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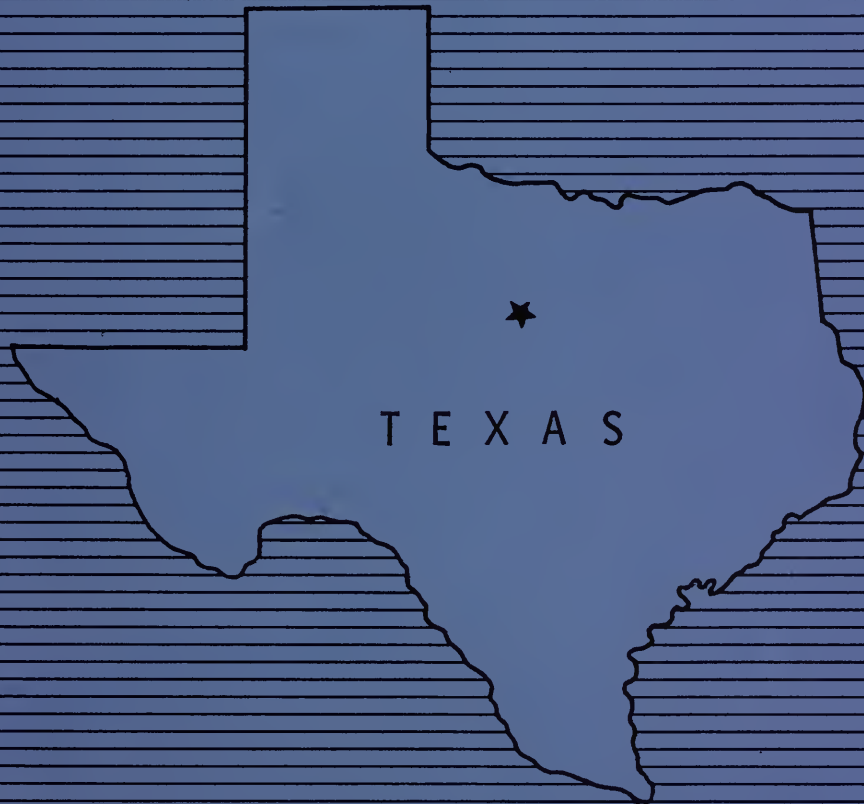
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FINAL
ENVIRONMENTAL IMPACT STATEMENT

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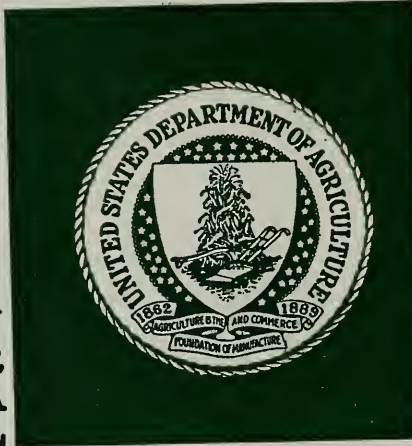
POLLARD CREEK
WATERSHED PROJECT

PALO PINTO COUNTY, TEXAS



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Pollard Creek Watershed
Palo Pinto County, Texas

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FINAL ENVIRONMENTAL IMPACT STATEMENT

CATALOGING - r

Edward E. Thomas, State Conservationist
Soil Conservation Service

Sponsoring Local Organizations:

City of Mineral Wells
First National Bank Bldg., Mineral Wells, Texas 76067

Palo Pinto County Commissioners Court
County Courthouse, Palo Pinto, Texas 76072

Palo Pinto Soil and Water Conservation District
Star Route, Strawn, Texas 76475

July 1975

PREPARED BY

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

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USDA ENVIRONMENTAL IMPACT STATEMENT

Pollard Creek Watershed Project
Palo Pinto County
Texas

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

Summary Sheet

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of Action: A project for watershed protection and flood prevention in Palo Pinto County, Texas to be implemented under authority of the Watershed Protection and Flood Prevention Act (PL 566, 83rd Congress, 68 Stat. 666), as amended. The plan proposes that land treatment measures be accomplished on the 7,260 acres drainage area of Pollard Creek watershed and two single purpose floodwater retarding structures be constructed during a 3-year installation period.
- V. Summary of Environmental Impacts:
 - Action on installing the conservation treatment measures will:
 1. Sustain biological activity of soil used for cropland
 2. Beneficially modify and restore pastureland ecosystem
 3. Restore ecosystem on rangeland
 4. Reduce upland erosion by 20 percent
 5. Reduce peak runoff from watershed by 5 percent
 6. Improve wildlife food conditions
 7. Improve fish habitat in ponds
 - Action on installing the structural measures in addition to the conservation treatment measures will:
 1. Protect 338 acres of flood plain having moderate to severe flood problems by reducing damages as follows:
 - a. Crop and pasture, 66 percent
 - b. Other agricultural, 94 percent
 - c. Road and bridge, 83 percent
 - d. Urban, 99 percent
 - e. Overbank deposition, 50 percent
 - f. Flood plain scour, 71 percent
 - g. Indirect damages, 99 percent
 2. Benefit 25 farms and ranches and 60 residential and business units in the flood plain
 3. Reduce sediment carried into the Brazos River

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4. Reduce volume of sediment deposited in Lake Granbury
5. Create 41 acres of surface water for fish and wildlife habitat
6. Improve quality of fish habitat by reducing sediment content and the polluting debris in the runoff
7. Minimize interruptions in travel and disruptions of business and agricultural activities on flood plain land
8. Reduce threat to lives on urban flood plain
9. Reduce average monetary flood damages from \$68,450 to \$920 annually
10. Reduce flood damages to city park
11. Increase economic activity of the local economy
12. Create about 23 man-years of employment during construction of the structural measures
13. Result in an initial reduction of 3.9 percent in the runoff from the watershed
14. Cause destruction of 41 acres of wildlife habitat
15. Cause replacement of 10 acres of wildlife habitat destroyed during construction with altered habitat
16. Cause slight increase in air and water pollution during construction of the structural measures
17. Cause a net loss of about \$200 annually on agricultural land needed for structural measures

VI. List of Alternatives Considered:

1. Accelerated land treatment only
2. Flood-proofing
3. Land treatment and channel work
4. Foregoing the implementation of the project

VII. Agencies from Which Written Comments were Received:

- U. S. Department of the Army
- U. S. Department of Health, Education, and Welfare
- U. S. Department of the Interior
- U. S. Department of Transportation
- Environmental Protection Agency
- Advisory Council on Historic Preservation
- Division of Planning Coordination (State agency designated by Governor and State Clearinghouse)
- North Central Texas Council of Governments (Regional clearinghouse)

VIII. Draft Statement transmitted to CEQ on March 24, 1975.

USDA SOIL CONSERVATION SERVICE

FINAL ENVIRONMENTAL IMPACT STATEMENT

for

Pollard Creek Watershed
Palo Pinto County, Texas

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

City of Mineral Wells
Palo Pinto County Commissioners Court
Palo Pinto Soil and Water Conservation District

PROJECT OBJECTIVES AND PURPOSES

The conservation land treatment measures and structural measures selected for inclusion in this plan are those which will meet the goals of the sponsors, the public, and the Soil Conservation Service in achieving:

1. Quality in the natural resource base for sustained use.
2. Quality in the environment to provide attractive, convenient, and satisfying places to live, work, and play.
3. Quality in family standards of living based on community improvement, economic opportunity, wholesome leisure, and cultural and educational opportunities.

Watershed Protection (Land Treatment Measures)

The goals are to accelerate the establishment of conservation land treatment measures to increase the total applied on the land to 80 percent and achieve adequate treatment (complete installation of all needed conservation measures) on 70 percent of the land during a 3-year installation period. These measures are needed on poorly

Pollard Creek Watershed, Texas

vegetated and eroding lands to prevent further degradation of the natural resource base.

The permissible soil loss rates for cropland and pastureland soils range from 2 to 5 tons per acre per year. These rates are correlated to soil depth and other physical and chemical characteristics of the soils. The land treatment measures planned for cropland will be of a type and applied at an intensity that will keep soil losses within this range. The expected conversion of about one-half of the present acreage of cropland will remove much of the more erodible land from cultivation. Most of this land will go to improved pastures. This type of cover will improve the already modified ecosystem caused by man's demands on the land. Approximately 150 acres of rangeland are also expected to be converted to improved pastureland since the present cover of low producing grasses, brush, and trees cannot meet the demands for producing adequate forage for domestic livestock which are being placed upon it.

The management goals established during planning for treatment of the rangeland are aimed toward improving the quantity of the plant cover for soil erosion control and the quality of this cover to better balance the harmony of the needs of man, wildlife, and domestic farm animals. The grazing pressure exerted on the rangeland has tended to reduce the matted effect of vegetative cover on the surface of the soil. The permissible soil loss rates for the rangeland soils range from 1 to 3 tons per acre per year. The existing vegetative cover is adequate to protect the soil from erosion in all areas except on some of the clayey footslopes and sandstone hillsides. Erosion on approximately 100 acres of these sites exceeds the allowable rates.

Absentee ownership of land is expected to increase from the present number of four absentee owners and 1,121 acres of land. The complexity of economic conditions, adjacent community development, esthetic appeal resulting from developments within the watershed, and other undetermined factors will affect the trend of ownership. It will be a goal to contact and work with these owners to develop sound land use and conservation treatment on their properties.

The Soil Conservation Service will encourage the Palo Pinto Soil and Water Conservation District to take positive educational and advisory actions with the municipality of Mineral Wells in safeguarding the quality of the Pollard Creek watershed. This will include the vegetating of any critical sediment producing areas as a result of urban development. Installation of mechanical practices will be encouraged where vegetation will not suffice. The Soil Conservation Service will also make available needed soils interpretative data pertinent to road construction, building sites, and the installation of septic tanks and other sanitary facilities to assist in reducing or preventing the degradation of downstream water quality and sedimentation of stream channels and water impounded in the sediment pools of the floodwater retarding structures.

Pollard Creek Watershed, Texas

Flood Prevention

The flood prevention goals are:

1. Prevent flooding of the 50 residential units and 10 businesses located on the 157 acres of Pollard Creek flood plain within the urban and built-up area of Mineral Wells.
2. Reduce floodwater, sediment, and erosion damage on the 181 acres of agricultural flood plain along Pollard Creek, between the developed area of Mineral Wells and the Brazos River, which are subject to moderate to severe damage.
3. Identify other flood prone areas, not now developed, so that hazards can be prevented through flood plain regulations where state law permits or through public information programs where state law does not permit.

Fish and Wildlife

The goals to be achieved in preserving, improving, and developing fish and wildlife habitat are as follows:

1. The improvement of fish habitat in the existing ponds and the lower reach of Pollard Creek and the Brazos River by applying land treatment measures in the watershed which will effectively control erosion and reduce the sediment load in runoff water.
2. The addition of approximately 41 acres of good fish habitat in the sediment pools of the two floodwater retarding structures.
3. The improvement of wildlife forage conditions in the watershed by properly grazing the native plant communities with domestic livestock. This will permit some of the more palatable legumes and forbs, which are important deer food plants, to reproduce and increase.
4. The retention of optimum cover conditions for most species of wildlife by selectively applying brush management in a strip or block pattern while removing some of the brush for increased production of food plants such as legumes, forbs, and grasses.

PLANNED PROJECT

The project is an integrated one for environmental protection which includes soil, water, and related resource conservation measures, both vegetative and structural, needed to control erosion, maintain or improve soil fertility, reduce flooding, and stimulate the economy.

Pollard Creek Watershed, Texas

The watershed project is to be carried out by the sponsoring local organizations with assistance from the Soil Conservation Service, USDA, under the authority of Public Law 566, 83rd Congress, 68 Stat. 666, as amended, for the purposes of watershed protection and flood prevention. The project, located in Palo Pinto County, Texas, proposes that 2 flood-water retarding structures be installed to reduce flood damages now occurring to 362 acres of agricultural flood plain land and 157 acres of urban and built-up flood plain in Mineral Wells and that land users be encouraged to complete the establishment and to maintain needed land treatment measures on 20 acres of cropland, 600 acres of pastureland, and 2,000 acres of rangeland at an accelerated rate during a 3-year installation period, in addition to maintaining those measures already applied.

Land Treatment Measures

Planned land treatment measures (conservation practices) will be applied on private lands in the watershed by land users on a voluntary basis. These measures are based upon a resource conservation plan developed by the land user in cooperation with the Palo Pinto Soil and Water Conservation District. The Soil Conservation Service will provide technical assistance to the land user in the planning and application of all soil, plant, and water conservation measures. This assistance is based upon a working agreement contained in a Memorandum of Understanding between the Soil Conservation Service and the Palo Pinto Soil and Water Conservation District.^{1/}

Land treatment measures are to be applied at an accelerated rate over a 3-year installation period. Complete treatment is to be applied on 20 acres of cropland, 600 acres of pastureland, and 2,000 acres of rangeland in addition to maintaining the treatment measures already established on other lands. This rate of application will increase the amount of land adequately treated in the watershed to 70 percent.

The land treatment measures to be installed include conservation cropping systems on the cropland; pasture planting, pasture management, and brush management on pastureland; range seeding, proper grazing use, ponds, and brush management on rangeland; and wildlife upland habitat management and fishpond management for fish and wildlife habitat improvement. These measures are defined in the Soil Conservation Service National Handbook of Conservation Practices.^{2/}

^{1/} Memorandum of Understanding Between United States Department of Agriculture and Palo Pinto Soil and Water Conservation District, September 1962 (Rev.); Supplemental Memorandum of Understanding Between U. S. Department of Agriculture, Soil Conservation Service and Palo Pinto Soil and Water Conservation District, July 1967.

^{2/} U. S. Department of Agriculture, Soil Conservation Service, National Handbook of Conservation Practices, July 1971.

Pollard Creek Watershed, Texas

Conservation cropping systems are to be applied to the cropland which is expected to remain in this use in the future. These systems consist of crop rotations of small grain with and without legumes, grain sorghums, and forage sorghums.

Conservation treatment measures are to be applied to 600 acres of pastureland to maintain a year-round cover of forage plants for protection against erosion and to maintain the soil resource while providing the volume of forage desired by the land user. Pasture planting is to be applied to former cropland and areas of overused rangeland to restore cover and forage producing plants. The plants most commonly chosen by the land-users for seeding or reseeding of pasturelands are coastal bermudagrass, lovegrass and kleingrass. Other pasture management practices include fertilization, the grazing of plants at periods of time and at intensities which are compatible with the physiological needs, and the control of undesirable plants which interfere with the intensive grazing use of these lands through their competition for moisture and space.

Rangeland which does not have the desired quantity or quality of native plants will receive range seeding in addition to other conservation treatment measures. Range seeding is to be applied on about 960 acres of rangeland which cannot be improved within a reasonable period of time by grazing management practices due to the absence of a satisfactory seed source. Reseeding is to be accomplished with seeding mixtures of plants compatible with the native plant community on adjacent areas. Proper grazing use, deferred grazing, and planned grazing systems involve the grazing of forage plants at periods of time and at intensities which are compatible with the physiological needs of the plant. Application of these practices assures the continued growth and survival of desired plant species. Rangeland which has satisfactory composition of native plants for forage production will be managed to maintain or improve the existing range condition.

Brush management is to be applied on about 1,630 acres of rangeland for the selective control of undesirable woody species in order to reduce competition and allow the reestablishment of desired native vegetation. Mechanical methods of control such as tree dozing or root plowing will be used to achieve the desired selectivity. Patterns of application which will enhance wildlife habitat and preserve esthetic values will be encouraged. The recommended method of implementing brush management in areas having populations of wildlife is to retain units and patterns of brush of good habitat value in favorable locations for use as browse and cover. Post oak, blackjack oak, cedar elm, and pecan compose about 10 percent of the present composition on the bottomland. These species will be retained. Brush management on the upland will leave about 20 percent of the woody species for wildlife cover.

Pollard Creek Watershed, Texas

Conservation land treatment measures which will have a direct effect on fish and wildlife include fishpond management and wildlife upland habitat management. The ponds in the watershed will be managed by controlling aquatic plants, fertilizing pond waters to increase planktonic and zootic growth for more fish food, controlling overpopulations of sunfish and other undesirable species, and by the use of other pond management techniques to increase fish production for the landowners and others who may fish in the ponds.

The application of wildlife upland habitat management on about 2,000 acres of agricultural land will enhance the value of plant communities on rangeland for habitat for certain species of wildlife, principally game birds and mammals. Domestic livestock grazing will be limited to such a degree as to permit the more palatable grasses, legumes, woody plants, and other plants eaten by livestock, deer, and other wildlife species to increase in abundance. In areas where woody plants produce such thick canopy as to shade out the herbaceous ground cover, brush clearing will be applied in strip or block pattern to produce alternating strips or blocks of brush and open areas. This technique will increase the food supply for wildlife species such as white-tailed deer, rabbits, quail, dove, etc., yet retain the necessary cover types needed by these species. This will also increase the "edge effect" as described by Aldo Leopold^{3/} as being essential in the habitat of many wildlife species.

Nonstructural Measures

The City of Mineral Wells, on December 17, 1974, enacted a zoning ordinance that complies fully with the provisions of Section 1910.3 of Public Law 92-234. The ordinance regulates urban expansion below the 100-year, with-project floodwater elevation along Pollard Creek within the corporate limits of the city.

No sponsoring local organization has authority under state law to enact zoning ordinances or flood plain regulations outside the corporate limits of Mineral Wells. The City of Mineral Wells and the Palo Pinto County Commissioners Court will, therefore, jointly develop and initiate a public information program to publicize, at least annually, the areas outside the corporate limits of Mineral Wells still subject to flooding from a 100-year event.

Structural Measures

A system of two floodwater retarding structures is planned for construction during the 3-year installation period. Runoff from 58 percent of the watershed will be retarded by the structures. The location of the floodwater retarding structures is shown on the project map (Appendix E).

^{3/} Leopold, Aldo, Game Management, Charles Schribner's Sons, N.Y., N.Y. 1933.

Pollard Creek Watershed, Texas

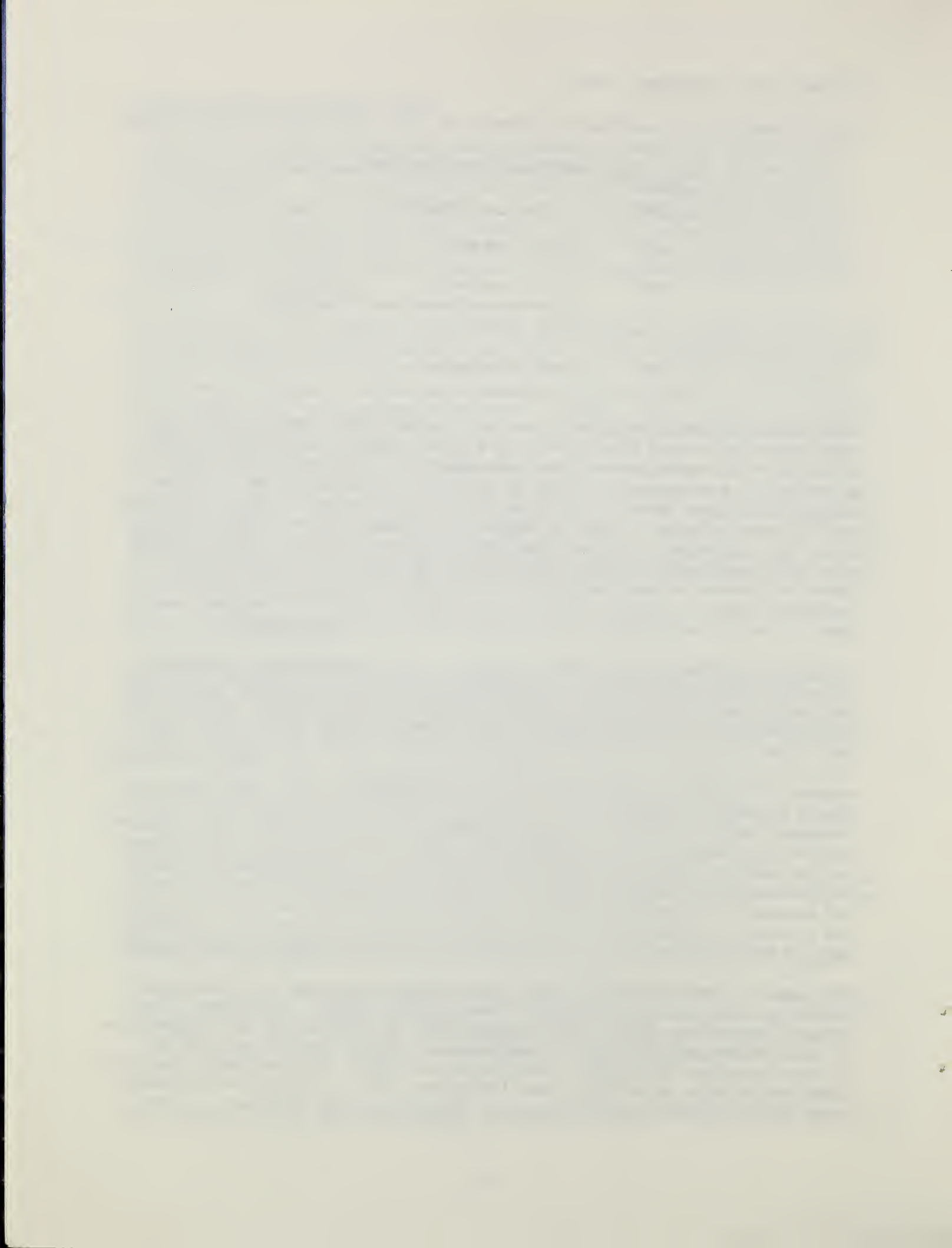
The following is the estimated schedule for the 3-year installation period:

Installation Schedule	
Fiscal Year	Measure
1st	Land Treatment
2nd	Land Treatment Floodwater Retarding Structures Nos. 1 and 2
3rd	Land Treatment

The floodwater retarding structures are planned with capacity for sediment accumulation and floodwater. The total capacity allocated for the anticipated 100-year accumulation of sediment is 245 acre-feet, with 173 acre-feet in structure No. 1 and 72 acre-feet in structure No. 2. The principal spillway crest of both structures will be set at the capacity of the 100-year sediment volume predicted to be deposited as submerged sediment. The principal spillways for both structures will be the drop inlet type with cantilever outlets. The inlets of both structures 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 in the two floodwater retarding structures is 1,998 acre-feet, provided for in the space between the sediment pools and the emergency spillway crests. The emergency spillway for structure No. 1 will be a concrete chute over the dam, and it will have less than a 2 percent chance of use at the end of 100 years after construction. The emergency spillway of structure No. 2 will be a vegetated channel excavated in earth around the end of the embankment, and it will have less than a 1 percent chance of use. The embankments of both structures will be compacted earthen fills. The embankments of both structures, the emergency spillway at structure No. 2, disturbed areas, and odd areas on or adjacent to the works of improvement will be vegetated to control erosion, provide wildlife food and cover, minimize habitat loss resulting from construction, and enhance the remaining habitat. Plant species will be selected, sited, and planted in accordance with SCS Technical Specifications for Establishment of Wildlife Habitat on or Adjacent to Watershed Works of Improvement.

