The Draft Watershed Plan and Environmental Impact Statement for Hamilton Creek Watershed, Burnet County, prepared by the Soil Conservation Service has been reviewed by the Budget and Planning Office and interested State agencies.

The comments of the reviewing agencies are enclosed for your use in the preparation of the final plan and environmental impact statement. If this Office can be of further assistance, please contact me.

Sincerely,

Tom B. Rhodes

Tom B. Rhodes, Director
Budget and Planning Office

Enclosures

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

ward

Harvey Davis
Executive Director

December 12, 1978

Mr. Charles D. Travis, Director
Governor's Budget & Planning Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Dear Mr. Travis

Subject: U.S. Department of Agriculture, Soil Conservation Service (SCS)--Draft Combined Watershed Plan and Environmental Impact Statement--Hamilton Creek Watershed, Burnet County, Texas. (USDA-SCS-EIS-WS-(ADM)-78-5-(D)-(TX), November 1978--State Reference No. EIS-8-D11-020.

In response to your memorandum of December 4, 1978, the staff of the Texas Department of Water Resources (TDWR) has reviewed the subject document prepared by the Soil Conservation Service (Temple, Texas) under authority contained in the Watershed Protection and Flood Prevention Act (P.L. 83-566), as amended, and in accordance with Section 102 (2)(C) of the National Environmental Policy Act of 1969 (P.L. 91-190), as amended. The document describes, analyzes, and justifies the proposed plan developed by the Soil Conservation Service, and local sponsors (i.e., the Hill Country Soil and Water Conservation District, the Commissioners Court of Burnet County, and the City of Burnet) for watershed protection and flood protection in the 82.81-square mile Hamilton Creek Watershed of the Colorado River Basin, Burnet County, Texas, which is located approximately 45 miles northwest of Austin and 60 miles southwest of Temple, Texas. The plan proposes that three floodwater-retarding structures with a total retarding storage capacity of 1,180 acre-feet and total land requirement of 172 acres, be constructed during a four-year period. In addition, the plan provides that the City of Burnet will adopt and enforce flood plain use regulations, and institute a flood plan hazard information program. The plan, estimated to cost $675,440 (1977 prices) in Federal and local funds, will have a ratio of total average annual flood-hazard prevention benefits ($69,050), to total average annual maintenance and operational costs ($45,790), of 1.5-to-1.0.

TDWR concurs in the proposed watershed plan, insofar as it relates to TDWR's statutory, State-wide functions and interests relative to water resources development, management, and regulation,--including water quality, flood control, and soil transport and sedimentation.

TDWR notes that the installed project is expected to attain significant flood hazard prevention and damage avoidance benefits while causing only a nominal, initial reduction of 0.27 percent in average annual streamflow from the watershed. Therefore, from TDWR's basin-wide interests, the proposed plan appears to be a most valuable addition to the overall USDA-SCS Watershed Management Program in the Colorado River Basin, which is consistent and compatible with TDWR's own continuing water resources planning and development in the said basin. Our records show that as of January 1, 1976, there was about 2,052 square miles of drainage area behind 310 existing floodwater-retarding structures within the Colorado River Basin. As of January 1, 1976, an additional 40 structures, with a combined drainage area of 316 square miles were planned for construction. About 90 percent of the planned and existing structures are located within Zone 2 (i.e., middle reach) of the Colorado River Basin, and the remainder are located in Zone 3 (i.e., the lower reach). (Reference Texas Water Development Board, Continuing Water Resources Planning and Development for Texas, Volume 2, May 1977 (Draft), page IV-480). Therefore, TOWR believes that it may be desirable in the analysis of the "Regional Development Account," for the Hamilton Creek Watershed, presented in Appendix A, to consider the "region" not only as Burnet County, Texas but the area of influence of the overall inter-related USDA-SCS Watershed Management Program for the Colorado River Basin.

TDWR appreciated the opportunity to examine the subject documents. We will continue to work closely with all agencies concerned to ensure a practical degree of consistency and compatibility in all State-wide and basin-wide plans insofar our statutory State-wide water resources functions and responsibilities are concerned. Please advise if we can be of further assistance.

Sincerely yours,

Harvey Davis
Executive Director

TEXAS STATE SOIL AND WATER CONSERVATION BOARD

1002 First National Building
P. O. Box 658
Temple, Texas 76501
Area Code 817, 773-2250

December 22, 1978

Mr. Ward C. Goessling, Jr., Coordinator
Natural Resources Section
Budget and Planning Office
Office of the Governor
411 West 13th Street
Austin, Texas 78701

Dear Mr. Goessling:

We have received a copy of a draft watershed plan and environmental impact statement for the Hamilton Creek Watershed in Burnet County, Texas.

This agency reviewed and commented on the preliminary plans for this project in August of this year. We have no additional comments to contribute. For your convenience we have enclosed a copy of our response on the preliminary plans.

Sincerely yours,

A. C. Spencer
Executive Director

ACS/MD/lc

TEXAS STATE SOIL AND WATER CONSERVATION BOARD
TEMPLE, TEXAS 76501

August 10, 1978

Mr. Ward C. Goessling, Jr., Coordinator
Natural Resources Section
Budget and Planning Office
Office of the Governor
411 West 13th Street
Austin, Texas 78701

Dear Mr. Goessling:

We have received a copy of a preliminary watershed plan and environmental impact statement for the Hamilton Creek Watershed in Burnet County, Texas.

This agency received the application for assistance on this project on May 11, 1966. Since then we have worked with the sponsors on numerous occasions attempting to ensure that their control objectives would receive federal assistance. The members of the State Soil and Water Conservation Board personally inspected the project area and held an informal public hearing on July 15, 1970 prior to recommending that the Soil Conservation Service develop a work plan.

Our involvement with the sponsors and the Soil Conservation Service staff working on this project leads us to believe that the objectives of the sponsors will be satisfied by this work plan and that the project measures called for in the work plan are the best practicable solution to the watershed problems. We urge that all associated with the project from this point forward seek expedient implementation of the plan.

Sincerely yours,

A. C. Spencer
Executive Director

ACS/MD/lc

General
Land Office
AUSTIN, TEXAS 78701
BOB ARMSTRONG, COMMISSIONER

January 9, 1979

Mr. Bill Hamilton
Budget and Planning Office
Office of the Governor
411 West 13th Street
Austin, Texas 78701

Re: Draft Watershed Plan and Environmental Impact Statement: Hamilton Creek Watershed, Burnet County, Texas - U. S. Department of Agriculture Soil Conservation Service (EIS 8-011-020)

Dear Mr. Hamilton:

We have reviewed the above referenced document and this agency concurs with the implementation of this plan.

We appreciate this opportunity to review and comment on this document.

Sincerely,

A. J. Bishop

A. J. Bishop
512/475-1540

AJB/cc

Approved: Mike Hightower
Mike Hightower
Program Manager/Director

TEXAS DEPARTMENT OF AGRICULTURE

REAGAN V. BROWN, COMMISSIONER / P. O. BOX 12847 / AUSTIN, TEXAS 78711
AN EQUAL OPPORTUNITY EMPLOYER M/F

COMMENTS

The Texas Department of Agriculture concurs with the proposed plan for the "Hamilton Creek Watershed, Burnet County, Texas - U.S. Department of Agriculture Soil Conservation Service." (EIS 8-011-020)

Person Conducting Review (Signature) [signature]

Agency Texas Department of Agriculture Date 12-8-78

RAILROAD COMMISSION OF TEXAS

SURFACE MINING DIVISION

ROY D. PAYNE
Director

12th FLOOR THOMPSON BUILDING • CAPITOL STATION - P.O. DRAWER 12967 AUSTIN, TEXAS 78711

December 27, 1978

Mr. Karl C. Goessling, Jr.
Coordinator
Natural Resources Section
Governor's Office of Planning
& Budget
Executive Office Building
411 West 13th Street
Austin, Texas 78701

SUBJECT: DRAFT WATERSHED PLAN AND ENVIRONMENTAL IMPACT STATEMENT: HAMILTON CREEK WATERSHED, BURNET COUNTY, TEXAS - U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE (EIS 8-011-020)

Dear Mr. Goessling:

This project appears to benefit those who have already built in the 100-year floodplain of Hamilton Creek. While the Railroad Commission of Texas does not object to the construction of these structures, we emphasis that compliance with National Flood Insurance Program regulations, both here and in other parts of the State is the surest, most effective approach to abating flood damage.

The funding for public information dispersal for the project is too low to provide sufficient input and/or documentation of the hazards of building in a floodplain to citizens of Burnet County.

Very truly yours,

Vika Newsom
Administrative Assistant

VN:lkm

TEXAS AIR CONTROL BOARD

8520 SHOAL CREEK BOULEVARD
AUSTIN, TEXAS 78758
512/451-5711

December 14, 1978

Mr. Ward C. Goessling, Jr.
Natural Resources Section
Budget and Planning Office
Office of the Governor
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Subject: Draft Watershed Plan and Environmental Impact Statement: Hamilton Creek Watershed, Burnet County, Texas - U.S. Department of Agriculture Soil Conservation Service (EIS 8-011-020)

Dear Mr. Goessling:

We have no comments on the above cited document.