The type of vegetation to be used will include annual and perennial vegetation of native and introduced grasses, forbs, shrubs, and trees. Sod forming vegetation such as bermudagrass will be used as the base vegetation on embankments and spillways. Bunchgrasses, forbs, and shrubs such as bluestem species, kleingrass, maximilian sunflower, bushsunflower, dewberry, bush honeysuckle, buttonbush, and indigobush will be planted on disturbed areas and odd areas and overseeded or planted at some locations. Woody



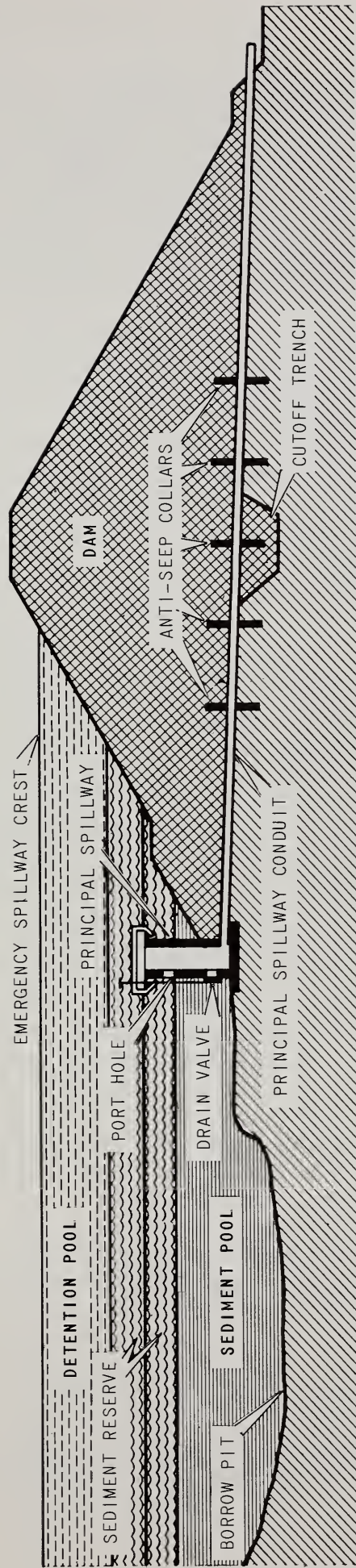


Figure 1

SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

Pollard Creek Watershed, Texas

species such as crabapple, autumnolive, russianolive, mulberry, walnut, oaks, and pecan will also be planted in odd areas within the rights-of-way. These plantings will be sited and planned in detail during the final design stage in consideration of specific site conditions. The selection of exact species to be used will be from the adapted species of seed and plant stock available at the time of construction. Fences will be constructed around the embankment and emergency spillway of each structure to protect the vegetation from damage by grazing.

The foundations contain 10 to 12 feet of yielding clayey alluvium over nonyielding, moderately soft shale bedrock. Preliminary site investigations indicate that all needed fill material for the embankment for structure No. 1 should be obtainable from the sediment pool area and from the embankment of old Lake Pinto. Investigations indicate that embankment materials for structure No. 2 should be obtainable from the emergency spillway and sediment pool areas. These materials consist mainly of silty clay (CL), clayey sand (SC), and some clayey gravel (GC) in the lower horizons. Some scattered sandstone cobbles and boulders derived from the sandstone capped abutments occur in the alluvium near the base of the slopes.

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 excessive 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 Regulation 1, Rule 101.25 of the Texas Air Control Board and other applicable laws, ordinances, and regulations pertaining to burning. 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, or controlled burning, as applicable. Necessary sanitary facilities, including garbage disposal facilities, will be located to prohibit such facilities being injuriously adjacent to wells or springs in conformance with 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 operations.

Pollard Creek Watershed, Texas

Efforts will be made to avoid creating conditions which will increase populations of vectors that affect public health. 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 structure.

The environment will continue to be protected from erosion and water pollution following completion of construction. Project sponsors will operate and maintain the structural measures in accordance with a specific operation and maintenance agreement. The agreement will set forth the inspections to be made and the maintenance to be performed to prevent soil erosion and water pollution.

The sediment pools of both floodwater retarding structures are expected to hold water. The pools and surrounding areas have a good potential for incidental recreational use. The problems, expenses, and liability associated with the landowners' opening their property to public use limit the acceptance of this activity. The City of Mineral Wells is currently involved in other recreational developments and the additional cost of land rights acquisition for this purpose by the sponsoring organizations exceeds their financial ability. For these reasons, the sponsors do not plan to assure public access to either of the structures; therefore, public recreation use will be prohibited at both sites. If, at some future time, public access is provided at either 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.

All applicable state water laws will be complied with in the design and construction of the structural measures, as well as those pertaining to the storage, maintenance of quality, and use of water.

Land Use Changes

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 approximately 2,000 feet of county road and a portion of a powerline and a telephone line affected by structure No. 2.

The City of Mineral Wells 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 structural measures. If relocations or displacements

Pollard Creek Watershed, Texas

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.

Installation of the structural measures will require 185 acres of land. This area on which the dams will be constructed and on which sediment and floodwater will be impounded consists of 175 acres of pastureland and rangeland and 10 acres (3.0 miles) of intermittent stream channels under present land use conditions. Construction of the dams and emergency spillways will require 10 acres of land, which includes 9 acres of pastureland and rangeland and 1 acre (0.3 mile) of intermittent stream channel. The sediment pools, which will initially impound water, will inundate 41 acres of land, which includes 38 acres of pastureland and rangeland and 3 acres (0.9 miles) of intermittent stream channels. The retarding pools will temporarily inundate 134 acres of land, which includes 128 acres of pastureland and rangeland and 6 acres (1.8 miles) of intermittent stream channels.

During construction operations, the areas needed for construction of the dams and emergency spillways and the borrow areas will be cleared of all existing vegetation. In addition, all large woody vegetation within the reservoir areas below the elevation of the lowest ungated outlet will be cleared, except any large trees in the upper fringes of the sediment pools that will not interfere with the operation of the structures will be retained. It is estimated that 14 acres of large woody vegetation will be cleared. The dams, emergency spillways, and all areas disturbed during construction, except water impoundment areas, will be vegetated with adaptable multiuse plants for erosion control, wildlife use, and grazing of livestock.

Operation and Maintenance

Land treatment measures will be maintained by the land users on whose land the measures are installed under agreements with the Palo Pinto Soil and Water Conservation District. The district will encourage landowners to maintain the land treatment measures.

The City of Mineral Wells will be responsible for coordinating the operation and maintenance of the floodwater retarding structures. Financial responsibility will be shared by the city and Palo Pinto County. Funds for this purpose will come from the general funds of the county and the city. These general funds are supported by existing taxes and are adequate and available for this purpose. The estimated average annual cost of operation and maintenance is \$420, based on current prices.

Immediately following completion of the structures by the contractor, the sponsors will be responsible for and 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

Pollard Creek Watershed, Texas

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.

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 Mineral Wells 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 operations 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 tabulations:

Pollard Creek Watershed, Texas

Installation Cost Item	Estimated Cost (Dollars) 1/		
	PL-566	Other	
	Funds	Funds	
	Non-Federal Land	Non-Federal Land	
	SCS ^{2/}	SCS ^{2/}	Total
<u>Land Treatment 3/</u>			
Installation		41,600	41,600
Technical Assistance	6,500	2,100	8,600
Subtotal	6,500	43,700	50,200
<u>Structural Measures</u>			
Construction	471,800	-	471,800
Engineering Services	25,470	-	25,470
Project Administration	71,630	1,000	72,630
Land Rights (Including water rights)		102,280	102,280
Subtotal	568,900	103,280	672,180
TOTAL PROJECT	575,400	146,980	722,380

1/ Price Base: 1974

2/ Federal agency responsible for assisting in installation of works of improvement.

3/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.

The ratio of the average annual benefits to the average annual cost is given in Appendix A.

The estimated average annual cost of operation and maintenance of the two floodwater retarding structures is \$420.

Pollard Creek Watershed, Texas

ENVIRONMENTAL SETTING^{1/}

Physical Resources

Pollard Creek Watershed comprises an area of 7,260 acres, or 11.34 square miles, in northeastern Palo Pinto County, Texas. It lies about 40 miles west of the large metropolitan area of Fort Worth. The western portion of the city of Mineral Wells, population 18,411,^{2/} lies within the watershed.

Approximately 2,150 acres of urban and built-up areas of the city of Mineral Wells and adjoining suburbs lie within the central portion of the watershed. Much of the remainder of the watershed is densely populated with residents who live on small acreages and work in Mineral Wells.

The watershed is in the Texas-Gulf Water Resource Region.^{3/} Pollard Creek is a tributary of the Brazos River. It flows into the Brazos River 45 river miles downstream from the Possum Kingdom Reservoir and about 65 river miles upstream from Lake Granbury.

The climate is subhumid and warm. The average annual rainfall is about 28 inches. Rainfall is fairly well distributed through the year; however, the months of April and May normally receive the greatest amounts. The average temperatures for January and July are 46° and 84° Fahrenheit, respectively.^{4/}

Flooding occurs on 519 acres of flood plain land on Pollard Creek. About 50 residences and 10 businesses are located on 157 acres of urban land lying within the flood plain. Associated facilities such as utilities, roads, two city parks, and a city sewage treatment plant are also located within this area. Most of the remaining 362 acres of flood plain land is used for agricultural production.

^{1/} 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.

^{2/} U. S. Department of Commerce, Bureau of the Census, 1970 Census of Population, January 1974.

^{3/} U. S. Department of Agriculture, Soil Conservation Service, Atlas of River Basins of the United States, Washington, D. C., June 1971.

^{4/} 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., 1970.

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The watershed lies in a region of bench-like (cuesta) topography. This topography consists of a succession of gently northwestwardly sloping plains terminated by steep southeastward facing scarps. The lower portion of the watershed is dominated by a prominent scarp which extends across the watershed and through Mineral Wells in a northeast to southwest direction. A unique scenic area of steep-walled valleys, nearly level flood plain, and prominent outlying mesa-like remnants of the scarp is formed by Pollard Creek and its tributaries, which lie within deep valleys incised into the scarp. A gently rolling plain occurs in the upper portion of the watershed above the scarp. The northwestern edge of this plain is bordered by the next successive scarp, which also forms the watershed divide. Elevations above mean sea level range from 1,140 feet in the headwaters to about 800 feet near the Brazos River.

The watershed is underlain by sedimentary rocks of the Mineral Wells Formation of Pennsylvanian age.^{5/} These rocks consist mainly of thick beds of soft shale of 100 feet or more thickness interbedded with thin beds of hard sandstone and limestone of 25 feet or less thickness. Quaternary age sandy terrace deposits occur in the lower portion of the watershed and sandy clay alluvium occurs in narrow bands along streams of the watershed.

The watershed lies within the North Central Prairies Land Resource Area of Texas.^{6/} The soils of this area were formed over sandstone and shale of Pennsylvanian age. The upland soils are composed of deep soils of the Truce, Thurber, and Leeray series, moderately deep soils of the Bonti and Vashti series, and shallow soils of the Owens series. The major bottomland soils are the Bunyan and Frio series.

The Bonti and Truce soils are the dominant soils in the uplands. These soils have fine sandy loam topsoils over clay subsoils. They occur on gentle to steep slopes, with the Bonti series occurring on the sandstone bedrock and the Truce series occurring on the shale bedrock. Clay and clay loam textured soils of the Thurber and Leeray series occur on smaller areas of the uplands. These soils occur on gentle to moderate sloping areas over shale bedrock. The Bonti and Truce soils are used mainly for rangeland and pastureland. The Thurber soils are now used mainly for pastureland, but many areas were once cultivated. Most of the present cultivated land is on the Leeray soils.

^{5/} Bureau of Economic Geology, The University of Texas at Austin, Geologic Atlas of Texas, Abilene Sheet, Austin, Texas, June 1970.

^{6/} Texas Agricultural Experiment Station, Texas A&M University, in cooperation with U. S. Department of Agriculture, Soil Conservation Service, General Soil Map of Texas, College Station, Texas, 1973.

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Moderately deep sandy soils of the Vashti series occur on sandstone bedrock on gentle to moderate slopes. These soils are found on high ridge tops over small areas and are used mainly as rangeland.

Shallow clay soils of the Owens series occur on the steep hillsides and lower slopes of the southeastward-facing, shaly scarps in the watershed. These soils are used mainly for rangeland and are easily eroded when overgrazed.

The bottomland soils consist mainly of the Bunyan series, with small areas of the Frio series. The Bunyan soils occupy the flood plain areas along and adjacent to stream channels. These soils have light colored, fine sandy loam surface layers over sandy loam, sandy clay loam, and clay loam lower layers. The Frio soils have silty clay loam surfaces and occupy smaller areas of the flood plain favoring clayey deposition. The flood plain soils are used for pastureland, rangeland, parks, and urban development.

The present land use in the watershed is as follows:

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland	90	1
Pastureland	1,260	17
Rangeland	3,600	50
Miscellaneous ^{1/}	2,310	32
Total	7,260	100

^{1/} Urban areas, roads, farmsteads, etc.

Proven mineral resources in the watershed are limited to deposits of clay shales, mineralized ground water, and limited quantities of sand and gravel. There is no production of clay or sand within the watershed; however, clay is mined outside the watershed in eastern Mineral Wells for the production of brick. Some mining of gravel in the northeastern part of the watershed has been reported. The production of mineralized ground water containing high amounts of sodium sulphate and other salts^{7/} was important in the development of a thriving health resort complex in Mineral Wells during the early 1900's. Heavy usage of the ground water for its therapeutic properties during this period resulted in many wells going dry and others suffering drastic reduction in yields. Bottled mineral water and packaged mineral crystals are still sold in limited quantities.

^{7/} Turner, Samuel F., Mineral-Water Supply of the Mineral Wells Area, Texas, U. S. Department of the Interior, Geological Survey, Circular 6, Washington, D. C., 1934.

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Natural gas liquids, natural gas, and petroleum are produced nearby, and oil shales have been reported at Mineral Wells. The Thurber coalbed outcrops along Rock Creek about 4 miles east of Mineral Wells. The coal seam is 18 to 24 inches thick at this point and has been mined locally. The coalbed is projected at depths of 400 feet or more below the surface at the sites of proposed floodwater retarding structures.^{8/}

Streamflow in Pollard Creek is intermittent under natural conditions. This flow condition is altered by the sewage effluent that is released into the lower 2 miles of stream from the Mineral Wells sewage treatment plant. Most of the stream channels can be classified as natural except for about a 1/2-mile segment which has been altered in the old lake bed of former Lake Pinto and another 1/2-mile segment which has been straightened downstream from the city park in Mineral Wells.

The overall quality of runoff from the watershed is unknown. The estimated average sediment concentration in runoff from the watershed is 2,000 milligrams per liter. The quality of runoff from the agricultural land is believed to be of higher quality than that from the urban and suburban areas. A new sewage treatment plant was installed by Mineral Wells to treat sewage to meet state water quality standards. An average annual volume of 3,800 acre-feet of effluent is being released into Pollard Creek. This volume greatly exceeds the annual runoff from the watershed, which is estimated to average 1,600 acre-feet.

The old refuse disposal area of Mineral Wells is located on the flood plain downstream from the sewage treatment plant. This area contributes polluting debris to floodwaters which overflow the banks of the stream. Erosion on the agricultural land and urban and suburban areas contributes an average concentration of about 2,300 milligrams per liter of sediment in the annual runoff from the watershed.

Present and Projected Population

The population of Mineral Wells is assumed to remain static to 1980, due to the closure of Fort Wolters. After 1980, based on OBERS data for water resource subarea^{9/} and BEA economic area,^{10/} the population is expected to increase by 10 percent each decade to the year 2000 and by 15 percent each decade to the year 2020. This would result in an estimated population of about 30,000 in the year 2020.

^{8/} Information provided as input by United States Department of the Interior, Bureau of Mines.

^{9/} 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.

^{10/} U. S. Water Resources Council, OBERS Projections; Regional Economic Activity in the U. S., Volume 2, BEA Economic Areas, Washington, D. C., 1972.

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Economic Resources

The economy generated within the watershed is based primarily on the activity associated with Mineral Wells. Mineral Wells became famous for the discovery of mineral water on the present townsite in 1880. The reputation of this mineral water and the packaged mineral crystals spread throughout both this country and abroad. Thousands of people came to Mineral Wells for health reasons. A resort city developed quickly and was incorporated in 1882. In the early 1900's, many hotels and rooming houses sprang up to take care of the 15,000 guests visiting Mineral Wells annually.

Mineral Wells has emerged as an industrial city, having recently established its 37th manufacturing concern. The industries employ 1,500 people in manufacturing and 4,000 people in non-manufacturing.

Mineral Wells today has manufacturing, tourist and resort business, and ranching and agriculture to promote a balanced economy.

The city of Mineral Wells, with a population in 1970 of 18,411, is the main marketing center for watershed residents. The city offers good schools, hospital facilities, churches, services, and supplies. About 25 miles of paved roads and 40 miles of all-weather roads link the watershed with other population and marketing centers in all directions.

Nearly all the agricultural land is owner-operated. There are about 43 farms and ranches, averaging about 240 acres, either wholly or partially within the watershed. Sizes of individual operating units range from but a few acres to nearly 3,000 acres. About 30 of these are family-type units employing less than 1-1/2 man-years of outside labor. About 15 are small, low income producing units whose operators work off the farm in order to maintain an acceptable standard of living. This varies from full-time employment to a day or so a week or seasonal employment such as custom harvesting of crops or feeding of livestock.

Agricultural land values range from \$300 to \$700 per acre, depending upon soil capability and location. Urban land values range from a few thousand dollars for a city lot to many thousands of dollars for commercial property.

Over two-thirds of the agricultural income of the watershed is derived from livestock and its associated products and the balance from crops. Principal crops grown and average yields per acre are: Oats, 40 bushels and 2 animal unit months of grazing; and forage sorghums, 4 tons of hay.

The Work Force Estimates for Nonmetropolitan Counties in Texas for April 1973,^{11/} the latest statistics which are available, shows a labor force

^{11/} Texas Employment Commission, Work Force Estimates for Nonmetropolitan Counties in Texas for April 1973, Austin, Texas, July 1973.

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of 8,970, or 31 percent, from a total population of 28,962 for Palo Pinto County, within which the watershed is located. Approximately 3.1 percent (280 workers) are unemployed. This is below the state and national rates of unemployment. Approximately 8 percent (685 workers) are employed in the agricultural sector.

Plant and Animal Resources

The watershed occurs in the North Central Prairies vegetational region. According to Dr. Frank Gould,^{12/} the native vegetative understory of this area is predominantly tall and mid grasses characterized by little bluestem, big bluestem, yellow indiagrass, purpletop, sideoats grama, hairy grama, tall dropseed, and texas wintergrass (see Appendix C for scientific names of plants). The vegetative overstory is characterized by post oak, blackjack oak, cedar elm, and bumelia.

Originally, a delicate natural balance existed between perennial grasses, browse, and tree species. Introduction of man and domestic animals disrupted this balance. The present existing plant communities reflect the harsh use of native vegetative resources. Widespread stands of annual plants, the spread of woody plants into dense stands, and the reduction of total forage vegetation are indications of past mismanagement.

Three native vegetation types of the broad North Central Prairies vegetational region occur in the watershed. These occur on sandy loam upland and bottomland sites, clay and clay loam footslope and bench sites, and sandstone hillside sites.