Sincerely,

Roger R. Wallis, Deputy Director
Standards and Regulations Program

cc: Mr. Eugene Fulton, Regional Supervisor, Waco

Lower Colorado River Authority

Post Office Box 220 Austin, Texas 78767 AC 512 474-5931

CHARLES HERRING, General Manager

December 14, 1978

George C. Marks,
State Conservationist
USDA, Soil Conservation Service
P. O. Box 648
Temple, Texas 76501

Dear Sir:

We have carefully reviewed the draft Environmental Impact Statement for the Hamilton Creek Watershed, Texas, project which has been prepared by your organization and filed with the Environmental Protection Agency.

We do not find there is any need from our standpoint for anything to be added or deleted to the statement.

Sincerely yours,

Charles Herring
General Manager

CH:jf

Wildlife Management Institute

709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
IRA N. GABRIELSON
Board Chairman

Southcentral Representative
Murray T. Walton
815 Christopher Street
Austin, Texas 78704
Telephone: 512—444-3901

November 30, 1978

Mr. George C. Marks
State Conservationist
U.S. Soil Conservation Service
P.O. Box 648
Temple, Texas 76501

Dear Mr. Marks:

The Wildlife Management Institute has reviewed the Draft Watershed Plan and Environmental Impact Statement, Hamilton Creek Watershed, Burnet County, Texas. The SCS and local sponsors are commended for including non-structural floodplain management measures in the favored plan and other action alternatives. The public information program to annually publicize the 100-year floodplain is especially noteworthy.

The only suggestion that we offer is that floodwater retarding structures be developed for public recreation due to their proximity to the City of Burnet.

Thank you for the opportunity to comment on this project.

Sincerely,

Murray T. Walton
Southcentral Representative

APPENDIX D

LIST OF COMMON AND SCIENTIFIC NAMES OF VEGETATON OBSERVED
(Gould, 1962)

Common	Scientific
agarito	Berberis trifoliolata
arizona cottontop	Trichachne californica
ashe juniper	Juniperus ashei
bermudagrass	Cynodon dactylon
bernardia	Bernardia sp.
blackjack oak	Quercus marilandica
black willow	Salix nigra
broomsedge bluestem	Andropogon virginicus
buffalograss	Buchloe dactyloides
bumelia	Bumelia sp.
bushsunflower	Simsia sp.
canada wildrye	Elymus canadensis
cane bluestem	Andropogon barbinodis
cedar elm	Ulmus crassifolia
curlymesquite	Hilaria belangeri
elbowbush	Forestiera pubescens
elm	Ulmus sp.
engelmanndaisy	Engelmannia pinnatifida
evergreen sumac	Rhus virens
fall witchgrass	Leptoloma cognatum
feathery bluestem	Andropogon sp.
fern acacia	Acacia angustissima
gaura	Gaura sp.
greenbrier	Smilax sp.
green sprangletop	Leptochloa dubia
hackberry	Celtis sp.
hairy dropseed	Sporobolus asper pilosus
hoary blackfoot	Melampodium cinereum
hooded windmillgrass	Chloris cucullata
indiangrass	Sorghastrum nutans
kidneywood	Eysenhardtia sp.

APPENDIX D

Common	Scientific
lime pricklyash	Zanthoxylum fagara
little bluestem	Andropogon scoparius
live oak	Quercus virginiana
maximilian sunflower	Helianthus maximiliani
meadow dropseed	Sporobolus asper hookeri
mealycup sage	Salvia farinacea
mesquite	Prosopis juliflora
oak	Quercus sp.
orange zexmenia	Zexmenia hispida
pecan	Carya illinoensis
persimmon	Diospyros sp.
pinhole bluestem	Andropogon perforatus
plains lovegrass	Eragrostis intermedia
plums	Prunus sp.
post oak	Quercus stellata
red grama	Bouteloua trifida
seep muhly	Muhlenbergia reverchoni
shin oak	Quercus sp.
shrubby dalea	Dalea sp.
sideoats grama	Bouteloua curtipendula
sumac	Rhus sp.
switchgrass	Panicum virgatum
tall dropseed	Sporobolus asper
tall grama	Bouteloua pectinata
texas croton	Croton texensis
texas oak	Quercus shumardii texana
texas persimmon	Diospyros texana
texas sophora	Sophora affinis
texas stillingia	Stillingia texana
texas wintergrass	Stipa leucotricha
threeawn	Aristida sp.
upright prairie-coneflower	Ratibida columnifera
vine-mesquite	Panicum obtusum

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Gould, F. W., Texas Plants, A Checklist and Ecological Summary, Texas A&M University, TAES, College Station, Texas, 1962.