The sandy loam sites comprise 59 percent of the native vegetational area of the watershed. The original vegetation found on these sites was made up mainly of sideoats grama, little bluestem, plains bristlegrass, arizona cottontop, vine-mesquite, heath aster, dotted gayfeather, engelmann daisy, halfshrub sundrops, catclaw sensitive brier, sagewort, fragrant sumac, bumelia, elbowbush, saw greenbrier, post oak, ashe juniper, sugar hackberry, and cedar elm. Lesser amounts of big bluestem, indiagrass, purpletop, pitcher sage, switchgrass, maximilian sunflower, and pecan occurred in areas of more favorable soil moisture such as bottomlands and seep areas. These areas are some of the most productive native vegetational sites in the watershed. They are potentially capable of producing up to 3,500 pounds of air dry herbage on the uplands and 6,000 pounds of air dry herbage on the bottomlands annually.

The clay and clay loam footslopes and benches make up 18 percent of the native vegetational area of the watershed. The original vegetation on these sites was comprised mainly of sideoats grama, vine-mesquite, cane

^{12/} Gould, F. W., Texas Plants, A Checklist and Ecological Summary, Texas A&M University, TAES, College Station, Texas, 1962.

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bluestem, silver bluestem, buffalograss, texas wintergrass, meadow dropseed, yellow neptunia, catclaw sensitivebrier, engelmannndaisy, curlycup gumweed, heath aster, feather dalea, vine ephedra, cedar elm, and sugar hackberry. These sites are capable of producing up to 4,500 pounds of air dry herbage annually. The footslopes portion of these areas present more shallow soils than normal for the sites and tend to produce more sparse vegetation than the benches.

Sandstone hillsides make up 23 percent of the watershed and produce a heavy cover of trees. This woody vegetation consists primarily of post oak, blackjack oak, cedar elm, bumelia, and texas ash, with a dense undergrowth of browse plants such as saw greenbrier, fragrant sumac, white honeysuckle, elbowbush, and pricklyash. Grass growth is generally sparse and includes purpletop, texas wintergrass, sideoats grama, little bluestem, indiagrass, sand lovegrass, scribner panicum, and tall dropseed. Other plants of the understory include velvet bundleflower, roundhead lespedeza, engelmannndaisy, and sedge. These hillsides are strewn with sandstone rocks and boulders. These rocks greatly reduce the amount of soil surface available for producing vegetation. The amount of soil covered by rocks and the continuous shade created by dense tree canopy severely affect the ability of these areas to produce other vegetation. Up to 3,000 pounds of air dry herbage may be produced annually. As much as 15 percent of this herbage yield is produced by woody plants.

The vegetation on pastureland consists of improved perennial grasses. The land in this use was converted from cropland or rangeland and planted to grasses adapted to intensive grazing use. The main grass grown is bermudagrass. A few acres of kleingrass-75 and wintergreen hardinggrass have also been planted. Pasturelands are generally in a good state of cover; however, weed encroachment does occur where adequate fertility is not maintained or where heavy grazing by livestock occurs.

The watershed lies in the Texas Parks and Wildlife Department's Possum Kingdom Game Management Area.^{13/}

The quality of plant communities in the watershed for wildlife habitat ranges from poor to fair. Major wildlife species found in the watershed are whitetailed deer, bobwhite, mourning dove, raccoon, opossum, jackrabbit, cottontail, fox squirrel, migrating ducks, and various species of songbirds, rodents, and predators. At this time, there are no known threatened wildlife species which occur in the watershed.

Wildlife populations are generally low throughout the watershed. Bobwhites, mourning doves, raccoons, opossums, jackrabbits, and cottontails

^{13/} Information relevant to fish and wildlife resources extracted from the fish and wildlife reconnaissance report by the Fish and Wildlife Service, USDI, in cooperation with the Texas Parks and Wildlife Department, to State Conservationist, Soil Conservation Service, USDA, Temple, Texas, dated January 22, 1974, concerning a detailed study of the Pollard Creek watershed.

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are found in low to moderate numbers. Deer and fox squirrel populations are low.

Some waterfowl frequent the project area during spring and fall migrations.

Fish habitat in the watershed consists of about 16 ponds averaging about one-half acre in size and the lower 2-mile reach of Pollard Creek. The quality of the habitat in the ponds is good, while that in the stream is poor.

The ponds are stocked with largemouth bass and channel catfish. One pond is open to the public on a fee basis. The other ponds are fished lightly by landowners and their friends.

Effluent from the Mineral Wells sewage treatment plant maintains perennial flow in the lower 2-mile reach of Pollard Creek. The creek has not supported a significant fish population because of the poor quality of the effluent released from the old treatment plant and the polluting effects of the old refuse disposal area which is located immediately downstream from the sewage treatment plant. However, the fish population is expected to increase because of the improved quality of the effluent released from a newly completed treatment plant and the development of a new solid waste disposal site. The water quality report submitted to the Texas Water Quality Board by the city for effluent discharged from the plant in March 1974 shows the following quality:

<u>Item</u>	<u>Average of Data Collected During the Month (milligrams/liter)</u>	<u>Highest Value Measured for Month (milligrams/liter)</u>
B.O.D.	5.0	6.0
Total Suspended Solids	3.0	5.0
Chlorine Residual	1.2	0.9*

*Lowest value measured for month.

There is no commercial fishery in the watershed and none is expected to develop.

Recreational Resources

Opportunities for outdoor recreation are provided at two city parks located in the flood plain of Pollard Creek. Limited opportunities for hunting and fishing are available on agricultural land and farm and ranch ponds on a fee basis. Excellent opportunities for all forms of outdoor recreation and water-based recreation are available at nearby Possum Kingdom State Park, Possum Kingdom Reservoir, Lake Palo Pinto, the Brazos River, and other small lakes.

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Archeological, Historical, and Unique Scenic Resources

There are no known historic sites within the watershed either listed in, or in process of nomination to, the National Register of Historic Places, according to the Texas State Historical Commission. The Palo Pinto Historical Society advised that there are no known sites or structures within the watershed. Archeological studies by archeologists of the Archaeology Research Program, Department of Anthropology, Southern Methodist University,^{14/} indicate that archeological resources are limited to surface evidence of chipping activities.

Soil, Water, and Plant Management Status

There is a gradual trend in land use change toward more intensified production of forage plants. This is identified by an expected 50 percent change in cropland to pastureland and an expected change of 11 percent of rangeland to pastureland during the next 3 years. Pastureland is increasing in acreage because of increased forage producing ability, favorable livestock markets, and the reduced need for labor and farm machinery.

Urban expansion has continued with an increase in both business and dwelling structures. This trend is expected to continue in the future. However, the recent closing of the Fort Wolters military installation near Mineral Wells may cause a temporary slowdown of this trend for the next several years.

There are presently 29 soil and water conservation district cooperators in the watershed whose conservation plans with the Palo Pinto Soil and Water Conservation District cover 4,292 acres. Nearly 88 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 75 percent (3,670 acres) of the agricultural land are adequately protected from deterioration, either naturally or by action of the land user. However, it is estimated that only about 14 percent of the land in the watershed 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.

At the present, many of the agricultural programs are complementary to the achievement of planned goals for land treatment. These include the Great Plains Conservation Program, Rural Environmental Conservation Program, Rural Environmental Assistance Program, and various types of loans administered by the Farmers Home Administration. Some delay could be encountered in land use conversions because of the emphasis being given to increased production of food and fiber crops. However, the total long range effect is expected to be minimal in this watershed.

^{14/} Mosca, Herbert P., III, Archaeological Survey of Texas Watersheds in Central Texas, Archaeology Research Program, Department of Anthropology, Southern Methodist University, January 1974.

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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 included in this project.

A study of flood hazard areas in Mineral Wells, both inside and outside of the watershed, was made for the Federal Insurance Administration, U.S. Department of Housing and Urban Development, by the Soil Conservation Service, U.S. Department of Agriculture, to determine where flood insurance is to be made available to residents.

The Farmers Home Administration has initiated a program for lending money to suburban homeowners to solve septic tank problems. The city of Mineral Wells received financial assistance from the Environmental Protection Agency under provisions of Public Law 660 for the construction of a new sewage treatment plant.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Management

The broad concept of resource conservation has been accepted by farmers and ranchers as evidenced by their individual progress in applying conservation measures to their lands. Although there is opportunity to improve management on all land uses, there appear to be no inhibitions or prejudices to the use of new technology in resource conservation.

Many of the farms and ranches are marginal to submarginal as an economic unit. The trend is toward smaller units due to the proximity of the city of Mineral Wells. These smaller units tend to degrade environmental quality. Domesticated livestock, human, and vehicular traffic usually increases proportionately as the acreages are reduced, thus reducing plant cover, increasing soil erosion and downstream sedimentation, and reducing downstream water quality. Land users must be educated and motivated to use a more resistant vegetal cover such as turf grasses to prevent this degradation. This frequently involves land use changes, more intensive land treatment and a greater economic and managerial input by the land user.

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. Small land users normally have off-the-farm employment which improves their financial ability to carry out basic resource conservation programs on their lands.

Floodwater Damage

The principal problem in the watershed is frequent damage to urban properties on the Pollard Creek flood plain within the developed area of Mineral Wells. Flooding on the agricultural flood plain of Pollard Creek between

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the developed urban area and the Brazos River causes moderate to severe damages to crops and pastures, other agricultural properties, and to public roads and bridges. Flooding also occurs on the Pollard Creek flood plain above the site location of floodwater retarding structure No. 1 and on the flood plain of an unnamed tributary stream that joins Pollard Creek below Mineral Wells. Although portions of these flood plain areas are within the corporate limits of Mineral Wells, there are no urban developments subject to floodwater damages. Damages are minor and are limited to pastures and other agricultural properties.

An estimated 519 acres of the watershed, excluding stream channels, are flood plain. Of the 519 acres of flood plain, 157 acres are within the developed area of Mineral Wells and 181 acres are between the developed urban area and the Brazos River. Another 119 acres occur along Pollard Creek in and above the site location of floodwater retarding structure No. 1 and 62 acres along an unnamed tributary stream that joins Pollard Creek below Mineral Wells.

At the present time, land use of the flood plain is about 4 percent cropland, 41 percent pastureland, 14 percent rangeland, 38 percent urban and built-up, and 3 percent miscellaneous. Current trends are toward improvement of pastureland and native rangeland.

Appendix B shows the flood plain that is subject to flood damage. The urban area of the city of Mineral Wells that will be damaged by the 100-year frequency flood is shown in Appendix E.

Some land users, on an individual basis, have attempted to enlarge and straighten segments of the stream. However, this has resulted in very little reduction of flood damage. The adverse economic and physical effect of flooding has been felt throughout the watershed and will prompt local participation in the alleviation of the flood problem.

Agricultural flood plain lands have a market value of \$300 to \$700 per acre, depending upon location and productivity. Urban properties subject to flood damage are valued in excess of \$1,000,000. Acreages and properties are those expected to be inundated by a 100-year frequency flood.

Floods are caused by runoff from high intensity, short duration storms which may occur over the entire drainage area of the watershed. The steep terrain in the upper portion of the watershed causes a rapid rate of runoff. 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. Depths of up to 5.5 feet can be expected in some residences and businesses. Such depths of rapidly flowing water present a serious hazard to life.

Floods which inundate less than half of the flood plain and result in minor damage occur on the average of once each year. Major floods which inundated more than half of the flood plain and resulted in moderate to severe damage in recent years occurred in 1957, 1959, 1962, 1966, and 1970.

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Information obtained from local residents indicated that the flood event of March 1970 was caused by approximately 5 inches of rainfall. It is estimated that this storm inundated approximately 277 acres of flood plain in the watershed, of which 92 acres are located inside the urban area of Mineral Wells. Damages were estimated at \$92,000, of which \$90,000 would be to urban properties in reach 1 (Appendix E). Storms of this magnitude can be expected to occur about once each 5 years.

A flood resulting from the one percent chance event would cause direct floodwater damages estimated at \$345,000. Flood damages in the urban area of Mineral Wells are estimated at \$340,000 based upon present development. About 10 businesses and 50 residences in the city of Mineral Wells and about 25 agricultural land users suffer floodwater damages.

Under nonproject conditions the estimated average annual direct monetary damage by floodwater is \$56,900. Of this amount, \$580 is crop and pasture; \$170, other agricultural; \$360, road and bridge; and \$55,790 is urban damage.

Indirect damages such as interruption of travel, losses sustained by businesses, evacuation of premises when floods threaten, and similar losses are estimated to average \$11,310 annually.

Erosion Damage

Erosion rates and associated damages are low. The present gross erosion rate in the watershed averages about 3 tons per acre. This rate varies from less than one ton per acre on rangeland and pasture-land having good vegetative cover to more than 10 tons per acre on small isolated areas of poorly vegetated soils on steep slopes. These small isolated areas comprise a total of slightly less than 100 acres.

Streambank erosion on small isolated areas is occurring in reaches of channel which have been straightened. The most active area is in the upper reaches of the man-made channel in the old lake bed of former Lake Pinto.

Flood plain scour is minor and has caused erosion damages on less than 10 acres of bottomland soils. The average annual value of this damage is \$140.

Sediment Damage

The sediment load carried into the Brazos River by Pollard Creek averages about 5,000 tons (4.9 acre-feet) annually. This volume of sediment represents an average sediment concentration of 2,300 milligrams per liter in the estimated 1,600 acre-feet of annual runoff from the watershed. It is estimated that approximately one acre-foot of sediment derived from Pollard Creek is deposited in Lake Granbury annually.

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Overbank deposition of sandy loam sediment occurs in the form of natural levees on the flood plain adjacent to the streambanks of Pollard Creek. This depositional process has resulted in a 10 to 20 percent reduction in soil productivity on 18 acres of agricultural land. The average annual value of this damage is \$100. A more severe type of sediment damage occurs in the urban areas where the sediment is left as a thin coating in homes and businesses and on equipment. The damage caused by this process is reflected as part of the floodwater damages.

Municipal and Industrial Water Problems

The city of Mineral Wells obtains its water from surface supplies outside the watershed. These sources are adequate for present and future needs. Rural, domestic, and livestock water is obtained from ground water and surface ponds.

Plant and Animal Problems

From the time of introduction of domestic livestock prior to 1900, land users have caused vivid changes in native plant communities in the watershed. These changes have been brought about by continued heavy grazing rates, lack of technical knowledge in plant management, and an inability to recognize gradual regressive trends occurring in plant communities. As a result, existing plant cover reflects a pronounced change from that which existed prior to 1900. These changes, in general, have resulted in native rangelands of the watershed producing a lower quality and quantity of plant cover in relation to recorded original conditions.^{1/} Although the existing plant cover on native rangelands is now inferior in quality and quantity to that produced decades ago, it does provide a base from which it is possible to achieve an acceptable level of soil erosion control when properly managed for medium levels of forage production.

The changes in existing vegetative conditions are most pronounced in the native vegetative type areas which are more easily accessible to livestock. On the uplands area of the sandy loam site, such palatable species as sideoats grama, little bluestem, arizona cottontop, plains bristlegrass, vine-mesquite, engelmann daisy, falsegaura, and heath aster have given way to an increase in buffalograss, sand dropseed, purple threeawn, fall witchgrass, and silver bluestem. Many woody plants have either increased or invaded. These are honey mesquite, ashe juniper, lotebush, buckley yucca, and texas pricklypear. The per acre annual air dry herbage yields rarely exceed 3,500 pounds now.

The grazable plants on the bottomlands area of the sandy loam site have been severely changed as a result of livestock accessibility. Luxuriant

^{1/} Turney, Henry, Texas Range and Pasture, Tarleton State College, Stephenville, Texas, page 31.

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stands of tall grass intermingled with a colorful array of perennial forbs and overtopped by pecan, cedar elm, and sugar hackberry have given way to dense stands of head-high underbrush, sparse stands of short and mid grasses, and an invasion of woody plants. Plants which typify existing vegetative conditions are texas wintergrass, buffalograss, purpletop, silver bluestem, tall dropseed, western ragweed, baldwin ironweed, false-gaura, sedge, saw greenbrier, berlandier wolfberry, elbowbush, ashe juniper, post oak, and cedar elm. The annual air dry herbage yield rarely exceeds 3,500 pounds per acre now.

The dominant species such as sideoats grama, vine-mesquite, and texas wintergrass on the clay and clay loam site have been replaced in large part by an increase of purple threeawn, texas grama, buffalograss, and an invasion of texas pricklypear, lotebush, honey mesquite, and western ragweed. Following periods of increased rainfall, there is an abundant growth of annual plants, characterized by japanese brome, common broomweed, and texas filaree. The annual air dry herbage yield seldom exceeds 2,500 pounds per acre now.

The sandstone hills site has changed less vegetatively than others in the watershed since the turn of the century. This is due to the steepness of the topography which discourages concentrated grazing and by the boulders and rocks which provide protection from grazing to many of the plants. As the other more accessible vegetative type areas are "grazed out" by livestock, this site serves as a source of secondary forage supplies. When these areas regress vegetatively, sideoats grama and little bluestem are the first grasses to be grazed out. They are replaced by silver bluestem, hairy grama, fragrant sumac, and an increase in post oak and purpletop. Further regression results in an invasion of purple threeawn, red lovegrass, sand dropseed, and annual grasses and forbs. Eventually, these areas are invaded by honey mesquite. An overstory of cedar elm and an understory of saw greenbrier increase with the honey mesquite invasion. Occasionally fragrant sumac will dominate the site in the lower stages of plant succession. Annual air dry herbage yield will seldom exceed 2,500 pounds per acre under these circumstances.

Only one endangered plant species is listed as occurring in the vegetative area within which this watershed lies.^{2/} This is the heartleaf adderstongue. This plant has not been specifically identified as occurring within this watershed.

Water Quality Problems

Present sources of pollution in the watershed are associated with suburban growth. Seepage and overflow from improperly installed septic

^{2/} "Preliminary List of Endangered Texas Plants," Texas Almanac, 1974-1975 edition, page 131.

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tanks in the suburban areas; manure from pets, horses, and other livestock concentrated in small areas; and the washing of fertilizers, insecticides, and other wastes from gardens and lawns in the urban and suburban areas will become increasingly greater sources of water pollution as the watershed develops and the number of their occurrences increases. Flooding of the old refuse disposal area for the city of Mineral Wells downstream from the sewage treatment plant results in polluting debris being picked up and carried into the Brazos River.

Recreation Problems

The park facilities of Mineral Wells are located on the flood plain of Pollard Creek. Swimming pool facilities at the main city park are subject to damages by flooding. Picnic and other outdoor recreational facilities at this park and at Lions Park are less likely to be damaged by flooding, but are subject to interrupted recreational use because of flooding.

Economic and Social

About 20 operating units in the flood plain are family-type farm operations employing less than 1-1/2 man-years of outside labor. About one-half, or 10, of these units are low income producing units which require outside employment by their operators to maintain an adequate standard of living. There is a need for additional employment opportunities for the 280 unemployed in the watershed area.

Residents of Mineral Wells who suffer flood damage are burdened with flood losses that result in a lower standard of living. Along with the monetary losses, there exists the future threats of loss of life and displacements during floods.

A potential source of pollution of floodwater and downstream areas exists along Pollard Creek at the sewer plant and sanitary landfill.

The damages caused by flooding of two parks in the city of Mineral Wells result in the loss of recreational opportunities and an expenditure of funds which could be used for other public improvements.

Other

Other problems are the control of diseases, vectors, and the cleanup of debris which is spread along the flood plain by floodwaters.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

The project provides flood protection for urban and built-up areas on the flood plain of Pollard Creek. Flood protection is not provided for the

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undeveloped flood plain lying along a smaller tributary in the western edge of Mineral Wells. Land management and land use controls will be needed to prevent unwise development from occurring in this area. The city recently adopted 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. The city is tentatively planning to purchase portions of the flood-prone lands for use as greenbelts and to restrict development in areas not purchased.

Installation of the planned project will eliminate or reduce the flood hazard potential to developments lying downstream from the floodwater retarding structures. This will require modifications in the flood insurance program in the protected areas to reflect change in flood risk zones, rates of probable flood loss, and actuarial rates.

ENVIRONMENTAL IMPACT

Conservation Land Treatment

The application of land treatment measures to complete the treatment on 20 acres of cropland, 600 acres of pastureland, and 2,000 acres of rangeland during the 3-year installation period will increase land adequately treated in the watershed to 70 percent. Many of these measures would eventually be installed by the land users under the present going program. However, they would be applied at a slower rate, over a longer period of time, due to lack of sufficient technical assistance for planning and applying these measures.

Installation of conservation treatment on the land which is to remain in cropland in the future will provide for a continuous soil cover of growing vegetation and plant residues on or near the surface of the soil. This will reduce erosion to within the permissible soil loss rate of 5 tons or less per acre annually by protecting the soil from the impact of the energy of falling raindrops and by preventing the washing of soil from the fields. Needed plant residues will also be returned to the soil to sustain the biological activity necessary for maintenance and improvement of the soil resource.

The application of pastureland conservation treatment measures on former cropland and areas of intensively used former rangeland will beneficially modify an already disrupted or degraded ecosystem on these lands. The environment will be improved on this land through the establishment of a denser and more productive soil cover which will reduce soil erosion and return the needed volume of plant residues for biological activity in the soil.

The conservation land treatment and management practices to be applied to rangeland will improve the quantity and quality of the native vegetation.

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The application of brush management on rangeland will restore open areas for recovery of the desirable native grasses, forbs, and browse plants. The use of grazing management practices to control grazing by livestock during specified periods through the growing season will allow natural reseeding of the rangeland by the native plants. Range seeding will re-establish many of the native grasses on areas of rangeland which do not have sufficient plants for natural reseeding. These practices will also allow the restoration of a denser and more productive soil cover for erosion prevention while improving the savannah and prairie ecosystem.