McCormick, Olin F. and Roger E. Filson, Archaeological Survey of Portions of Hamilton Creek Watershed, Burnet County, Central Texas, unpublished findings of the Institute for Environmental Studies, North Texas State University, submitted to the USDA, Soil Conservation Service, Temple, Texas, under contract No. AG-48-SCS-02849, 1975.

Memorandum of Understanding Between United States Department of Agriculture and Hill Country Soil and Water Conservation District, September 1962 (Rev.); Supplemental Memorandum of Understanding Between U. S. Department of Agriculture, Soil Conservation Service and the Hill Country Soil and Water Conservation District, July 1967.

Mount, J. Russell, Ground-Water Conditions in the Vicinity of Burnet, Texas, Texas Water Commission, 1962.

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U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Climatological Data, Texas, Annual Summary, Vol. 75, No. 13, Asheville, N.C., 1971.

U. S. Water Resources Council, OBERS Projections; Regional Economic Activity in the U. S., Volume 4, Water Resources Regions 9-20, Washington, D.C., 1972.

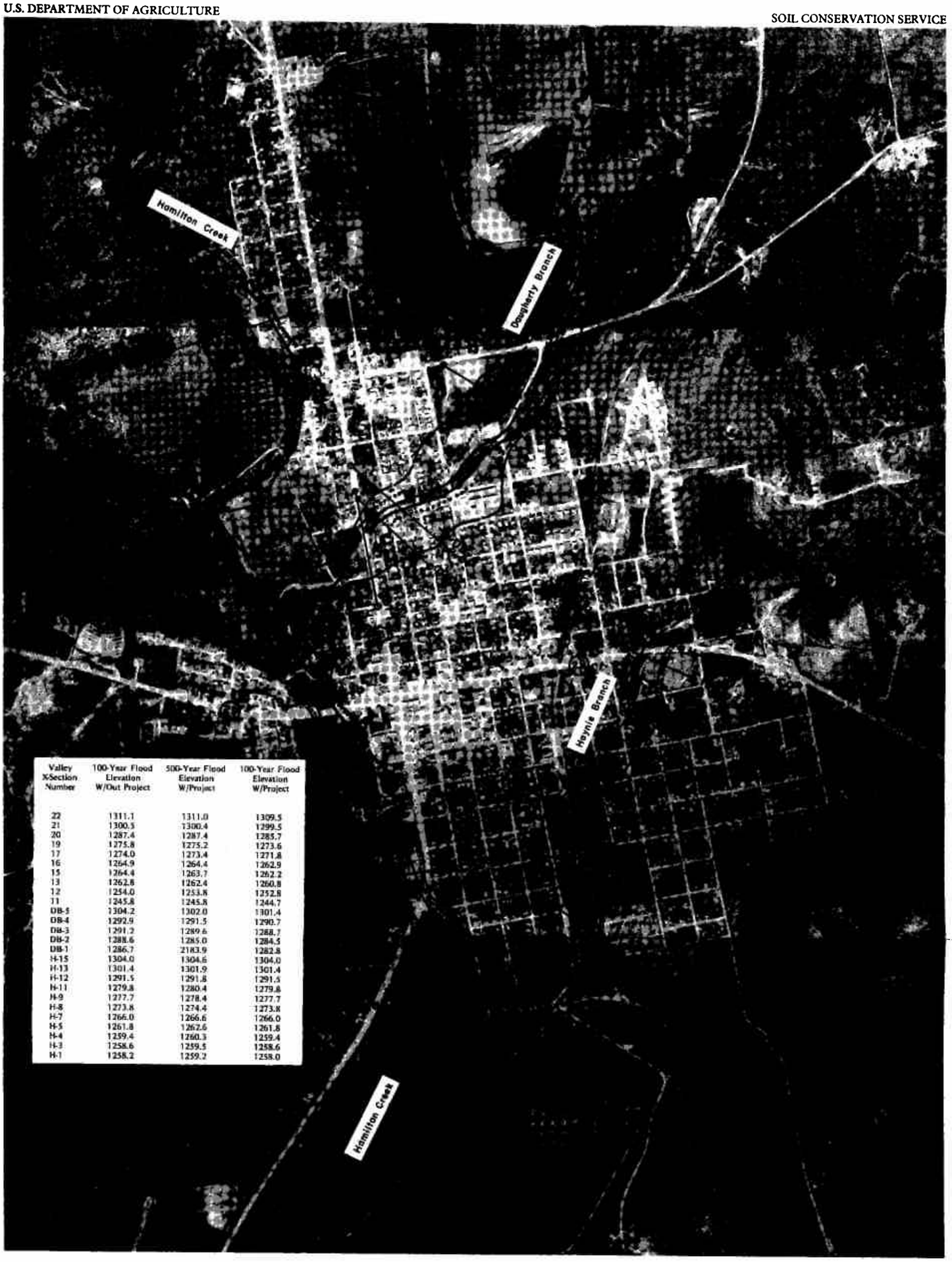
SUMMARY COMPARISON TABLE

Hamilton Creek Watershed, Texas

FACTORS	DESIRED RESULTS	ACTUAL RESULTS			
		Alt. 1 3 FRS, Flood Plain Regulation, and a Public Information Program	Alt. 2 Flood-proofing, Relocation, Changing Land Use	Alt. 3 1 FRS, Flood Plain Regulation, and a Public Information Program	Alt. 4 No Project
Economic, Environmental, and Social					
Total Installation Cost	Minimize	$675,440	$1,210,000	$268,290	0
Local Share Installation Cost	Minimize	$ 83,450	$1,210,000	$ 17,500	0
Annual O&M Cost	Minimize	$ 970	$ 12,100	$ 500	0
Annual Cost	Minimize	$ 47,460	$ 80,000	$ 18,300	0
Average Annual Benefits	Maximize	$ 69,050	$ 70,320	$ 40,610	0
Average Annual Remaining Damages	Minimize	$ 5,220	$ 3,940	$ 13,030	$74,270