The reduction in upland erosion by the application of land treatment measures on cropland, pastureland, and hayland will decrease the volume of infertile sediment delivered to the flood plain and downstream channels.

The use of fertilizer is expected to continue on both the cropland and pastureland in the future. Fertilization is needed to maintain the productivity of the soil by replacing elements removed from the soil by crops and the forage plants consumed by livestock. The rates of fertilization, however, are not expected to be high in this subhumid climatic area, and no significant increase is expected as a result of project action. Fertilization should have no significant adverse impacts on the quality of the water impounded in the structures.

Improvements in watershed cover conditions during the installation period are expected to reduce annual gross erosion by about 20 percent, or 4,600 tons annually. These measures are expected to reduce sedimentation damages by 10 percent. These measures are also expected to reduce peak runoff from the uplands and reduce downstream floodwater damages by about 5 percent.

Most of the land treatment measures to be applied will generally benefit wildlife. The application of wildlife upland habitat management practices on about 2,000 acres of agricultural land will improve wildlife habitat by the following means:

1. Use of seed producing grasses such as kleingrass or lovegrass in pasture planting to furnish seed eaten by many species of birds and small mammals.
2. Application of brush management by leaving patterns of brush surrounding open areas for edge habitat for deer.
3. Retention and improvement of woody vegetation along creeks, fence rows, etc., to improve food supply and cover in cropland and pastureland areas.

The application of fishpond management in ponds in the watershed will benefit the fisheries.

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Structural Measures

The installation of the floodwater retarding structures will provide flood protection to the 338 acres of flood plain lands having moderate to severe flood problems under the existing level of development. The remaining 181 acres, which are not provided flood prevention by structural measures, have only a very minor flood problem under the existing level of development and do not warrant project type action. These areas are identified, however, as potential flood hazard areas if urban type developments are not prevented. To prevent or minimize future damages, the sponsoring local organizations will enforce flood plain regulations on all areas still subject to flooding from a 100-year frequency flood event where they have authority under state law, or will initiate a public information program to publicize the hazards remaining after project installation where they do not have regulatory authority.

Reduction in area inundated varies with respect to location within the watershed. The general locations of the areas to be benefited as a result of reduced flooding are shown in the following tabulation:

Evaluation Reach (Appendix E)	Acres Inundated					
	Average Recurrence Interval					
	5-Year		25-Year		100-Year	
	Without Project	With Project	Without Project	With Project	Without Project	With Project
1	96	0	137	5	157	14
2	86	16	145	36	181	54
Subtotal (Area benefited by structural measures)	182	16	282	41	338	68
X ^{1/}	74	70	101	96	119	113
Y ^{2/}	35	33	54	51	62	59
TOTAL	291	119	437	188	519	240

1/ Area in and above site not benefited by structural measures.

2/ Area on unnamed tributary not benefited by structural measures.

Appendix E shows the urban area of Mineral Wells that will be inundated by the 100-year frequency flood for without and with project conditions. With the project installed, damages in the urban area of Mineral Wells will be reduced by 99 percent.

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After installation of the combined program of land treatment and structural measures, the reduction in flooding and floodwater depths and velocities, sediment deposition, and erosion will reduce crop and pasture damages by 66 percent; other agricultural damages, 94 percent; road and bridge damages, 83 percent; urban damages, 99 percent; overbank deposition damages, 50 percent; flood plain scour, 71 percent; and indirect damages by 99 percent.

The project will benefit directly the owners and operators of 25 farms and ranches in the agricultural land of the flood plain and the owners and operators of about 60 residential and business units in Mineral Wells.

The planned project will provide protection from the 100-year event to all existing urban properties except three garages and yards which are at extremely low elevations. The depth of flooding in one garage will be limited to a depth of 0.7 foot from the 100-year event. The other two will be flooded less than 0.2 foot deep from the 100-year event. The damages will be very minor due to shallow depths, slow velocities, and the small areal extent of flooding.

After installation of the planned program of land treatment and structural measures, the direct monetary floodwater damages resulting from a recurrence of a flood similar to the one that occurred in March 1970 will be eliminated in the urban area (reach 1)(Appendix B). An 88 percent reduction will be provided for reach 2.

The average annual volume of sediment delivered to the Brazos River with the total project installed will be reduced from an estimated 5,000 tons under without-project conditions to 2,000 tons with the project installed. This sediment load represents a sediment concentration of 2,300 mg/l in the estimated 1,600 acre-feet of average annual runoff from the watershed, excluding the sewage effluent released into Pollard Creek, and 900 mg/l after the project is installed. It is estimated that the volume of sediment deposited in Lake Granbury from Pollard Creek will be reduced by about 0.5 acre-foot annually.

The quality of streamflow will be improved through the reduction of sediment that will result from project installation. Streamflow quality below the old refuse disposal area will also be improved somewhat. Polluting debris and soluble pollutants now being transported into the stream system will be reduced as a result of a 62 percent reduction in average annual flooding over the refuse area. Other than the effects caused by reduction of sediment and flooding of the refuse area, the project will have no measurable effect on water quality within the watershed. During the initial filling of the sediment pools and the occasional extreme dry periods when the sediment pools are below the emergency spillway elevation, the tendency will be toward a lowering of the water quality due to the reduced runoff. During normal operations, the tendency will be toward improving the water quality due to the longer duration flows. Either way the changes will be insignificant and are not quantifiable.

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Initially, the project will cause a 3.9 percent reduction in the average annual volume of streamflow from the watershed because of evaporation and seepage losses in the sediment pools. However, as sediment accumulates in the sediment pools, the streamflow will again approach pre-Public Law 566 project conditions.

The two proposed floodwater retarding structures will in general be beneficial to fish and wildlife. About 51 acres of poor-to-fair quality habitat for upland wildlife species will be destroyed or altered. The existing vegetation on 10 acres will be destroyed by construction of the dams and emergency spillways and replaced with a suitable vegetation for erosion control, grazing use, and wildlife food value. The existing vegetation on the other 41 acres will be destroyed by permanent inundation by water impounded in the sediment pools. These water areas will furnish good quality fish habitat and feeding and resting areas for migrating waterfowl, shorebirds, and wading birds, as well as a few resident species, such as the kildeer, great blue heron, etc.

The quality of fish habitat in lower Pollard Creek will be improved by the reduction of sediment in the runoff and the reduction of polluting debris carried away from the old refuse disposal area by floodwater.

Increased flood protection afforded by the proposed structures may increase the rate of urbanization in the protected areas below the structures. Increased urbanization in this area would reduce growth in other areas of the watershed.

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.

There are no archeological or historical sites listed in or nominated to the National Register of Historical Places that will be adversely affected by the installation of structural measures. An archeological survey made by the Archaeology Research Program of Southern Methodist University found that there are no significant archeological resources within the pool areas or construction areas of the planned floodwater retarding structures. The study concluded that additional studies of the archeology should not be necessary before construction begins. Interagency Archeological Services-Denver, National Park Service, will kept informed of the progress of the plan. If archeological sites are located during construction activities, a trained archeologist will be called to the site to investigate, record, and collect material to mitigate any possible loss of information.

Impoundment of water in the sediment pools will take 41 acres of pastureland and rangeland out of further agricultural production. Another 10 acres of pastureland and rangeland will be converted to use for dams and emergency spillways and will have restricted agricultural use as pastureland.

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It is expected that most of the 134 acres of pastureland and rangeland in the detention pools will remain in present use with only limited interruption when inundated. The total net loss of agricultural production resulting from inundation and construction of the structural measures is about \$200. No measurable effect is anticipated on the management operation of the individuals affected.

The installation of this project will have no adverse effect on any endangered plant species.

Economic and Social

The installation of land treatment and structural measures will reduce substantially the direct income losses due to floodwater damage suffered by farm and ranch operators and residents in the urban area of Mineral Wells. Indirect losses such as displacements due to flooding, rerouting to traffic, and individual efforts to alleviate flood losses will be eliminated for residents of the watershed. The future threats of loss of life to residents of the watershed due to floodwater will be minimized.

The installation of structural measures will not adversely affect recovery of known mineral resources in the watershed or preclude exploration for additional mineral resources which may exist there. The project could commit an estimated 500,000 tons of bituminous coal, but the proximity of the Mineral Wells community and the depth of the Thurber coalbed at this location indicate that development of this resource would be unlikely during the economic life of the project.

The estimated average annual monetary damages will be reduced from \$68,450 to \$920, or 99 percent. The following tabulation shows the reduction in damages by reach:

Direct Monetary Floodwater Damage					
:Total Average Annual Damage:					
Evaluation :	Without :	With :			
Reach :	Project :	Project :	Benefits :	Reduction	
(Appendix E)	(dollars)	(dollars)	(dollars)	(percent)	
1	66,950	529	66,430	99	
2	1,360	270	1,090	80	
Subtotal	68,310	790	67,520	99	
X & Y	140	130	10	7	
TOTAL	68,450	920	67,530	99	

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

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Evaluation Reach (Appendix E)	Direct Monetary Floodwater Damages					
	Average Recurrence Interval					
	5-Year		25-Year		100-Year	
	Without Project	With Project	Without Project	With Project	Without Project	With Project
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
1	83,010	800	209,870	1,740	305,760	3,020
2	1,400	220	2,670	590	3,560	960
Subtotal	84,410	1,020	212,540	2,330	309,320	3,980
X & Y	160	150	250	240	310	290
TOTAL	84,570	1,170	212,790	2,570	309,630	4,270

Indirect damages were estimated to be 10 percent of direct agricultural damages, 15 percent of road and bridge damages, and 20 percent for urban damages. Indirect benefits amount to \$11,180 annually, resulting from a reduction in damages from \$11,310 to \$130.

Flood damages will be reduced substantially to the city park. The reduced damages will make public funds available for other uses.

The net economic impact of the project from the reduction of crop and pasture, sediment, and erosion damages will result in an expansion of the local economy by \$270 annually. In addition, the expenditure of funds for the construction of the works of improvement will create approximately 23 man-years of employment.

FAVORABLE ENVIRONMENTAL EFFECTS

Conservation Land Treatment

1. Sustain biological activity of soil used for cropland.
2. Beneficially modify and improve the degraded ecosystem on land used for pastureland.
3. Restore the native prairie and savannah ecosystem on rangeland.
4. Reduce upland erosion by 20 percent, or 4,600 tons annually.
5. Reduce peak runoff from the watershed by 5 percent.

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6. Improve wildlife food conditions.
7. Improve fish habitat in farm and ranch ponds.

Structural Measures (In combination with conservation land treatment measures)

1. Provide flood protection to 338 acres of flood plain land having moderate to severe flood problems by reducing damages as follows:
 - a. Crop and pasture - 66 percent
 - b. Other agricultural - 94 percent
 - c. Road and bridge - 83 percent
 - d. Urban - 99 percent
 - e. Overbank deposition - 50 percent
 - f. Flood plain scour - 71 percent
 - g. Indirect damages - 99 percent
2. Benefit directly the owners and operators of 25 farms and ranches in the agricultural land of the flood plain and the owners and operators of about 60 residential and business units in the urban and built-up areas of the flood plain.
3. Reduce the average annual sediment content of the runoff from the watershed from 2,300 mg/l to 900 mg/l, thereby reducing the volume of sediment delivered to the Brazos River from 5,000 tons annually to 2,000 tons annually.
4. Reduce volume of sediment deposited in Lake Granbury from Pollard Creek by 0.5 acre-foot annually.
5. Create 41 acres of surface water for fish habitat and waterfowl feeding and resting areas by water impounded in the sediment pools of the two floodwater retarding structures.
6. Improve quality of fish habitat in lower Pollard Creek by reducing sediment content and reducing polluting debris carried away from the old refuse disposal area by floodwater.

Economic and Social

1. Minimize interruptions of travel and disruption of business and agricultural activities on the flood plain lands.

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2. Reduce threat of loss of life in the residential areas on the flood plain.
3. Reduce average annual monetary flood damage from \$68,450 to \$920.
4. Reduce flood damages to city park.
5. Increase the economic activity of the local economy by \$270 annually.
6. Create approximately 23 man-years of employment for installation of the structural measures.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

1. Result in an initial reduction of 3.9 percent in the runoff from the watershed due to evaporation and seepage losses from the sediment pools.
2. Cause the destruction of 41 acres of poor to fair quality wildlife habitat, including 0.9 mile of intermittent streams, to be covered by water in the sediment pools.
3. Result in the replacement of 10 acres of existing poor to fair wildlife habitat, including 0.3 mile of intermittent stream channel, which will be destroyed by construction of the dams and emergency spillways, with an altered habitat.
4. Cause a slight increase in air and water pollution during the construction of the structural measures.
5. Cause a net loss of about \$200 annually from the agricultural land committed to installation of the floodwater retarding structures.

ALTERNATIVES

The considered alternatives to the proposed action in planning for the development, conservation, and productive use of the soil, water, and related resources are:

1. A program of accelerated application of land treatment measures for watershed protection.
2. A program consisting of flood-proofing to minimize flood losses.
3. A program of accelerated application of land treatment measures and channel work.

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4. Foregoing the implementation of the project.

A discussion of each alternative follows:

Alternative No. 1 - Alternative No. 1 consists of applying the land treatment measures included in the selected plan. These measures and the environmental impacts are the same as discussed under "Planned Project - Land Treatment Measures" and under "Environmental Impact - Conservation Land Treatment." These measures would reduce average annual monetary damages from floodwater by 5 percent. Flood insurance, which is available through the flood insurance program administered by the Federal Insurance Administration, U. S. Department of Housing and Urban Development, would reduce the economic impact to an individual or a business from a flood. Other problems, such as interruption of business and travel during and after the floods, would continue to occur. The threat of loss of life would also remain.

The cost of installing alternative No. 1 is \$50,200, which does not include the cost for the flood insurance program.

Alternative No. 2 - Alternative No. 2 consists of applying land treatment as discussed in alternative No. 1 and flood-proofing buildings and improvements on the flood plain. Flood-proofing can be used to reduce floodwater damages to improvements on the flood plain. One homeowner has installed such measures to reduce damage to his property from the smaller floods. Similar measures could be used to reduce flood damages to other property; however, flood-proofing of all existing structures would be impractical. About 15 residences and 2 businesses of the 50 residences and 10 businesses in the flood plain probably could be flood-proofed. The remaining 35 residences and 8 businesses would be impractical to flood-proof because of their construction. Other damages, such as interruption of travel and business and the threat of loss of life, would continue to exist in the flood plain. Flood insurance will reduce the economic impact to individuals and businesses whose properties cannot be flood-proofed.

The cost of installing alternative No. 2 is \$70,200, which does not include the cost of flood insurance.

Alternative No. 3 - Alternative No. 3 consists of applying land treatment measures at an accelerated rate and installing channel work. The land treatment measures and the environmental impact of these measures are the same as those included in the selected plan. About 2.5 miles of channel work would need to be installed to provide the desired level of protection. Flow velocities of up to 10 cubic feet per second would be experienced in the channel to

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achieve about the same level of protection as provided by the measures included in the selected plan. Rock riprap and/or concrete would be required for channel stability with velocities of this magnitude. Approximately 45 acres of land would be required for installation. Existing woody habitat along about 2.0 miles of channel would be destroyed. Two bridges would need to be modified or replaced. Run-off from the watershed would be moved through this portion of the watershed at a slightly faster rate. Increased flooding would occur within the deep, narrow gorge section of Pollard Creek downstream from the sewage treatment plant and old landfill area.

The total cost of installing alternative No. 3 is \$2,057,200, of which \$50,200 is for land treatment and \$2,007,000 is for channel work.

Alternative No. 4 - Alternative No. 4 consists of foregoing the implementation of the project. Land treatment measures would continue to be applied for watershed protection under the on-going program. It is reasonable to expect that land users would eventually install many of these measures to maintain the productivity of their lands. However, the level and rate of application of these measures would be lower than in the selected plan due to limited availability of technical assistance and associated motivation.

The environmental impacts of installing the land treatment measures under the going program would be generally the same as those discussed under "Environmental Impacts - Land Treatment Measures." However, the magnitude of the impact of these measures would be less due to the lower level and rate of application.

Average annual floodwater damages would be reduced by about 3 percent as a result of the land treatment measures expected to be applied without accelerated technical assistance. The economic impact of remaining floodwater damages to individuals and businesses will be reduced by flood insurance.

The selection of alternative No. 4 would forego the opportunity to realize about \$24,330 in average annual net benefits.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Land use trends within the watershed include the conversion of cropland and some of the rangeland to pastureland, and the expansion of the urban areas of Mineral Wells into the agricultural areas. The trend of conversion of cropland and some areas of rangeland to pastureland reflects the effects of rising production costs for producing crops on small units of marginal land and the increasingly more favorable economic returns being experienced

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from producing beef and animal products. The installation or failure to install the project will have little or no effect on this trend. The conservation land treatment program is flexible for meeting the treatment needs of changing land uses in order to protect and improve the soil, water, and vegetative resources for the future.

The thrust of urban development is westward across the central portion of the watershed. The new city-county hospital was constructed in this area and new subdivisions have been opened in this area. The land management and use requirements of the flood insurance program will help prevent urban development and buildup within the flood-prone land along a small tributary on the western side of the watershed which will not receive flood protection.

The Pollard Creek watershed project is within the Brazos River basin. The Brazos River drains portions of New Mexico and one-sixth of the state of Texas. The total area of the basin is about 44,640 square miles, of which an estimated 9,240 square miles do not contribute surface runoff to the river. The total length of the Brazos River basin is about 600 miles and the maximum width is 120 miles.^{1/} Mean annual precipitation varies from about 17 inches in the upper portion to about 46 inches at the mouth.

There are 56 watersheds located in the Brazos River basin on which watershed projects have been installed, approved for operations, or appear to be feasible for planning under provisions of Public Law 83-566. Sixteen of the projects are installed or are in the process of being installed, 9 have been approved for operations, 8 are currently being planned, and 23 appear to be feasible for planning. The total drainage area of the 56 watersheds is about 9,300 square miles. The drainage area of these watersheds is about 20.8 percent of the drainage area of the Brazos River basin. Of the 23 watersheds which appear to be feasible, applications for planning assistance have been made to the Texas State Soil and Water Conservation Board on 11.

The Texas Water Plan (Summary)^{2/} indicated that in 1968 there were 33 reservoirs either existing or under construction which have total capacities of 5,000 acre-feet or more. Based on the report of the U. S. Study Commission - Texas,^{3/} there are about 90 reservoirs in the basin, excluding structures installed under the watershed program, with capacities of less than 5,000 acre-feet.

^{1/} Corps of Engineers, U. S. Army District, Flood Damage Study for Main Stem and Major Tributaries, Fort Worth and Galveston, Texas, April 1961, p. 53.

^{2/} Texas Water Development Board, The Texas Water Plan (Summary), Austin, Texas, November 1968.

^{3/} United States Study Commission, The Report of the U. S. Study Commission - Texas, Part III, The Eight Basins, A Report to the President and to the Congress, March 1962.

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There are 337 floodwater retarding structures, 3 multiple-purpose structures, and 156.5 miles of channel work constructed or planned in the 25 watershed projects that are installed or approved for operations. It is estimated that if all the remaining projects that appear feasible were installed, a total of about 690 floodwater retarding structures would be constructed and 280 miles of channel work would be installed in the basin under provisions of Public Law 83-566.

Pollard Creek enters the Brazos River upstream from Lake Granbury and downstream from Possum Kingdom Reservoir. Variations in the operation of these major reservoirs damp out the effects of project-induced phenomena such as seepage and evaporation to the extent that they cannot be related to conditions above or below the major reservoirs. Any cumulative effects resulting from the installation of a project on Pollard Creek watershed on the streamflow of the Brazos River will be associated only with other watershed projects that enter the Brazos River between the two reservoirs. The total intervening drainage area between the two reservoirs is about 2,140 square miles. Only two watershed projects impacting on this river reach have been authorized for operations. All 11 planned floodwater retarding structures, with a combined drainage area of 52.72 square miles, have been constructed. In addition to Pollard Creek watershed, one other watershed project (Kickapoo Creek) is currently being planned. It is estimated that when all four of these projects are installed, a total of 19 floodwater retarding structures will have been constructed. The total drainage area of the constructed and currently being planned floodwater retarding structures is about 88 square miles, or 4.11 percent of the total contributing area between Possum Kingdom Reservoir and Lake Granbury. The cumulative effect of watershed development, authorized and being planned currently, is small. It is estimated that the cumulative decrease in average annual runoff to Lake Granbury that originates within the intervening drainage area will initially be about 0.19 percent.

It is anticipated that the works of improvement proposed in this project, along with the works of improvement in the projects which are authorized for construction, will have significant impacts on the quality of the human environment. The long-term cumulative impacts of the projects in the Brazos River basin and the region are as follows.

The works of improvement, both land treatment and structural, will help contribute to conservation, development, and productive use of the soil, water, and related resources. The projects will allow the productivity of the resources to be sustained economically and indefinitely. The standard of living of the residents of the region will be improved through added income. The projects 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

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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 41 acres of surface water that will be created by this project and the 11,287 acres of surface water that will be created by the projects either installed or approved for operations will provide a total of 11,328 acres of surface water which can be used for lake fisheries, waterfowl resting areas, etc.

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 environment and aesthetic 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 185 acres of land. The dams and emergency spillways will require 10 acres and the sediment pools will require 41 acres. The detention pools will require 134 acres. The land use of the 51 acres needed for construction of the dams and emergency spillways and the land that will be inundated by the sediment pools is 47 acres pastureland and rangeland and 4 acres (1.2 miles) stream channels. The land use of the 134 acres needed for the detention pools, which are subject to temporary inundation, is 128 acres pastureland and rangeland and 6 acres (1.8 miles) stream channels.

The 10 acres of land committed to the dams and emergency spillways can still be used for grazing by livestock and for wildlife. The 134 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, etc.

The commitment of labor, material resources, and energy required for construction will be irretrievable. A capital expenditure of \$722,380 will also be required.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

The application for assistance for the Pollard Creek watershed was submitted to the Secretary of Agriculture through the Texas State Soil and Water Conservation Board (designated state agency). A field examination was made by the Soil Conservation Service and representatives of appropriate state agencies to determine that, within the requirements of national standards, there were no apparent obstacles to planning and

Pollard Creek Watershed, Texas

carrying out a watershed project. The Texas State Soil and Water Conservation Board held a public hearing to solicit public reaction. The board then recommended that the Soil Conservation Service furnish planning assistance.

The plan was developed in full consultation and cooperation with all interested agencies and individuals. Written notification of initiation of work plan development was sent to all federal, state, and local agencies that might have an interest in the project, soliciting information and comments. The Fish and Wildlife Service, U. S. Department of the Interior, in cooperation with the Texas Parks and Wildlife Department, made a reconnaissance survey of the fish and wildlife resources of the watershed. This report was used in plan formulation. A study of the watershed was made by a representative of the Texas Forest Service to determine if there were any forest management possibilities. The Palo Pinto Historical Society determined whether there were any known archeological or historical sites that would be adversely affected by the installation of measures included in the project. The Archaeology Research Program, Department of Anthropology, Southern Methodist University, made a survey of the areas to be affected by structural measures to determine if any archeological sites of scientific value would be affected.

Public meetings were held during planning to explain the project and solicit public reaction and participation. Representatives of the sponsoring local organizations contacted landowners for permission to survey, and to explain how the project would affect their lands. Owners of utility lines, roads, etc., were contacted to determine what modifications, if any, would be necessary to their improvements when the project is installed.

On January 9, 1975, prior to the preparation of the final plan, a public information meeting was held in Mineral Wells, Texas. The proposed project and the environmental statement were discussed and the interested agencies and individuals were given the opportunity to present their views and recommendations. The plan and environmental impact statement were prepared considering the comments and recommendations offered by the agencies who reviewed the plan.

The following agencies were requested to review and submit comments and recommendations:

- U. S. Department of the Army
- U. S. Department of Commerce
- U. S. Department of Health, Education, and Welfare
- U. S. Department of the Interior
- U. S. Department of Transportation
- Office of Equal Opportunity, USDA
- Environmental Protection Agency
- Federal Power Commission
- Advisory Council on Historic Preservation

Pollard Creek Watershed, Texas

The following state and local agencies were requested to review and submit comments and recommendations:

Division of Planning Coordination (State agency designated by Governor
and state clearinghouse)
North Central Texas Council of Governments

Discussion and Disposition of Each Comment on Draft Environmental Impact
Statement and Work Plan

All of the agencies that were requested to comment on the Draft Environmental Impact Statement and Work Plan submitted comments except the U. S. Department of Commerce, the Office of Equal Opportunity, USDA, and the Federal Power Commission. The responding agencies comments and the disposition of each are as follows:

U. S. Department of the Army

Comment: The Department stated that they foresee no conflicts with any project or current proposal of their Department and the draft environmental impact statement was considered to be satisfactory.

Response: Noted.

Comment: The Department stated that the alternatives on page 22 of the Work Plan do not indicate the benefits and benefit-cost ratio needed for decision making.

Response: The alternatives were discussed in relation to the level of protection provided, environmental effects, and estimated total costs. An examination of a benefit-to-cost ratio, expressed in purely monetary terms, was not considered germane to an analysis of alternatives for decision making.

Comment: The Department stated that the operation and maintenance cost estimate of \$420 annually appears low.

Response: Operation and maintenance costs have been reviewed. On the basis of actual costs incurred for similar structural measures, at updated and current prices, the estimated costs indicated are considered adequate.

Comment: The Department stated that the 100-year frequency overflow area for the urban area is incomplete, for local planning use, without the related elevation data. Data on a larger flood (such as the Federal Insurance Administration 500 year flood) would be of value in local planning decisions. A similar map for non-urban areas should be provided.

Pollard Creek Watershed, Texas

Response: Elevation data relative to the 100-year frequency flood line within the urban area of Mineral Wells, for both with and without project conditions, is available to the city in more detail than is possible to depict on figure 3. Data on a 500-year frequency flood is also available to the city as part of a completed flood insurance study. A map showing flood lines for non-urban areas is not considered necessary for the implementation of this project.

U. S. Department of Health, Education and Welfare

Comment: The Department reviewed the draft environmental impact statement with no objections but recommended that consideration be given to vectors of public health significance that might be associated with this project.

Response: A discussion relative to vector control has been added to the final work plan and to the environmental impact statement in the PLANNED PROJECT-Structural Measures section.

U. S. Department of the Interior

Comment: The Department stated that they found the work plan to be adequate and were especially pleased to note that brush clearing measures which provide for the preservation and retention of adequate wildlife cover are being included in the work plan. They also noted that plant species to be used in revegetating disturbed areas have been specifically named and recognized as being of considerable value for wildlife habitat.

Response: Noted.

Comment: The Department stated that: "There seems to be a degree of adulteration on the environmental objective occurring throughout the Work Plan which is especially noticeable in the Environmental Quality Account and the Abbreviated Environmental Quality Plan. Some of the component needs for the environmental quality objective reflect economic development, regional development, and social well-being, components which should appear in their respective plans or accounts.

"An example would be using flood control as a component of the environmental objective. To prevent flooding of a floodplain would contribute to the destruction of the very environment that was meant to be conserved under the Environmental Quality Plan. The natural floodplain ecosystem exists because of its periodic flooding. According to the 'Principles and Standards for Planning Water and Related Land Resources,' Federal Register, Vol. 38, No. 174, page 33,' . . . the environmental objective reflects

Pollard Creek Watershed, Texas

man's abiding concern with the quality of the natural physical-biological system in which all of life is sustained.' Man-made dams are certainly not natural.

"To point out some examples of this appearing in the report, we would like to call your attention to a few of these misplaced statements.

"Page A-3, No. A-1 states 'Project output will make available regional funds and resources that can be used to enhance the physical appearance of 28 farms and ranches in the uplands and 15 farms and ranches on 181 acres of agricultural flood plain and 60 business and residential properties on 157 acres of urban flood plain land.'

"Page A-3, No. A-6 states 'Opportunities will be provided for urban renewal.'

"Page A-3, No. B-2 states 'Reduce sediment deposition on 18 acres of agricultural land by 50 percent.'

"Page A-4, No. D-2 states 'Labor, materials, and energy for construction of project measures.'

"Page A-9, 1st paragraph states 'The goals of this environmental quality plan for the Pollard Creek watershed are to . . . preserve and enhance the biological resources and ecosystems of the watershed so that man can live in an esthetically and culturally pleasing environment.'

"Page A-9, 2nd paragraph states 'The principal environmental quality problems in the watershed are . . . the threat of loss of life, property, and source of livelihood by flooding in the urbanized area of the flood plain.'

"Page A-9, last paragraph states 'Flooding of the city parks damages swimming pool facilities and interrupts recreational use.'

"Page A-10, No. 2-f states 'prevent destruction of houses, businesses, transportation systems, and sources of livelihood of human inhabitants by flooding.'

"Page A-11, 1st paragraph states "Cropland treatment measures would include conservation cropping systems . . . grassed waterways and terraces, contour tillage and fertilizing as needed.'

"The summary of environmental effects resulting from the installation of the environmental plan lists several similar statements on pages A-12 through A-14. Examples are numbers 1-a, 1-b, 2-d, 2-e, 2-f, 2-g, 2-h, and 4-b.

Pollard Creek Watershed, Texas

"This is a partial list of these statements made in the table on 'Environmental Quality Account' (pages A-3 and A-4) and Part III, 'Abbreviated Environmental Quality Plan' (pages A-9 to A-14) which do not pertain to the quality of the natural environment.

"Therefore, we recommend that the table entitled 'Environmental Quality Account' and the section on 'Abbreviated Environmental Quality Plan' contain only objectives concerned with the quality of the natural environment, as stated in the above-mentioned Principles and Standards."

Response: The effects considered not to be related to the environmental quality account of the selected plan were deleted. An introduction has been added to the three part addendum which sets forth the purpose of the addendum and also explains the formulation of the "Abbreviated Environmental Quality Plan". No change has been made in the "Abbreviated Environmental Quality Plan (Part III)". The plan was formulated in accordance with the Soil Conservation Service's interpretation of the Water Resource Council's guidelines, in which the environmental quality plan can and should provide national economic development, regional development, and social well-being effects that are incidental and do not detract from the environmental quality objective. The "Environmental Quality Account" of the selected plan as displayed in Part II of the addendum has been revised to delete measures of effects related to national economic development, regional development, and social well-being.

Comment: The Department stated that the environmental statement covers a wide range of environmental influences and appears to satisfactorily consider the impacts of the proposed action on the environment.

Response: Noted.

Comment: The Department stated that the proposed action will not adversely affect any proposed unit of the National Park Service nor any site eligible for registration as a National Historic, National or Environmental Education Landmark.

Response: Noted.

Comment: The Department suggests that the following sentence be added to the final statement: "If archeological sites are located during construction activities, a trained archeologist will be called to the site to investigate, record, and collect material to mitigate any possible loss of information".

Pollard Creek Watershed, Texas

Response: The suggested sentence has been added to the final environmental impact statement and to the work plan.

Comment: The Department stated that they concur with the appraisal of mineral resources in the Pollard Creek watershed. They suggested the following sentence be used to more clearly state the assessment of the mineral resources: "The installation of structural measures will not adversely affect the recovery of known mineral resources in the watershed or preclude exploration for additional mineral resources which may exist there. The project will commit an estimated 500,000 tons of bituminous coal, but the proximity of the Mineral Wells community and the depth of the Thurber coalbed at this location indicated that development of this resource would be unlikely during the economic life of the Pollard Creek project".

Response: The paragraph has been added, as offered, to the work plan and environmental impact statement with the following exceptions: The wording ". . . will commit an estimated 500,000 tons . . ." has been changed to ". . . could commit an estimated 500,000 tons . . .". The available evidence does not totally confirm the existence or the extent of the coalbeds which are estimated to occur at depths of 400 feet below the surface. In addition, the impounded water may or may not affect possible future mining operations at these depths.

U. S. Department of Transportation

Comment: The Department had no comments to offer nor any objections to the project.

Response: Noted.

U. S. Environmental Protection Agency

Comment: The Agency stated that the final statement should discuss the measures to be used to stabilize the old refuse disposal area of Mineral Wells, since this area is described as a source of polluting debris for Pollard Creek floodwaters.

Response: The project plan does not include measures to stabilize the old refuse disposal area. Financial assistance for the types of measures required for stabilization is not within the authority of Public Law 566.

Comment: The Agency stated that the final statement should discuss the possible effects after project completion of the refuse disposal area on water quality in Pollard Creek.

Pollard Creek Watershed, Texas

Response: A discussion relative to the impact of floodwater reduction at the refuse disposal site has been added to the final statement in the Environmental Impact-Structural Measures section.

Advisory Council on Historic Preservation

Comment: The Council stated that they have determined that the draft environmental statement and watershed work plan appear adequate regarding their area of expertise and that they have no further comment to make.

Response: Noted.

Division of Planning Coordination (State agency designated by Governor and state clearing house)

The Division stated that the Watershed Work Plan and the Draft Environment Impact Statement had been reviewed by the Division and by interested state agencies. The Division transmitted comments from the review participants for consideration. The comments from the reviewing state agencies and the responses made to the comments are as follows:

Natural Resources Section

Comment: The Section stated that on page A-11 of the work plan, the last paragraph should be altered to indicate that urban buildup would also be managed to prevent encroachment of damage-prone improvements into the flood plain.

Response: The suggested wording has been added to the work plan.

Comment: The Section stated that further explanation is needed in the addendum of the work plan to clarify the changes contemplated for existing septic systems and why \$80,000 will be needed for septic tank installation if home improvement loans are to be secured for this purpose.

Response: An introduction has been added to the three part addendum which sets forth the purpose of the addendum and also explains the formulation of the "Abbreviated Environmental Quality Plan" and basis of authorization.

Comment: The Section stated that otherwise, this is a well-documented Draft Environmental Impact Statement and Work Plan.

Response: Noted.

Pollard Creek Watershed, Texas

Texas Water Rights Commission

Comment: The Commission stated that the documents reflected the review comments submitted by the Commission staff by letter of December 13, 1974, relative to preliminary drafts of the reference documents.

Response: Noted.

Comment: The Commission stated that the Addendum to the Work Plan, summarizing the results of project analysis pursuant to the guidelines and criteria of the Water Resources Council's Principles and Standards for Planning Water and Related Land Resources, (38 FR 24778, September 10, 1973) enhances generally the basic P. L. 566 project justification and that clarification should be given identifying the authorization basis of preparing the \$907,880 "Abbreviated Environmental Quality Plan," included as Part III of the Addendum. They stated that this Plan introduces additional projects amounting to \$185,500 from streambank stabilization, stabilization of a refuse disposal area, flood plain management, and construction of septic tanks in suburban areas. They asked if these additional projects are proposed as part of an expanded P. L. 566 project and what is the anticipated source of funding?

Response: An introduction has been added to the three part addendum which sets forth the purpose of the addendum and also explains the formulation of the "Abbreviated Environmental Quality Plan" and basis of authorization.

Texas Water Development Board

Comment: The Board stated that they have determined that no elements of the Texas Water Plan will be adversely affected by the proposed Pollard Creek development, and that any diminution of basin yield as a consequence of water stored in the two flood-water-retarding structures will be of minor significance. They, therefore, regard the proposed work as being primarily a local project in which the city of Mineral Wells will be the principal benefactor. The Board offered no adverse comments on the draft Environmental Impact Statement.

Response: Noted.

Texas State Soil and Water Conservation Board

Comment: The Board stated that they have worked with the sponsors on numerous occasions, since April 10, 1967, to assure that their flood control objectives would receive federal assistance.

Pollard Creek Watershed, Texas

Members of the State Soil and Water Conservation Board personally inspected the project area and held an informal public hearing on September 2, 1970, prior to recommending that the Soil Conservation Service develop a work plan. The Board stated that they have provided \$28,141.66 of State appropriated funds for planning.

The Board also stated that their involvement with the sponsors and the Soil Conservation Service Staff working on this project leads them 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. They urge that all associated with the project from this point forward seek expeditious implementation of the plan.

Response: Noted.

Texas Water Quality Board

Comment: The Board stated that the project should improve water quality conditions in the watershed. The Board noted that the area will be protected from soil erosion and water and air pollution both during and after construction.

Response: Noted.

Comment: The Board noted that agreements with local sponsors will set forth provisions for monitoring to determine that there are no water pollution problems being created by livestock watering and other related uses.

Response: Noted.

Texas Highway Department

Comment: The Department stated that neither the work plan or environmental impact statement indicated that the project will have an adverse effect on highways or farm-to-market roads in the area.

Response: Noted.

Comment: The Department stated that drainage at the Pollard Creek crossing on US Highway 180 will likely be improved as a result of the project.

Response: Noted.

Pollard Creek Watershed, Texas

Texas Department of Agriculture

Comment: The Department stated that the plan appears to be environmentally acceptable and that it's primary benefit is to the urban area of Mineral Wells with some benefits accruing to the surrounding agricultural areas.

Response: Noted.

Texas Air Control Board

Comment: The Board stated that any open burning should be done in accordance with Regulation 1 Rule 101.25 of the Texas Air Control Board.

Response: A discussion relative to open burning has been added to the final Environmental Impact Statement and Work Plan in the Planned Project - Structural Measure sections.

The University of Texas at Austin

Bureau of Economic Geology

Comment: The Bureau stated that they foresee no significant adverse environmental effects associated with this project.

Response: Noted.

Parks and Wildlife Department

Comment: The Department stated that while there will be some benefit to certain plant and animal communities from development of this project, the use of these resources will be limited exclusively to the landowners where development is to occur.

Response: Noted.

Comment: The Department stated that their Department's extension biologists are available to assist the Soil Conservation Service in preparing recommendations concerning land treatment measures.

Response: Noted.

Comment: The Department suggested that up to 40 percent rather than 20 percent of the brush species be left as cover for wildlife.

Response: It is recognized that leaving 40 percent of the brush species may in some instances be more beneficial to wildlife than

Pollard Creek Watershed, Texas

leaving only 20 percent. The Soil Conservation Service must consider all competing needs and desires for the use of any resource. Experience has indicated that leaving about 20 percent of brush generally offers optimum balance in meeting the competitive needs of wildlife and livestock.

Comment: The Department suggested that shelter for fish may be created within impoundments which are completely cleared of vegetation by using brush cut during clearing operations.

Response: Experience has proven that loose brush within the pools of floodwater retarding structures is a hazard to proper functioning of the principal spillways.

However, as pointed out in the Planned Project - Structural Measure section of the Environmental Impact Statement and the Works of Improvement To Be Installed - Structural Measures section of the Work Plan, any large trees in the upper fringes of the sediment pools that will not interfere with the operation of the structure will be retained.

North Central Texas Council of Governments

Comment: The Council stated that "The NCTCOG Review Process has disclosed no conflict with the review criteria of areawide comprehensive planning as outlined in OMB Circular A-95 (revised). Favorable consideration of the application by the funding agency is recommended."

Response: Noted.

LIST OF APPENDIXES

- Appendix A - Comparison of Benefits and Costs for Structural Measures
- Appendix B - Project Map
- Appendix C - Letters of Comment Received on the Draft Environmental Impact Statement
- Appendix D - List of Plant Names
- Appendix E - Urban Area Map

APPROVED BY



Acting

DATE

OCT 17 1975

Edward E. Thomas, State Conservationist

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Pollard Creek Watershed, Texas

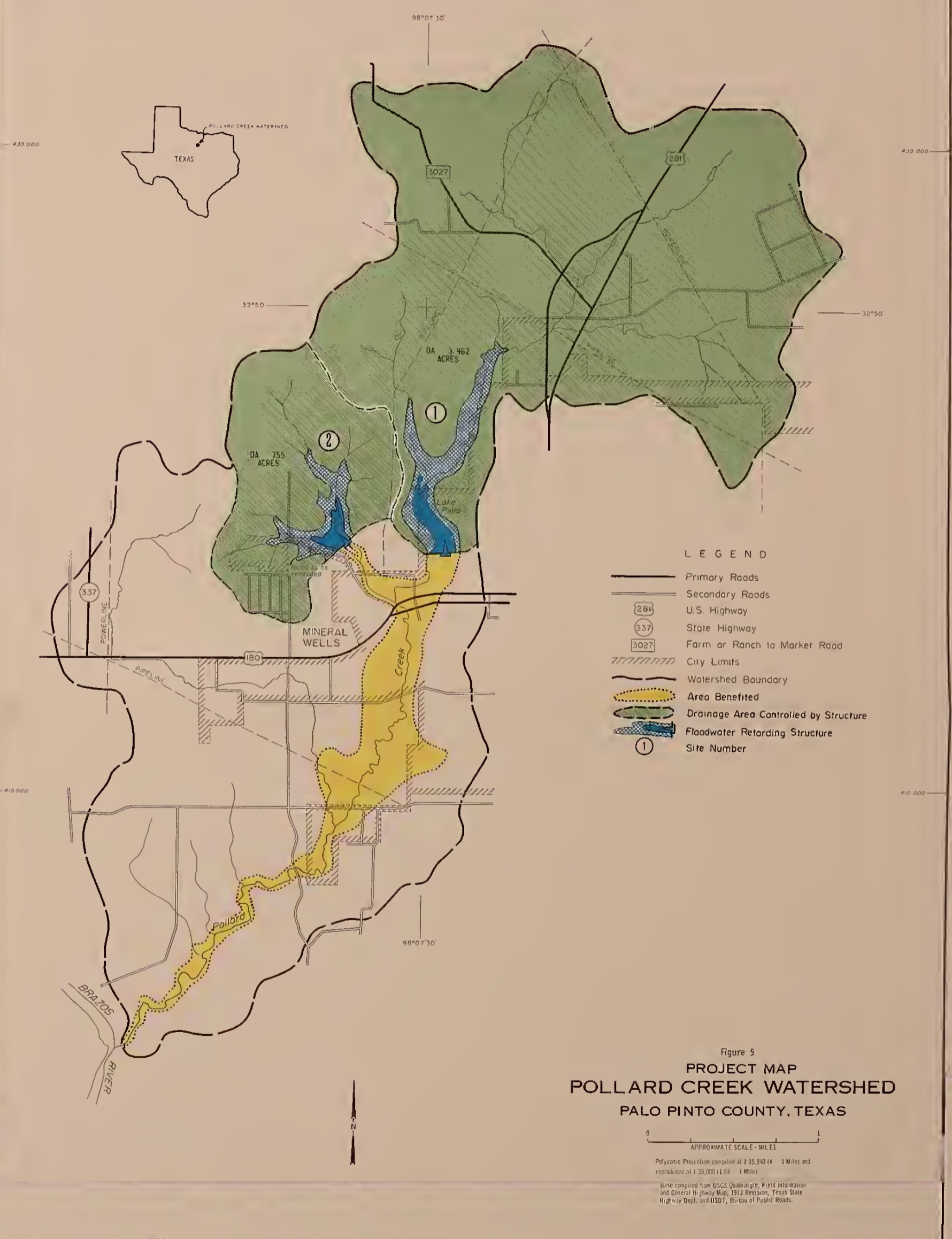
(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS ^{1/}			Total	Average Annual Cost ^{2/}	Benefit-Cost Ratio
	Damage Reduction	Secondary				
Two Floodwater Retarding Structures	64,100	270		64,370	35,760	1.8:1.0
Project Administration	xxx	xxx		xxx	4,280	xxx
GRAND TOTAL^{3/}	64,100	270		64,370	40,040	1.6:1.0

^{1/} Price Base: Current normalized prices for agricultural damages and 1974 prices for nonagricultural damages.