Flood Damage Reduction					
Urban Property	Maximize	96%	100%	78%	0
Agricultural Production	Maximize	48%	0	19%	0
Eliminate Threat to Human Lives	Maximize	Yes	Yes	No	No
Loss of Agricultural Land	Minimize	38 Ac.	0	66 Ac.	0
Fishery Resources	Minimize Damage	+38 Ac.	No Effect	+20 Ac.	0
Wildlife Resources	Minimize Damage	-38 Ac.	No Effect	-20 Ac.	0
Endangered or Threatened Flora or Fauna	Minimize Loss	No Impact	No Impact	No Impact	No Impact

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



Valley X-Section Number	100-Year Flood Elevation W/Out Project	500-Year Flood Elevation W/Project	100-Year Flood Elevation W/Project
22	1311.1	1311.0	1309.5
21	1300.5	1300.4	1299.5
20	1287.4	1287.4	1285.7
19	1275.8	1275.2	1273.6
17	1274.0	1273.4	1271.8
16	1264.9	1264.4	1262.9
15	1264.4	1263.7	1262.2
13	1262.8	1262.4	1260.8
12	1254.0	1253.8	1252.8
11	1245.8	1245.8	1244.7
DB-5	1304.2	1302.0	1301.4
DB-4	1292.9	1291.5	1290.7
DB-3	1291.2	1289.6	1288.7
DB-2	1288.6	1285.0	1284.5
DB-1	1286.7	2183.9	1282.8
H-15	1304.0	1304.6	1304.0
H-13	1301.4	1301.9	1301.4
H-12	1291.5	1291.8	1291.5
H-11	1279.8	1280.4	1279.8
H-9	1277.7	1278.4	1277.7
H-8	1273.8	1274.4	1273.8
H-7	1266.0	1266.6	1266.0
H-5	1261.8	1262.6	1261.8
H-4	1259.4	1260.3	1259.4
H-3	1258.6	1259.5	1258.6
H-1	1258.2	1259.2	1258.0

APPENDIX G

URBAN FLOOD PLAIN
CITY OF BURNET
HAMILTON CREEK WATERSHED
BURNET COUNTY, TEXAS

Uncontrolled Mosaic of 1966 Photography

0 660 1320 1980 2640

Approximate Scale - Feet

LEGEND

- 100-Year Frequency Flood Without Project
- 500-Year Frequency Flood With Project
- 100-Year Frequency Flood With Project
- Floodwater Retarding Structure Site
- (1) Site Number
- Valley Cross Section

Data prepared by SCS Watershed Planning Staff.

Material prepared by Field Personnel -- Reproduction only by SCS Cartographic Unit, Fort Worth, Texas.