^{2/} Average annual cost includes installation costs based on 1974 prices amortized for 100 years at 5-7/8 percent interest and operation and maintenance costs based on current prices.

^{3/} In addition, it is estimated that planned land treatment measures will provide flood damage reduction benefits of \$3,430 annually.



LEGEND

- Primary Roads
- Secondary Roads
- 281 U.S. Highway
- 337 State Highway
- 3027 Farm or Ranch to Market Road
- City Limits
- - - Watershed Boundary
- Area Benefited
- Drainage Area Controlled by Structure
- Floodwater Retarding Structure
- 1 Site Number

Figure 5
PROJECT MAP
POLLARD CREEK WATERSHED
PALO PINTO COUNTY, TEXAS

0 1
 APPROXIMATE SCALE - MILES

Polycyclic Projection compiled at 1:15,840 (4 1 Mile) and reproduced at 1:38,000 (1.58 1 Mile)
 Base compiled from USGS Quadrangle, Field Information and General Highway Map, 1913 Revision, Texas State Highway Dept. and USDT, Bureau of Public Roads.



APPENDIX C

Letters of Comment Received
on the
Draft Environmental Impact Statement



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY

WASHINGTON, D.C. 20310

Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the State Conservationist, on behalf of the Administrator of the Soil Conservation Service, by letter dated 24 March 1975, requested the views of the Secretary of the Army on the Watershed Work Plan and the Draft Environmental Impact Statement for the Pollard Creek Watershed, Palo Pinto County, Texas.

We have reviewed the work plan and foresee no conflicts with any projects or current proposals of this Department. The draft environmental impact statement is considered to be satisfactory. Our specific comments on the reports are inclosed.

Sincerely,

Charles R. Ford
Deputy Assistant Secretary of the Army
(Civil Works)

1 Incl (dupl)
As stated

COMMENTS ON SCS WATERSHED WORK PLAN
FOR
POLLARD CREEK WATERSHED
TEXAS

1. Page 22 - The alternatives do not indicate the benefits and benefit-cost ratio needed for decision making.
2. Page 40 - The operation and maintenance cost estimate of \$420 annually appears low.
3. Figure 3 - The 100-year frequency overflow area for the urban area is incomplete, for local planning use, without the related elevation data. Data on a larger flood (such as the Federal Insurance Administration 500 year flood) would be of value in local planning decisions. A similar map for non-urban areas should be provided.



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGIONAL OFFICE

1114 COMMERCE STREET
DALLAS, TEXAS 75202

OFFICE OF
THE REGIONAL DIRECTOR

April 8, 1975

Our Reference: ET #1275-517

Edward E. Thomas
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 648
Temple, Texas 76501

Re: Pollard Creek Watershed Project
Palo Pinto County, Texas

Dear Mr. Thomas:

Pursuant to your request, this office has completed a Departmental review of the Environmental Impact Statement in accordance with the provisions of Section 102(2)(C) of P. L. 91-190 and the Council on Environmental Quality Guidelines of April 23, 1973.

Environmental health program responsibilities and standards of the Department of Health, Education, and Welfare include those vested with the United States Public Health Service and the Facilities Engineering and Construction Agency. The U. S. Public Health Service has those programs of the Federal Food and Drug Administration (milk, food, interstate travel and shellfish sanitation) and of the Health Services and Mental Health Administration, which include the Bureau of Community Environmental Management (housing hygiene, injury control, recreational health, and insect and rodent control) and the National Institute of Occupational Safety and Health.

Attached are comments and reactions to the Environmental Statement made by departmental agencies concerned with environmental health aspects of the project.

We thank you for the opportunity to coordinate our mutual environmental interests as they relate to this project proposal.

Very truly yours,

William F. Crawford
Environmental Impact Coordinator

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

Reaction Review and Comments on Environmental Impact Statement for Project Proposal:

Draft Environmental Impact Statement Reviewed With Objections

Draft Environmental Impact Statement Reviewed With No Objections

Date: April 3, 1975

EI# 1275-517

Agency/Bureau: DHEW/PHS Region VI

Project Proposal: Pollard Creek Watershed Project
Palo Pinto County, Texas

Comments:

Recommend that consideration be given to vectors of public health significance that might be associated with this project. The enclosed publication - Prevention and Control of Vector Problems associated with Water Resources, is submitted as a guide to be used in concert with State and County Laws or regulations relative to vector control measures.



United States Department of the Interior

OFFICE OF THE SECRETARY
SOUTHWEST REGION

Room 4030, 517 Gold Avenue SW.
Albuquerque, New Mexico 87101

May 15, 1975

ER-75/301

Edward E. Thomas, State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 648
Temple, Texas 76501

Dear Mr. Thomas:

This responds to your letter of March 24, 1975, addressed to the Director, Office of Environmental Project Review, requesting our comments on your Draft Watershed Work Plan and Draft Environmental Impact Statement, Pollard Creek Watershed, Texas.

The Department of the Interior has reviewed the subject draft reports and offers the following comments:

WORK PLAN

We find the work plan to be adequate. We are especially pleased to note that brush clearing measures which provide for the preservation and retention of adequate wildlife cover are being included in the work plan. It is also notable that plant species to be used in re-vegetating disturbed areas have been specifically named and recognized as being of considerable value for wildlife habitat.

However, there seems to be a degree of adulteration on the environmental objective occurring throughout the Work Plan which is especially noticeable in the Environmental Quality Account and the Abbreviated Environmental Quality Plan. Some of the component needs for the environmental quality objective reflect economic development, regional development, and social well-being, components which should appear in their respective plans or accounts.

An example would be using flood control as a component of the environmental objective. To prevent flooding of a floodplain would contribute to the destruction of the very environment that was meant to be conserved under the Environmental Quality Plan. The natural floodplain ecosystem exists because of its periodic flooding. According to the "Principles and Standards for Planning Water and Related Land Resources," Federal Register, Vol. 38, No. 174, page 33, ". . . the environmental objective reflects man's abiding concern with the

quality of the natural physical-biological system in which all of life is sustained." Man-made dams are certainly not natural.

To point out some examples of this appearing in the report, we would like to call your attention to a few of these misplaced statements.

Page A-3, No. A-1 states "Project output will make available regional funds and resources that can be used to enhance the physical appearance of 28 farms and ranches in the uplands and 15 farms and ranches on 181 acres of agricultural flood plain and 60 business and residential properties on 157 acres of urban flood plain land."

Page A-3, No. A-6 states "Opportunities will be provided for urban renewal."

Page A-3, No. B-2 states "Reduce sediment deposition on 18 acres of agricultural land by 50 percent."

Page A-4, No. D-2 states "Labor, materials, and energy for construction of project measures."

Page A-9, 1st paragraph states "The goals of this environmental quality plan for the Pollard Creek watershed are to . . . preserve and enhance the biological resources and ecosystems of the watershed so that man can live in an esthetically and culturally pleasing environment."

Page A-9, 2nd paragraph states "The principal environmental quality problems in the watershed are . . . the threat of loss of life, property, and source of livelihood by flooding in the urbanized area of the flood plain."

Page A-9, last paragraph states "Flooding of the city parks damages swimming pool facilities and interrupts recreational use."

Page A-10, No. 2-f states "Prevent destruction of houses, businesses, transportation systems, and sources of livelihood of human inhabitants by flooding."

Page A-11, 1st paragraph states "Cropland treatment measures would include conservation cropping systems . . . grassed waterways and terraces, contour tillage and fertilizing as needed."

The summary of environmental effects resulting from the installation of the environmental plan lists several similar statements on pages A-12 through A-14. Examples are numbers 1-a, 1-b, 2-d, 2-e, 2-f, 2-g, 2-h, and 4-b.

This is a partial list of these statements made in the table on "Environmental Quality Account" (pages A-3 and A-4) and Part III, "Abbreviated Environmental Quality Plan" (pages A-9 to A-14) which do not pertain to the quality of the natural environment.

Therefore, we recommend that the table entitled "Environmental Quality Account" and the section on "Abbreviated Environmental Quality Plan" contain only objectives concerned with the quality of the natural environment, as stated in the above-mentioned Principles and Standards.

ENVIRONMENTAL STATEMENT

The draft environmental statement covers a wide range of environmental influences and appears to satisfactorily consider the impacts of the proposed action on the environment. We do, however, wish to make a few comments which we believe will improve the final environmental statement.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

The proposed action will not adversely affect any proposed unit of the National Park Service nor any site eligible for registration as a National Historic, Natural or Environmental Education Landmark.

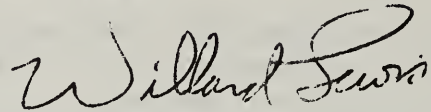
ENVIRONMENTAL IMPACT

Page 31, paragraph 6. We suggest that the following sentence be added to the final statement: "If archeological sites are located during construction activities, a trained archeologist will be called to the site to investigate, record, and collect material to mitigate any possible loss of information."

Page 32, paragraph 4. We concur with the appraisal of mineral resources in the Pollard Creek watershed; however, we believe the assessment of mineral resource commitments could be more clearly and succinctly stated. We suggest wording similar to the following paragraph: "The installation of structural measures will not adversely affect recovery of known mineral resources in the watershed or preclude exploration for additional mineral resources which may exist there." The project will commit an estimated 500,000 tons of bituminous coal, but the proximity of the Mineral Wells community and the depth of the Thurber coalbed at this location indicate that development of this resource would be unlikely during the economic life of the Pollard Creek project."

The opportunity to comment on the draft watershed work plan and the draft environmental impact statement for the Pollard Creek watershed is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "Willard Lewis". The signature is written in black ink and is positioned below the word "Sincerely,".

Willard Lewis
Special Assistant to the Secretary



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

MAY 20 1975

Mr. Edward E. Thomas
State Conservonist
Soil Conservation Service
P. O. Box 648
Temple, Texas 76501

Dear Mr. Thomas:

This is in response to your letter of 24 March 1975 addressed to Commandant, Coast Guard concerning a draft environmental impact statement for the Pollard Creek Watershed, Palo Pinto County, Texas.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

W. E. CALDWELL
Captain, U.S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
By direction of the Commandant



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1600 PATTERSON
DALLAS, TEXAS 75201

May 23, 1975

Mr. Edward E. Thomas
State Conservationist
Soil Conservation Service
P.O. Box 648
Temple, Texas 76501

Re: D-SCS-G36018-TX

Dear Mr. Thomas:

We have reviewed the Draft Environmental Impact Statement and Watershed Work Plan for Pollard Creek Watershed Project, Palo Pinto County, Texas. This project is to provide watershed protection and flood prevention. The project features include the application of land treatment measures on the 7,620 acre drainage area and the construction of two single purpose floodwater retarding structures.

The following comment is for your consideration in preparing the Final Environmental Impact Statement:

The final statement should discuss the measures to be used to stabilize the old refuse disposal area of Mineral Wells, since this area is described as a source of polluting debris for Pollard Creek floodwaters. The final statement should also discuss the possible effects after project completion of this refuse area on water quality in Pollard Creek.

This comment classifies your Draft Environmental Impact Statement as LO-2. Specifically, we have no objections to the project. Additional information is needed to evaluate the water quality impacts from the refuse disposal area. The classification and the date of our comments 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 attachment. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two (2) copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

George J. Putnicki
to- Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

IO - 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 such a determination.

**Advisory Council
On Historic Preservation**

132 K Street N.W. Suite 430
Washington D.C. 20005

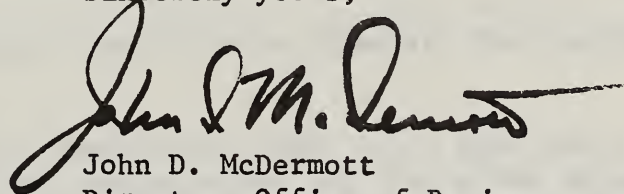
APR 16 1975

Mr. Edward E. Thomas
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 648
Temple, Texas 76501

Dear Mr. Thomas:

This is in response to your request of March 24, 1975 for comments on the environmental statement and watershed work plan for Pollard Creek Watershed Project, Palo Pinto County, Texas. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement and watershed work plan appear adequate regarding our area of expertise and we have no further comment to make.

Sincerely yours,



John D. McDermott
Director, Office of Review
and Compliance



OFFICE OF THE GOVERNOR
DIVISION OF PLANNING COORDINATION

DOLPH BRISCOE
GOVERNOR

JAMES M. ROSE
DIRECTOR

July 7, 1975

Mr. Edward E. Thomas
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 648
Temple, Texas 76501

Dear Mr. Thomas:

The Watershed Work Plan (WWP) and the draft of an Environmental Impact Statement (EIS) for the Pollard Creek Watershed, Texas have been reviewed by the Governor's Division of Planning Coordination and by interested State agencies. The EIS was reviewed in accordance with the National Environmental Policy Act of 1969.

The review participants submitted the following comments that warrant your consideration:

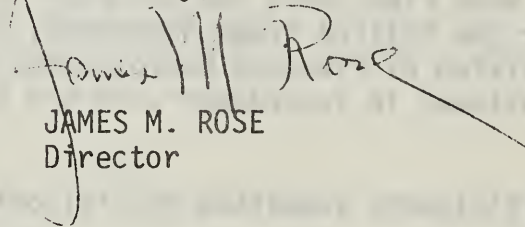
1. The Texas Water Rights Commission (TWRC) noted that their previous review comments had been incorporated into the cited documents. The TWRC requested clarification of the source of the funds for the additional projects included in the addendum to the WWP.
2. The Texas Water Development Board noted that no element of the Texas Water Development Plan would be adversely affected by the project and that any diminution of basin yield from water stored in the two floodwater-retarding structures will be of minor consequences.
3. The Texas State Soil and Water Conservation Board confirmed their participation and financial support in the planning effort for this project and urged that all concerned seek expeditious implementation of the plan.
4. The Texas Water Quality Board (TWQB) concurred with the conclusions of the cited project documents that the project should improve water quality conditions. The TWQB noted that the area will be protected from water and air pollution during and after construction and that local sponsors had agreed to provide monitoring to assure that livestock operations do not create water pollution problems.

Mr. Edward E. Thomas
Page 2

5. The Texas Highway Department confirmed comments submitted previously and expressed appreciation for the opportunity of reviewing the project prior to the initiation of detailed planning by the Soil Conservation Service.
6. The Texas Department of Agriculture noted that the plan is environmentally acceptable and will provide benefits to the urban area of Mineral Wells and the surrounding agricultural area.
7. The Texas Air Control Board (TACB) commented that any open air burning should be done in accordance with pertinent regulations of the TACB.

The Bureau of Economic Geology also participated in the review of this project. The enclosed comments are to assist in your planning effort. If we can be of further assistance, please let us know.

Sincerely,



JAMES M. ROSE
Director

JMR:bks

Enclosures

cc: Mr. Joe D. Carter, Texas Water Rights Commission
Mr. Harry P. Burleigh, Texas Water Development Board
Mr. Harvey Davis, Texas State Soil and Water Conservation Board
Mr. Hugh C. Yantis, Jr., Texas Water Quality Board
Mr. B. L. DeBerry, Texas Highway Department
The Honorable John C. White, Texas Department of Agriculture
Mr. Charles R. Barden, Texas Air Control Board
Dr. Charles G. Groat, Bureau of Economic Geology

COMMENTS

NATURAL RESOURCES SECTION

POLLARD CREEK WATERSHED

1. On page A-11 of the Work Plan, the last paragraph should be altered to indicate that urban buildup would also be managed to prevent encroachment of damage-prone improvements into the flood plains.
2. Also on page A-11 of the Work Plan, further explanation is needed to clarify the changes contemplated for existing septic systems. Why will \$80,000 be needed for septic tank installation (p. A-12) if home improvement loans are to be secured by homeowners for this purpose (p. A-11)?
3. Otherwise, this is a well documented DES and Work Plan.

Joe B. Harris

JOE B. HARRIS

May 7, 1975

John Gosdin

JOHN GOSDIN

May 7, 1975

MEMORANDUM FOR THE RECORD

On the 1st day of January 1900, the following...

The first item was...

The second item was...

The third item was...

The fourth item was...

The fifth item was...

The sixth item was...

W. J. [Signature]

TEXAS WATER RIGHTS COMMISSION

STEPHEN F. AUSTIN STATE OFFICE BUILDING

COMMISSIONERS

JOE D. CARTER, CHAIRMAN
475-2453

May 9, 1975

DORSEY B. HARDEMAN
475-4325

AUDREY STRANDMAN
SECRETARY

BURKE HOLMAN
475-2451

475-4514

Brigadier General James M. Rose
Director, Division of Planning Coordination
Office of the Governor
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Attention: Mr. Wayne N. Brown

Re: U.S. Department of Agriculture,
Soil Conservation Service --
A. Review Draft of Work Plan
(February 1975); and
B. Draft Environmental Impact
Statement (February 1975) --
Pollard Creek Watershed
Protection and Flood Prevention
Project, Palo Pinto County,
Texas.

Dear General Rose:

By letters of March 24, and April 1, 1975, the State Conservationist, U.S. Department of Agriculture, Soil Conservation Service at Temple, Texas, and your office requested that the appropriate State agencies review and submit comments on the referenced documents, pursuant to the provisions of the National Environmental Policy Act of 1969, and Office of Management and Budget Circular No. A-95.

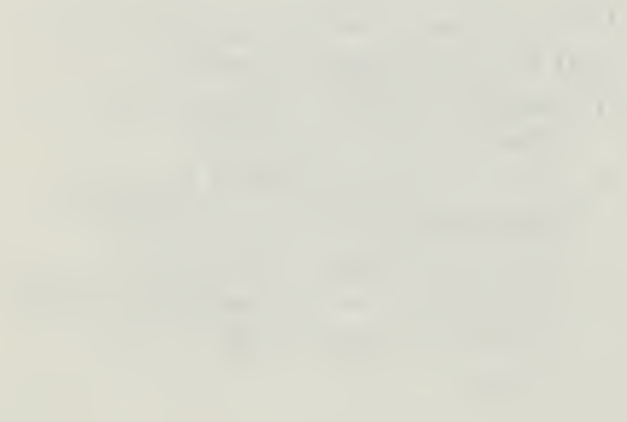
The Commission staff has reviewed the referenced documents relative to the \$722,380, P. L. 566 project involving the construction of two floodwater retarding structures (\$672,180), and the installation of land treatment measures for 2,620 acres of crop, pasture, and rangelands (\$50,200).

LABORATORY REPORT

Name: _____
Date: _____

Section: _____
Instructor: _____

Objective: _____
Theory: _____
Procedure: _____



Results: _____

Discussion: _____
Conclusion: _____

References: _____
Appendix: _____

The staff finds that:

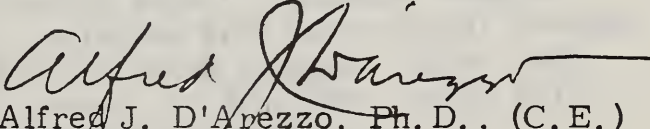
1. The referenced documents reflect the review comments submitted by the Commission staff by letter of December 13, 1974, relative to preliminary drafts of the referenced documents.
2. The Addendum to the Work Plan, summarizing the results of project analysis pursuant to the guidelines and criteria of the Water Resources Council's Principles and Standards for Planning Water and Related Land Resources, (38 FR 24778, September 10, 1973) enhances generally the basic P. L. 566 project justification. However, clarification should be given identifying the authorization basis of preparing the \$907,880 "Abbreviated Environmental Quality Plan," included as Part III of the Addendum. This Plan introduces additional projects amounting to \$185,500 from streambank stabilization, stabilization of a refuse disposal area, flood plain management, and construction of septic tanks in suburban areas. Specifically, are these additional projects proposed as part of an expanded P. L. 566 project? What is the anticipated source of funding?

The above comments are furnished with the constructive intent of enhancing the referenced documents. Notify the undersigned (Phone 512-475-2678) if you have any questions on the comments.

Sincerely yours,

TEXAS WATER RIGHTS COMMISSION

AJD:ll


By: Alfred J. D'Aprezzo, Ph. D., (C.E.)
Special Analyst for Environment
and Interagency Coordination

TEXAS WATER DEVELOPMENT BOARD

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FRIONA



P.O. BOX 13087
CAPITOL STATION
AUSTIN, TEXAS 78711

AREA CODE 512
475-3571
1700 NORTH CONGRESS AVENUE

May 9, 1975

IN REPLY REFER TO:

TWDBP-0

General James M. Rose, Director
Division of Planning Coordination
Office of the Governor
P.O. Box 12428, Capitol Station
Austin, Texas 78711

Dear Jim:

Please refer to your memorandum dated April 1, 1975 which transmitted for review and comment the "Draft Environmental Impact Statement Pollard Creek Watershed Project, Palo Pinto County, Texas."

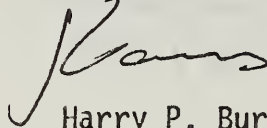
From our staff-level review of this report, we have determined that no elements of the Texas Water Plan will be adversely affected by the proposed Pollard Creek development, and that any diminution of basin yield as a consequence of water stored in the two floodwater-retarding structures will be of minor significance. We therefore regard the proposed work as being primarily a local project in which the City of Mineral Wells will be the principal benefactor.

The report shows that the one percent flood event (100 year flood) would cause an estimated \$345,000 damage to 10 businesses, 50 residences, and 25 agricultural land users. However, the average annual floodwater damages under non-project conditions is \$56,900, including \$750 agricultural damages, \$360 damages to roads and bridges, and \$55,790 urban damages. Total cost of installing the project, based on 1974 prices, is \$722,380. Costs will be borne by the City of Mineral Wells and Palo Pinto County.

General James M. Rose, Director
May 9, 1975
Page 2

This agency offers no adverse comments on the Draft Environmental Impact Statement for the Pollard Creek Watershed Project, Palo Pinto County, Texas.

Sincerely,



Harry P. Burleigh



TEXAS STATE SOIL AND WATER CONSERVATION BOARD

1018 First National Building
Temple, Texas 76501
AREA CODE 817. 773-2250

April 25, 1975

Mr. Wayne N. Brown, Chief
State Planning & Development
Office of the Governor
Division of Planning Coordination
P. O. Box 12428, Capitol Station
Austin, Texas 78711

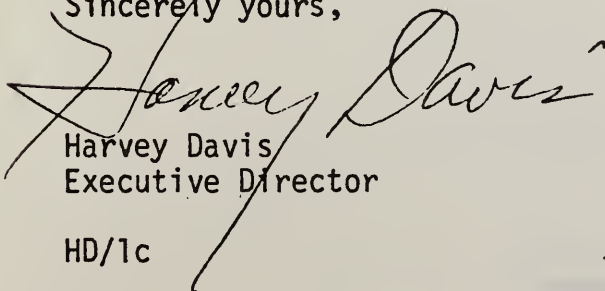
Dear Mr. Brown:

You have forwarded for our review and comment, a copy of the Work Plan and a copy of the Draft Environmental Impact Statement for Pollard Creek Watershed, Palo Pinto County, Texas submitted by the Soil Conservation Service, U.S. Department of Agriculture.

This agency received the application for assistance on **this** project on April 10, 1967. Since then we have worked with the sponsors on numerous occasions attempting to ensure that their flood 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 September 2, 1970 prior to recommending that the Soil Conservation Service develop a work plan. We have also provided \$28,141.66 of state appropriated funds for planning.

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 expeditions implementation of the plan.

Sincerely yours,


Harvey Davis
Executive Director

HD/lc

TEXAS WATER QUALITY BOARD

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CHAIRMAN

FRANK H. LEWIS
VICE CHAIRMAN

HARRY P. BURLEIGH

CLAYTON T. GARRISON



J. E. PEAVY, MD

BEN RAMSEY

HUGH C. YANTIS, JR.
EXECUTIVE DIRECTOR

PH. (512) 475-2651

1700 NORTH CONGRESS AVE. 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

April 25, 1975

Re: Draft Environmental Impact
Statement - Pollard Creek
Watershed in Palo Pinto
County

General James M. Rose, Director
Division of Planning Coordination
Office of the Governor
P. O. Box 12428, Cap. Sta.
Austin, Texas 78711

Dear General Rose:

The staff of the Texas Water Quality Board has reviewed the draft environmental impact statement and also the draft watershed work plan for the Pollard Creek watershed in Palo Pinto County and concurs with the draft statement as well as the work plan conclusions that the project should improve water quality conditions in the watershed. It has been noted that the area will be protected from soil erosion and water and air pollution both during and after construction. Also, that agreements with local sponsors will set forth provisions for monitoring to determine that there are no water pollution problems being created by livestock watering and other related uses.

We appreciate the opportunity to review this project. If we can be of further assistance, please let us know.

Sincerely,

A handwritten signature in cursive script that reads "Emory G. Long".

Emory G. Long, Director
Administrative Operations Division

cc: Soil Conservation Service, Temple, Texas
TWQB District 4



COMMISSION

REAGAN HOUSTON, CHAIRMAN
DEWITT C. GREER
CHARLES E. SIMONS

TEXAS HIGHWAY DEPARTMENT
11TH AND BRAZOS
AUSTIN, TEXAS 78701

STATE HIGHWAY ENGINEER
B. L. DEBERRY

May 2, 1975

IN REPLY REFER TO
FILE NO. D-5

SUBJECT: Work Plan and Draft Environmental Impact
Statement for Pollard Creek Watershed,
Palo Pinto County, Texas

Mr. Wayne N. Brown, Chief
State Planning and Development
Division of Planning Coordination
Office of the Governor
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Dear Sir:

We have reviewed the work plan and draft environmental impact statement for the proposed watershed protection and flood prevention project on Pollard Creek in Mineral Wells and vicinity which were transmitted with your memorandum of April 1, 1975. Neither document indicates that the project will have an adverse effect on highways or farm to market roads in the area. As stated in our letter of December 16, 1974, drainage at the Pollard Creek crossing on U.S. 180 will likely be improved as a result of the project.

Again we are grateful for the opportunity of reviewing this matter prior to the commencement of detailed planning by the Soil Conservation Service.

Sincerely yours

B. L. DeBerry
State Highway Engineer

By: *Marcus L. Yancey, Jr.*

Marcus L. Yancey, Jr.
Asst. State Highway Engineer



EDMUND L. NICHOLS
Assistant Commissioner

April 9, 1975

Mr. Wayne N. Brown
State Planning and Development
Division of Planning Coordination
Office of the Governor
Austin, Texas 78711

Dear Wayne:

As requested by your letter of April 1, 1975, we have reviewed the Work Plan and Draft Environmental Impact Statement for Pollard Creek Watershed, Palo Pinto County, Texas.

This plan appears to be environmentally acceptable. It's primary benefit is to the urban area of Mineral Wells with some benefits accruing to the surrounding agricultural areas.

We appreciate the opportunity to review the plan.

Sincerely,

A handwritten signature in cursive script that reads "Edmund L. Nichols".

Edmund L. Nichols

ELN/db



TEXAS AIR CONTROL BOARD

PHONE 512/451-5711
8520 SHOAL CREEK BOULEVARD

CHARLES R. BARDEN, P. E.
EXECUTIVE DIRECTOR

AUSTIN, TEXAS - 78758

JOHN L. BLAIR
Chairman

HERBERT W. WHITNEY, P.E.
Vice-Chairman

ALBERT W. HARTMAN, JR., M.D.
E.W. ROBINSON, P.E.
CHARLES R. JAYNES
JAMES D. ABRAMS, P.E.
FRED HARTMAN
WILLIE L. ULICH, Ph.D., P.E.
JOE C. BRIDGEFARMER, P.E.

April 8, 1975

Mr. Wayne N. Brown, Chief
State Planning and Development
Office of the Governor
Division of Planning Coordination
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Dear Mr. Brown:

We have completed our review of the Work Plan and Draft Environmental Impact Statement for Pollard Creek Watershed, Palo Pinto County and have the following comment. Any open burning should be done in accordance with Regulation 1 Rule 101.25 of the Texas Air Control Board.

Thank you for the review opportunity. If we can assist you further, please contact me.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Bill Stewart".

Bill Stewart, P.E.
Director
Control and Prevention

cc: Mr. Melvin Lewis, Regional Supervisor, Fort Worth

Attachment

TEXAS AIR CONTROL BOARD

REGULATION I

CONTROL OF AIR POLLUTION FROM
SMOKE, VISIBLE EMISSIONS, AND PARTICULATE MATTER

Rule 101. Outdoor Burning

- 101.1 No person may cause, suffer, allow or permit any outdoor burning within the State of Texas, except as provided by Rule 101.2.
- 101.2 Outdoor burning is authorized in the following instances if no nuisance is or will be created:
- 101.21 Outdoor burning when conducted pursuant to a written grant of authority by the Texas Air Control Board or Executive Director.
- 101.22 Outdoor burning for the purpose of training fire-fighting personnel when requested by certified mail and when authorized in writing by the local air pollution control agency or local health unit. If notice of denial from the local air pollution control agency or local health unit is not received within ten (10) days of the request, the burning is authorized. Authorization to conduct outdoor burning under this provision may be revoked by the Texas Air Control Board if it is found that this provision is used to circumvent Rule 101.
- 101.23 Outdoor burning of domestic waste at and from a property designed for and used exclusively as a private residence, housing not more than three families when collection of the domestic waste is not provided by the local governmental entity having jurisdiction.
- 101.24 Outdoor burning consisting of campfires and fires used solely for recreational or ceremonial purposes, or in the non-commercial preparation of food.
- 101.25 Outdoor burning in a rural area of trees, brush, grass, and other dry vegetable matter from such area in land-clearing, right-of-way maintenance operations, forest management purposes, and range land management purposes, if all the following conditions are met:

- 101.251 The burning must be outside the corporate limits of a city or town except when it is necessary to eliminate a naturally occurring fire hazard.
- 101.252 The wind direction at the time of starting the burning must be away from any nearby city, town, residence, recreational, commercial, or industrial area.
- 101.253 The burning must be at least one thousand feet from any residence, recreational, commercial, or industrial area except those located on the property where the burning is to take place, except when it is necessary to eliminate a naturally occurring fire hazard.
- 101.254 Heavy oils, asphaltic materials, items containing natural or synthetic rubber or any material other than dry plant growth which may produce unreasonable amounts of smoke must not be burned.
- 101.255 If the burning will cause smoke to blow onto or across a highway, it is the responsibility of the person initiating the burning to post flagmen on affected roads in accordance with the requirements of the Department of Public Safety.
- 101.256 The initial burning for land clearing and right-of-way maintenance purposes may be commenced after 9:00 a.m. Material which will not be completely consumed before 5:00 p.m. shall not be added to the fire.
- 101.257 Burning within an area should be staggered so that total atmospheric loads of smoke are reduced.
- 101.258 Burning shall not be conducted when meteorological forecasts predict wind movement of less than three (3) miles per hour or greater than fifteen (15) miles per hour or when a significant shift in wind direction is predicted which could produce adverse effects to personnel, animals, or property during the burning period.
- 101.259 Burning shall not be conducted during periods of actual or predicted persistent (12 hours or more) low-level (below 1600 feet) atmospheric inversions or in areas covered by a current air stagnation advisory.

- 101.26 Outdoor burning of the garbage and rubbish generated by a city or town having a population of less than 5,000, as determined by the most recent federal census, or by any unincorporated area serving less than 5,000, as determined by the most recent federal census, may be conducted if the following conditions are met:
- 101.261 The city or unincorporated area and the location of the burning must be outside a defined Standard Metropolitan Statistical Area.
 - 101.262 Cities in newly designated Standard Metropolitan Statistical Areas shall have eighteen (18) months after the designation of the Standard Metropolitan Statistical Area to comply with Rule 101.
 - 101.263 The location of the burning must not be within a city or town; must be at least one mile from any residential, recreational, commercial, or industrial area; and must be at least 300 yards from any public road.
 - 101.264 The initial burning may be commenced only between the hours of 9:00 a.m. and 1:00 p.m. Combustible material must not be added to the fire between 1:00 p.m. of one day and 9:00 a.m. of the following day.
 - 101.265 The exceptions provided by Rule 101.26 will not apply after December 31, 1973, to cities with a population over 3,000, as determined by the most recent federal census.
- 101.27 Outdoor burning of hydrocarbons from pipeline breaks and oil spills may be allowed upon proper notification as set forth in Rule 7 of the General Rules, if the Executive Director determines that the burning is necessary to protect the public welfare.
- 101.3 No disposal or deposit outdoors of any material capable of igniting spontaneously is allowed except where the disposal or deposit is made pursuant to a specific grant of authority by the Texas Air Control Board or the Executive Director.
- 101.4 The authority to conduct outdoor burning under this Regulation does not exempt or excuse the person responsible from the consequences, damages, or injuries resulting from the burning and does not exempt or excuse anyone from complying with all other applicable laws or ordinances, regulations and orders of governmental entities having jurisdiction even though the burning is otherwise conducted in compliance with the regulation.

Rule 102. Incineration

- 102.1 No person may cause, suffer, allow, or permit the burning of garbage or rubbish in a single-chamber residential or commercial incinerator unless the Executive Director approves an incinerator demonstrated to provide equivalent performance to multiple-chamber incinerators.
- 102.2 No person may cause, suffer or permit the burning of garbage or rubbish in a single-chamber incinerator constructed after April 1, 1972, unless the Executive Director approves an incinerator demonstrated to provide equivalent performance to multiple-chamber incinerators.

Rule 103. Visible Emissions.

- 103.1 No person may cause, suffer, allow, or permit visible emissions from any stationary flue to exceed an opacity of 30% averaged over a 5-minute period. No person may cause, suffer, allow, or permit visible emissions from any stationary flue beginning construction after January 31, 1972, to exceed an opacity of 20% averaged over a 5-minute period. Visible emissions during the cleaning of a firebox or the building of a new fire, sootblowing, equipment changes, ash removal and rapping of precipitators may exceed the limits set forth in Rule 103.1 for a period aggregating not more than five minutes in any sixty consecutive minutes, nor more than six hours in any ten-day period.
- 103.2 No person may cause, suffer, allow, or permit visible emissions from a waste gas flare for more than five minutes in any 2-hour period except as provided in Rule 12.1 of the General Rules.
- 103.3 No person may cause, suffer, allow, or permit excessive visible emissions from any building or enclosed facility.
- 103.4 No person may cause, suffer, allow, or permit excessive visible emissions from motor vehicles for more than ten consecutive seconds.
- 103.5 No person may cause, suffer, allow, or permit excessive visible emissions from any railroad locomotive, ship or any other vessel, except during reasonable periods of engine start-up.
- 103.6 No person may cause, suffer, allow, or permit visible emissions from any stationary flue having a total flow rate of 100,000 acfm or more to exceed an opacity of 15% averaged over a 5-minute period unless an optical instrument capable of measuring the opacity of emissions is installed in the flue. Records of all such measurements shall be retained as provided for in Rule 9 of the General Rules. The provision shall not apply to flues having gas streams containing moisture which interferes with proper instrument operation, if so determined by the Executive Director.

103.7 Contributions from uncombined water shall not be included in determining compliance with Rule 103. The burden of proof which establishes the applicability of Rule 103.7 shall be upon the person seeking to come within its provisions.

Rule 104. Particulate Matter from Materials Handling, Construction, and Roads.

104.1 Rule 104 shall apply only in Standard Metropolitan Statistical Areas where the federal air quality standards for particulate matter are exceeded.

104.2 No person may cause, suffer, allow, or permit any fine material to be handled, transported, or stored without taking at least the following precautions to prevent particulate matter from becoming airborne:

104.21 Application of water or suitable chemicals or some other covering on materials stockpiles, and other surfaces which can create airborne dusts under normal conditions;

104.22 Installation and use of hoods, fans and filters to enclose, collect, and clean the emissions of dusty materials;

104.23 Covering or wetting at all times when in motion, of open-bodied trucks, trailers, or railroad cars transporting materials in areas where the general public has access which can create airborne particulate matter.

104.3 No person may cause, suffer, allow or permit a building structure to be used, constructed, altered, repaired or demolished without taking at least the following precautions to prevent particulate matter from becoming airborne:

104.31 Use of water or chemicals where feasible for control of dust in the demolition of buildings or structures, in construction operations, or in the clearing of land;

104.32 Use of adequate methods to prevent airborne particulate matter during sandblasting of buildings or other similar operations.

104.4 No person may cause, suffer, allow, or permit a road to be used, constructed, altered, or repaired without taking at least the following precautions to prevent particulate matter from becoming airborne:

104.41 Application of asphalt, oil, water or suitable chemicals on heavily traveled dirt streets as necessary.

- 104.42 Paving of public or commercial parking surfaces having more than five parking spaces.
- 104.43 Removal as necessary from paved street and parking surfaces of earth or other material which have a tendency to become airborne.
- 104.5 Alternate means of control may be approved by the Executive Director of the Texas Air Control Board.

Rule 105. Particulate Matter

105.1 No person may cause, suffer, allow, or permit emissions of particulate matter from any source to exceed the allowable rates specified in Table 1 and/or Figure 1.

105.11 If a source has an effective stack height less than the standard effective stack height as determined from Table 2 and/or Figure 2, the allowable emission level must be reduced by multiplying it by:

$$\left(\frac{\text{Effective Stack Height}}{\text{Standard Effective Stack Height}} \right)^2$$

105.12 Effective stack height shall be calculated by the following equation:

$$h_e = h + 0.083 v_e D_e \left[1.5 + 0.82 \left(\frac{T_e - 550}{T_e} \right) D_e \right]$$

Where:

h_e = Effective stack height in feet (ft)

h = Physical stack height above ground level in feet (ft)

v_e = Stack exit velocity in feet per second (ft/sec)

D_e = Stack exit inside diameter in feet (ft)

T_e = Stack exit temperature in degrees Rankin ($^{\circ}$ R)

105.2 No person may cause, suffer, allow or permit emissions of particulate matter from a source or sources operated on a property or from multiple sources operated on contiguous properties to exceed any of the following net ground level concentrations.

105.21 One hundred (100) micrograms per cubic meter ($\mu\text{g}/\text{M}^3$) of air sampled, averaged over any five (5) consecutive hours.

105.22 Two hundred (200) micrograms per cubic meter ($\mu\text{g}/\text{M}^3$) of air sampled, averaged over any three (3) consecutive hours.

105.23 Four hundred (400) micrograms per cubic meter ($\mu\text{g}/\text{M}^3$) of air sampled, averaged over any one (1) hour period.

105.3 Rules 105.1 and 105.2 shall not apply to any oil or gas fuel fired steam generator with a heat input greater than 2500 million BTU per hour or any solid fossil fuel fired steam generator.

105.31 No person may cause, suffer, allow, or permit emissions of particulate matter from any solid fossil fuel fired steam generator to exceed 0.3 lbs. per million BTU heat input maximum 2-hour average.

105.32 No person may cause, suffer, allow or permit emissions of particulate matter from any oil or gas fuel fired steam generator with a heat input greater than 2500 million BTU per hour to exceed 0.1 lb. per million BTU heat input maximum 2-hour average..

Rule 106. Transient Operations.

106.1 Rules 103 and 105 shall not apply to portable hot-mix asphaltic concrete plants, portable rock-crusher, and other transient operations engaged in public works projects which are not operated at the same premise for more than six months if all the following conditions are met:

106.11 The plant is located at least one mile outside the nearest corporate limits of any city or town.

106.12 The plant is located at least one mile from any occupied facility or recreational area other than that located on the same property as the plant.

106.13 The plant is equipped with cyclones, or wet scrubbers, or water sprays at the material transfer points open to the atmosphere, or other equipment or systems approved by the Executive Director, properly installed, in good working order and in operation.

106.2 The time requirement for Rule 106.1 may be extended by the Executive Director upon written request.

106.3 All emissions from sources operating under provisions of Rule 106 shall be controlled so as not to permit or create a nuisance.

106.4 Rule 106 shall not apply in Dallas or Harris Counties.

106.5 Rule 106 shall not apply to portable hot-mix asphaltic concrete plants after December 31, 1974.

Rule 107. Agricultural Process.

107.1 Rules 103, 104, 105 and 108 shall not apply to any person affected by Section 3.10 (e) of the Texas Clean Air Act.

- 107.2 No person affected by Section 3.10 (e) of the Texas Clean Air Act may cause, suffer, allow, or permit emissions of particulate matter from any or all sources associated with a specific process to exceed the allowable levels specified in Table 3 and/or Figure 3, except as provided by Rule 107.3.
- 107.3 Any person affected by Section 3.10 (e) of the Texas Clean Air Act who does not wish to be controlled by the process weight method, established by Rule 107.2, may select an alternate method of control which the Executive Director finds will provide emission control efficiency and measurement to achieve the same goal as Rule 107.2.
- 107.4 Any person affected by Section 3.10 (e) of the Texas Clean Air Act who does not select an alternate method and notify the Executive Director, in writing, prior to any plant investigation by the staff of the Texas Air Control Board shall be controlled by the process weight method established by Rule 107.2, unless the Executive Director, at his discretion, chooses to accept proposals for an alternate method at that time.
- 107.5 Nothing herein is intended to affect the limitations on burning set out in Rule 101.
- 107.6 Persons affected by Rule 107 shall be in compliance with the provisions set forth herein by February 15, 1973.

Rule 108. Persons affected by this Regulation shall be in compliance with the provisions contained herein no later than December 31, 1973. Not later than six months after the effective date of this Regulation, any person affected by this Regulation shall submit to the Texas Air Control Board a written report on his compliance status, including but not limited to, the minimum time required to design, procure, install and test abatement equipment or procedures. Progress reports shall be submitted to the Board every four months commencing in July of 1972 until compliance is achieved.

All persons shall continue to be governed by the provisions of Regulation I, which became effective on March 16, 1967, and amended on January 23, 1968, September 12, 1969, and May 18, 1971, and Regulation II, which became effective February 22, 1968, and amended on September 12, 1969, until December 31, 1973, at which time this Regulation shall supersede the previous Regulation I and II.