REVISED JUNE 1977 4-R-35346-1

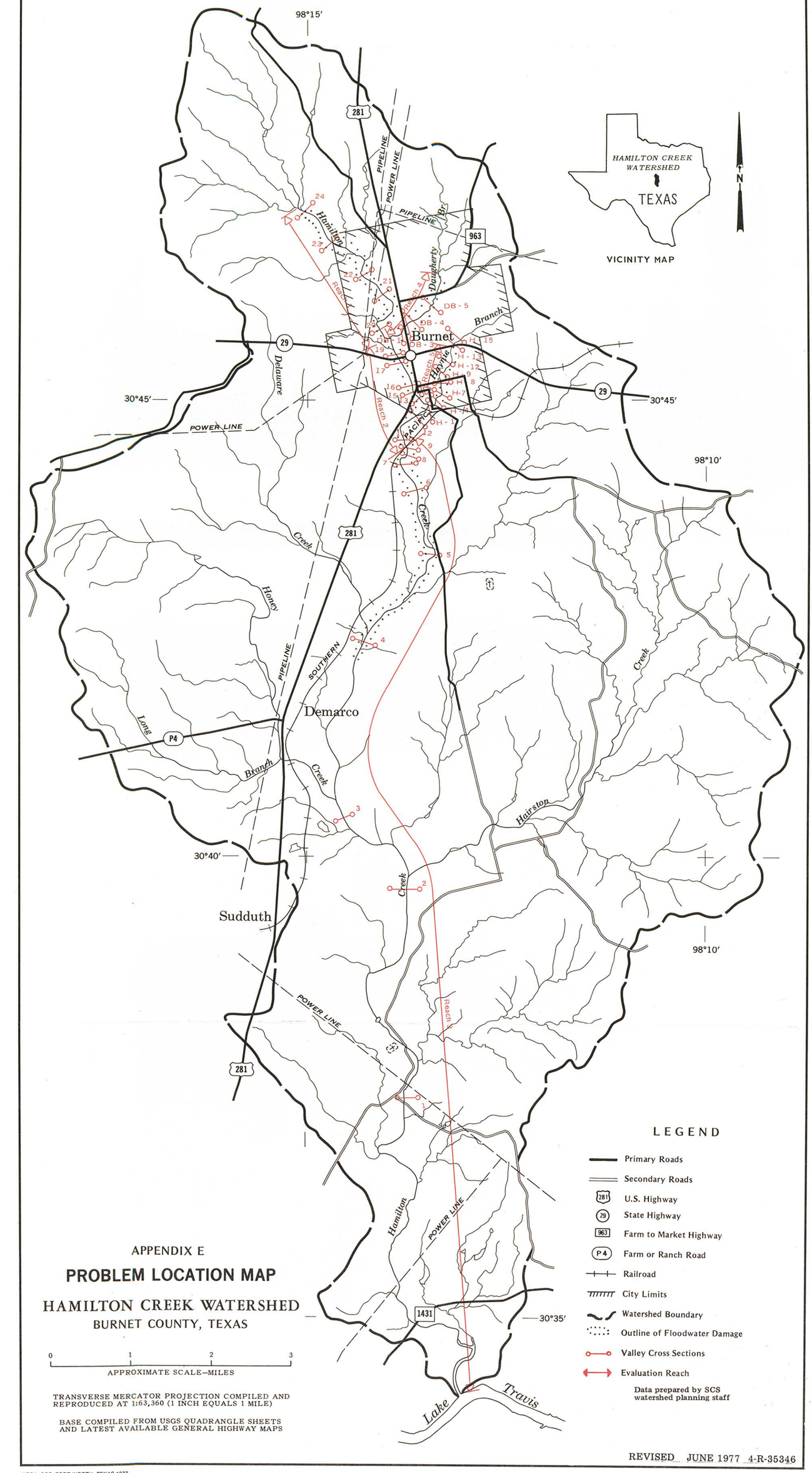
USDA-SCS-FORT WORTH, TEXAS 1977

APPENDIX D

Common	Scientific
Virginia creeper	Parthenocissus quinquefolia
virginia wildrye	Elymus virginicus
western ragweed	Ambrosia psilostachya
western soapberry	Sapindus drummondii
whitebrush	Aloysia lycioides
white crownbeard	Verbesina virginica
wild grape	Vitis sp.
wright threeawn	Aristida wrightii
yucca	Yucca sp.

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, TEMPLE, TEXAS



APPENDIX E

PROBLEM LOCATION MAP

HAMILTON CREEK WATERSHED

BURNET COUNTY, TEXAS

0 1 2 3

APPROXIMATE SCALE—MILES

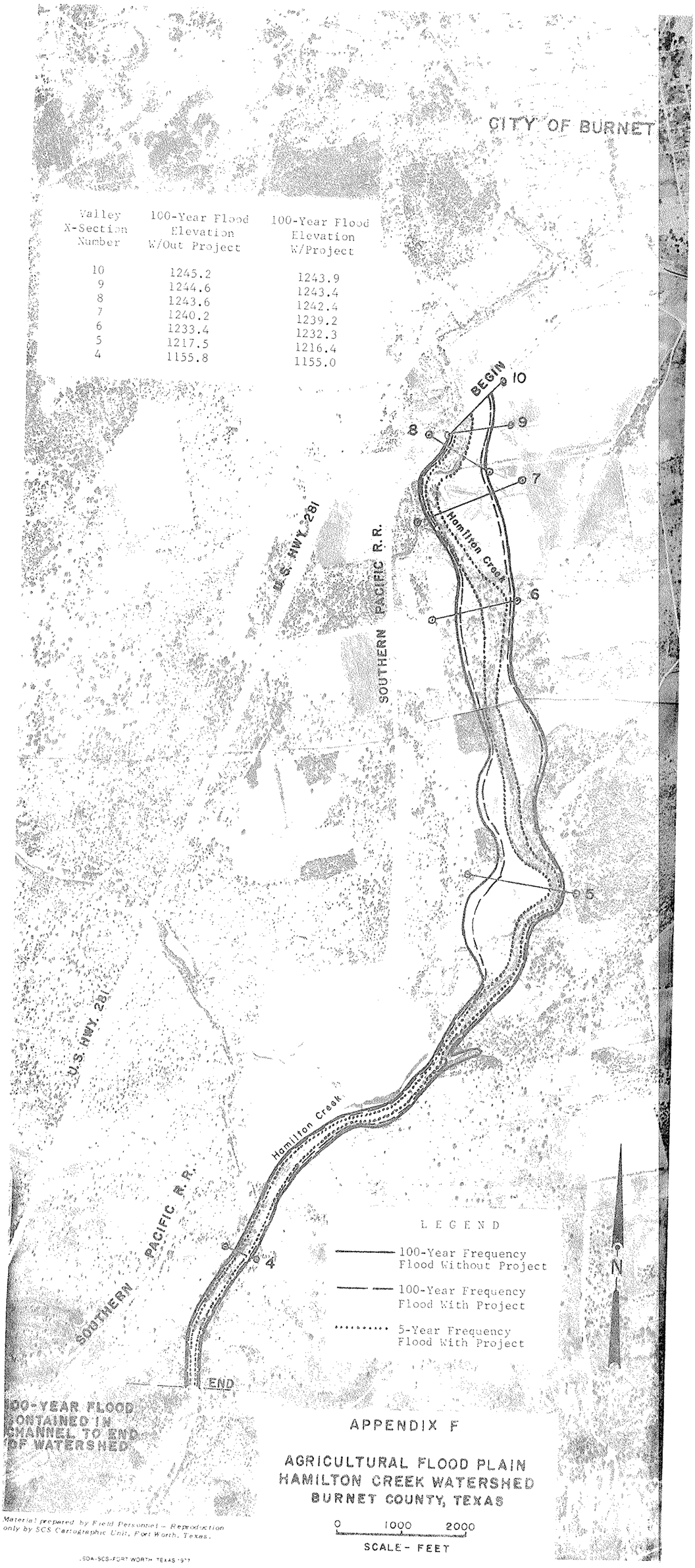
TRANSVERSE MERCATOR PROJECTION COMPILED AND REPRODUCED AT 1:63,360 (1 INCH EQUALS 1 MILE)

BASE COMPILED FROM USGS QUADRANGLE SHEETS AND LATEST AVAILABLE GENERAL HIGHWAY MAPS

REVISED JUNE 1977 4-R-35346

USDA-SCS-FORT WORTH, TEXAS 1977

NOVEMBER 1974 4—R—34476



Valley X-Section Number	100-Year Flood Elevation W/Out Project	100-Year Flood Elevation W/Project
10	1245.2	1243.9
9	1244.6	1243.4
8	1243.6	1242.4
7	1240.2	1239.2
6	1233.4	1232.3
5	1217.5	1216.4
4	1155.8	1155.0

APPENDIX F

AGRICULTURAL FLOOD PLAIN HAMILTON CREEK WATERSHED BURNET COUNTY, TEXAS

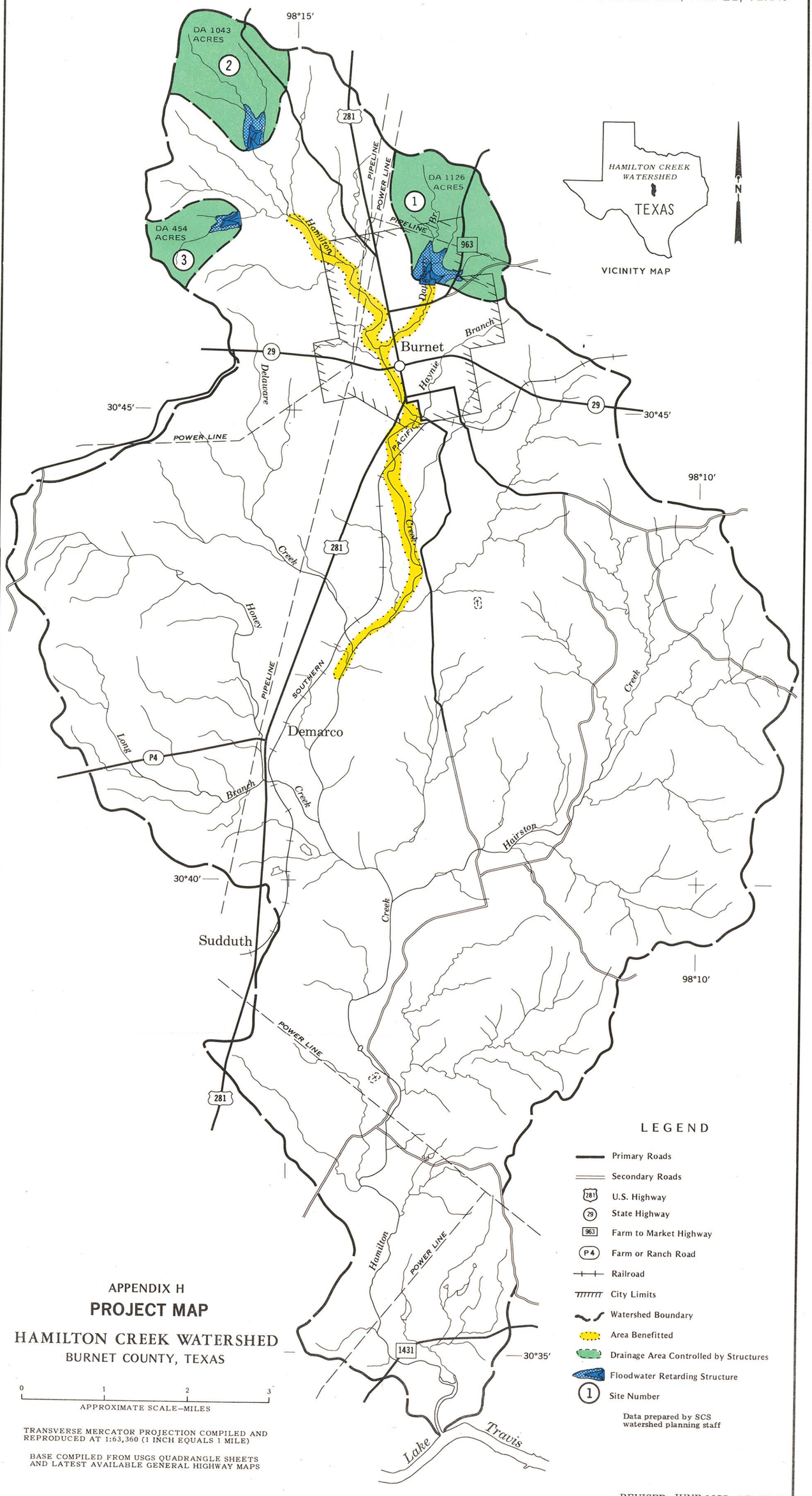
0 1000 2000

SCALE - FEET

USDA-SCS-FORT WORTH, TEXAS-1977

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, TEMPLE, TEXAS



LEGEND

- Primary Roads
- Secondary Roads
- 281 U.S. Highway
- 29 State Highway
- 963 Farm to Market Highway
- P4 Farm or Ranch Road
- Railroad
- City Limits
- Watershed Boundary
- Area Benefitted
- Drainage Area Controlled by Structures
- Floodwater Retarding Structure
- 1 Site Number

Data prepared by SCS watershed planning staff

APPENDIX H

PROJECT MAP

HAMILTON CREEK WATERSHED

BURNET COUNTY, TEXAS

0 1 2 3

APPROXIMATE SCALE—MILES

TRANSVERSE MERCATOR PROJECTION COMPILED AND REPRODUCED AT 1:63,360 (1 INCH EQUALS 1 MILE)

BASE COMPILED FROM USGS QUADRANGLE SHEETS AND LATEST AVAILABLE GENERAL HIGHWAY MAPS

REVISED JUNE 1977 4-R-35345

USDA-SCS-FORT WORTH, TEXAS 1977