Date Adopted: January 26, 1972
 Date Filed with Secretary of State: February 4, 1972
 Date Effective: March 5, 1972
 Amendment of Rule 105.3
 Date Adopted: December 19, 1973
 Date Filed with Secretary of State: December 20, 1973
 Date Effective: January 19, 1974

TABLE 1

ALLOWABLE PARTICULATE EMISSION RATES

FOR SPECIFIC FLOW RATES

Effluent Flow Rate acfm	Rate of Emission lb/hr
1,000	3.5
2,000	5.3
4,000	8.2
6,000	10.6
8,000	12.6
10,000	14.5
20,000	22.3
40,000	34.2
60,000	44.0
80,000	52.6
100,000	60.4
200,000	92.9
400,000	143.0
600,000	184.0
800,000	219.4
1,000,000	252.0

Interpolation and extrapolation of the data in this table shall be accomplished by the use of the equation $E = 0.048 q^{0.62}$ where E is the allowable emission rate in lb/hr and q is the stack effluent flow rate in acfm.

FIGURE 1

ALLOWABLE PARTICULATE EMISSION RATES

FOR SPECIFIC FLOW RATES

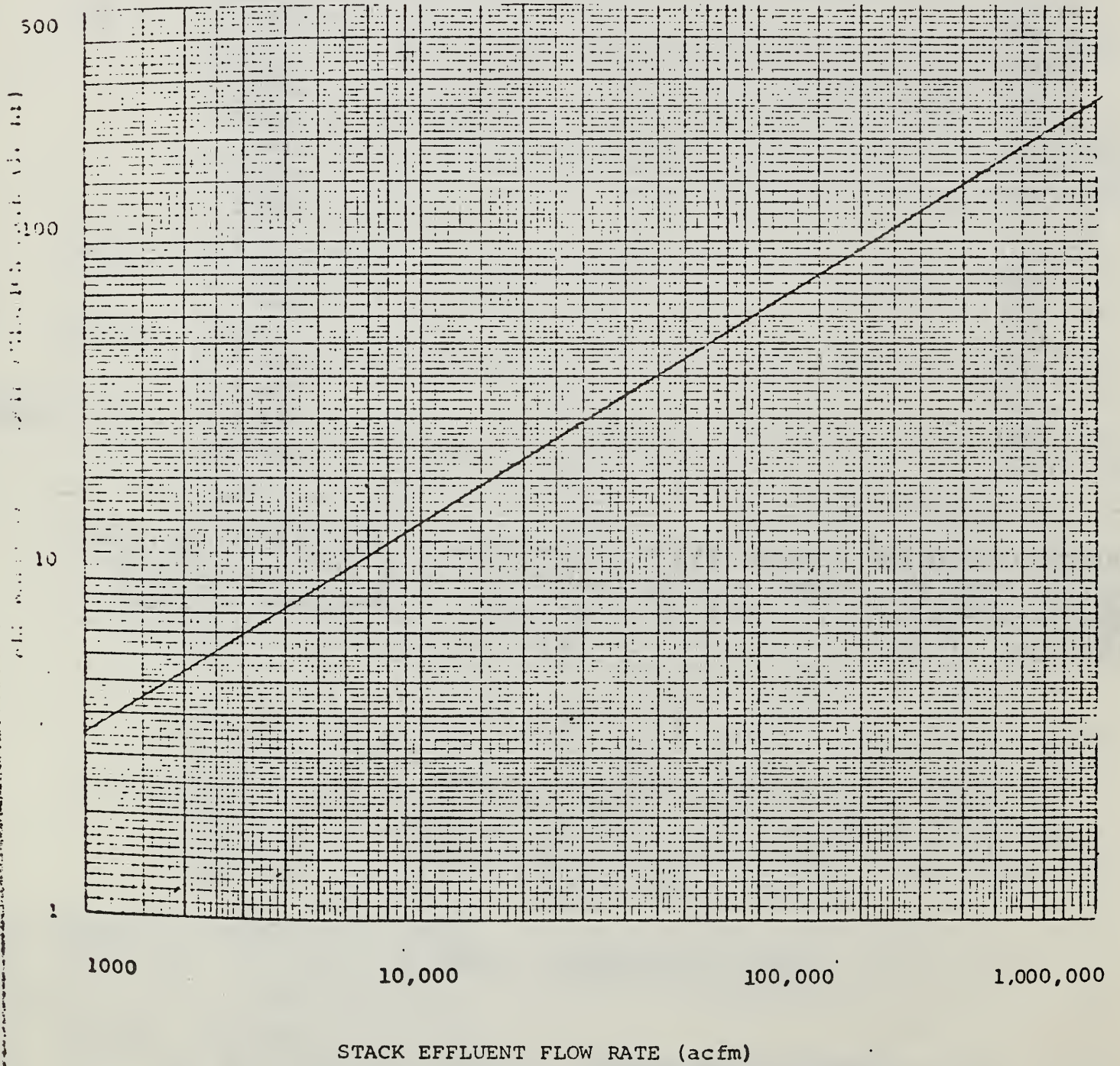


TABLE 2

STANDARD EFFECTIVE STACK HEIGHT
 BASED ON SPECIFIC FLOW RATES

Effluent Flow Rate acfm	Standard Effective Stack Height ft
1,000	12
2,000	15
4,000	19
6,000	22
8,000	24
10,000	26
20,000	34
40,000	43
60,000	49
80,000	55
100,000	59
200,000	75
400,000	96
600,000	110
800,000	122
1,000,000	132

Interpolation and extrapolation of the data in this Table shall be accomplished by the use of the equation $H_e = 1.05 q^{0.35}$ where H_e is the standard effective stack height in feet and q is the stack effluent flow rate in acfm.

FIGURE 2

STANDARD EFFECTIVE STACK HEIGHT

BASED ON SPECIFIC FLOW RATES

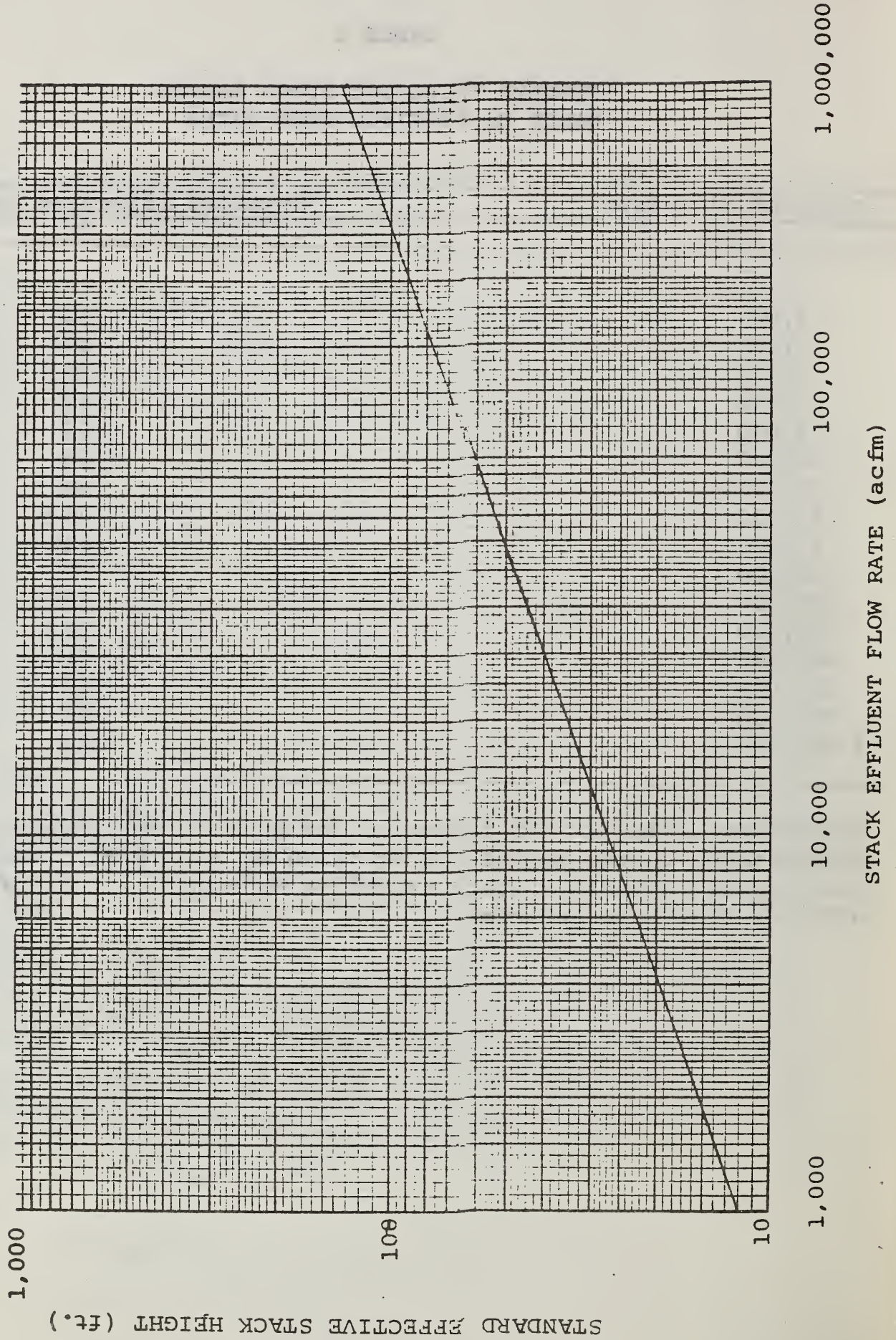


TABLE 3

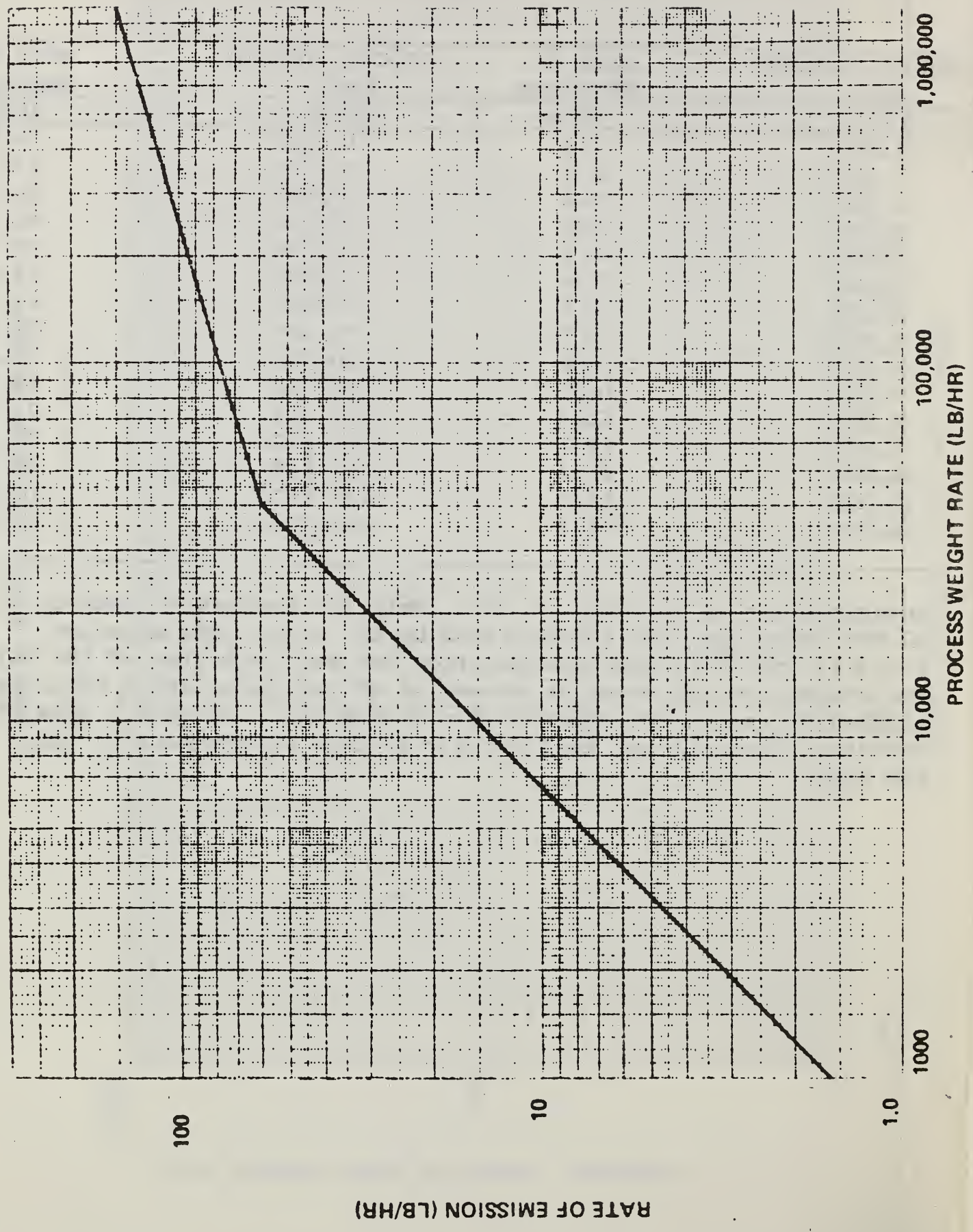
ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE

PROCESS WEIGHT RATE	RATE OF EMISSION	PROCESS WEIGHT RATE	RATE OF EMISSION
lb/hr	lb/hr	lb/hr	lb/hr
1,000	1.6	16,000	24.2
1,500	2.4	18,000	27.2
2,000	3.1	20,000	30.1
2,500	3.9	30,000	44.9
3,000	4.7	40,000	59.7
3,500	5.4	50,000	64.0
4,000	6.2	60,000	67.4
5,000	7.7	70,000	70.5
6,000	9.2	80,000	73.2
7,000	10.7	90,000	75.7
8,000	12.2	100,000	78.1
9,000	13.7	150,000	87.7
10,000	15.2	200,000	95.2
12,000	18.2	250,000	101.5
14,000	21.2	500,000	123.9

Interpolation of the data in this table for process weights up to 40,000 lb/hr shall be accomplished by the use of the equation $E = 3.12 (p^{0.985})$, and interpolation and extrapolation of the data for process weight rates in excess of 40,000 lb/hr shall be accomplished by use of the equation $E = 25.4 (p^{0.287})$ where E = rate of emission in pounds per hour and p = process weight rate in tons per hour.

FIGURE 3

ALLOWABLE PARTICULATE EMISSION LEVELS BASED ON
PROCESS WEIGHT RATE





THE UNIVERSITY OF TEXAS AT AUSTIN
BUREAU OF ECONOMIC GEOLOGY
AUSTIN, TEXAS 78712

April 17, 1975

University Station, Box X
Phone 512—471-1534

Mr. Wayne N. Brown, Chief
Division of Planning Coordination
P. O. Box 12428
Austin, Texas 78711

Dear Mr. Brown:

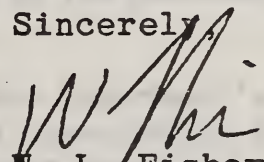
The staff of the Bureau of Economic Geology has reviewed the Work Plans and Draft Environmental Impact Statements for:

- (1) Elm Creek (Cen-Tex) Watershed, Texas
- (2) Pollard Creek Watershed, Palo Pinto County, Texas
- (3) Sandy Creek Watershed, Jasper County, Texas

We foresee no significant adverse environmental effects associated with these projects.

Thank you for the opportunity to respond.

Sincerely,


W. L. Fisher
Director

WLF:wll



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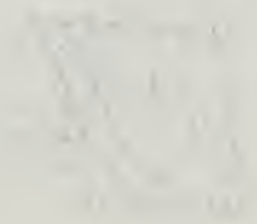
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PARKS AND WILDLIFE DEPARTMENT



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LOUIS H. STUMBERG
San Antonio

June 16, 1975

Mr. Wayne N. Brown
Office of the Governor
Division of Planning Coordination
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Dear Mr. Brown:

This Department has reviewed the draft environmental statements and accompanying work plans for the Elm Creek Watershed Project, Bell, Falls, McLennan, and Milam Counties, and Pollard Creek Watershed Project, Palo Pinto County, Texas.

These documents came to us simultaneously. The comments we offer apply to both projects except where specifically designated.

While there will be some benefit to certain plant and animal communities from development of these projects, the use of these resources will be limited in that use will be exclusive to the landowners where development is to occur.

Concerning land treatment measures, this Department's extension biologists are available to assist the Soil Conservation Service in preparing recommendations concerning land treatment measures.

With reference to brush management on the Pollard Creek Project, it is suggested that up to 40 percent rather than 20 percent of the brush species be left as cover for wildlife (see page 25, Work Plan). It is further suggested that shelter for fish may be created within impoundments which are completely cleared of vegetation, by using brush cut during clearing operations.

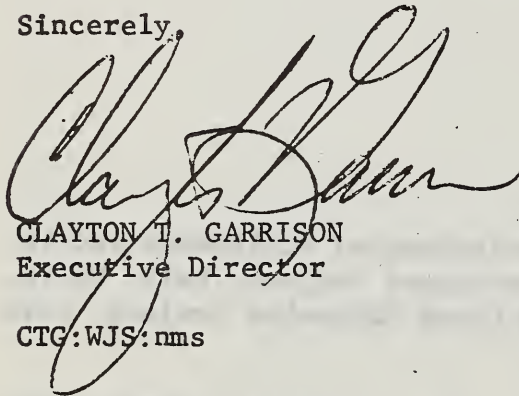
Page 2

Mr. Wayne N. Brown

The Elm Creek Work Plan Environmental Quality Account (A-3, C.) makes reference to small game and furbearers habitat that will be lost when covered with water. It is suggested that the enhancement of habitat, provision for food and for distribution of water for wildlife, creation of lake fishery and of reservoirs for waterfowl (Items 1, 2, and 3) should not be used to justify the need for such watershed development. The need to provide improved distribution of water for wildlife may be of little significance. Additionally, the need for additional lake fisheries and waterfowl resting areas may be of low priority for fish and wildlife in view of the great amount of standing water which presently exists.

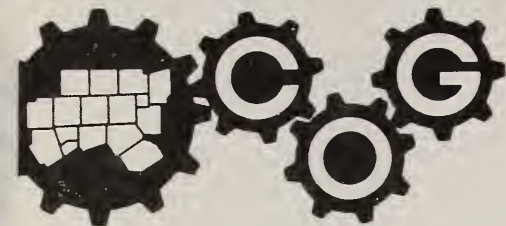
Thank you for the opportunity to comment on these documents.

Sincerely,



CLAYTON T. GARRISON
Executive Director

CTG:WJS:nms



P. O. Drawer COG Arlington, Texas 76011

April 11, 1975

Mr. Edward E. Thomas
State Conservationist
Soil Conservation Service
P. O. Box 648
Temple, Texas 76501

Re: 5-04-03017, received March 25, 1975
Pollard Creek Watershed Project
Federal Catalog No. 10.904

Dear Mr. Thomas:

Your application for a grant in the amount of \$40,040 from the Department of Agriculture for the above entitled project has been reviewed by the North Central Texas Council of Governments. This review included the consideration of potentially affected local governments and agencies for possible project notification. No potentially affected local governments or agencies were identified under NCTCOG's Local Significance Criteria.

In addition, the project was reviewed for appropriate area-wide concerns. This review process included consideration by appropriate NCTCOG planning staff, by the Government Applications Review Committee on April 9, and by the NCTCOG Executive Board on April 10. On the basis of that review process, the Board adopted the following areawide position on this proposal:

"The NCTCOG Review Process has disclosed no conflict with the review criteria of areawide comprehensive planning as outlined in OMB Circular A-95 (revised). Favorable consideration of the application by the funding agency is recommended."

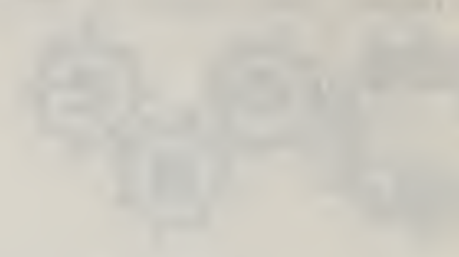
We sincerely thank you and your staff for your kind cooperation in this matter, and if we can be of further service or assistance, please feel free to call upon us.

Sincerely,

William J. Pitstick
Executive Director

bc

cc: J. Lynn Futch, State Director, U. S. Department of Agriculture



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PLANT NAMES

<u>Common</u>	<u>Scientific</u>
arizona cottontop	<i>Trichachne californica</i>
ashe juniper	<i>Juniperus ashei</i>
autumnolive	<i>Elaeagnus umbellata</i>
baldwin ironweed	<i>Vernonia baldwini</i>
berlandier wolfberry	<i>Lycium berlandieri</i>
bermudagrass	<i>Cynodon dactylon</i>
big bluestem	<i>Andropogon gerardi</i>
blackjack oak	<i>Quercus marilandica</i>
bluestem	<i>Andropogon (sp.)</i>
blue wildindigo	<i>Baptisia australis</i>
buckley yucca	<i>Yucca constricta</i>
buffalograss	<i>Buchloe dactyloides</i>
bumelia	<i>Bumelia (sp.)</i>
bush honeysuckle	<i>Lonicera (sp.)</i>
bushsunflower	<i>Simsia (sp.)</i>
buttonbush	<i>Cephalanthus occidentalis</i>
cane bluestem	<i>Andropogon barbinodis</i>
catclaw sensitivebrier	<i>Schrankia uncinata</i>
cedar elm	<i>Ulmus crassifolia</i>
common broomweed	<i>Gutierrezia dracunculoides</i>
crabapple	<i>Malus (sp.)</i>

PLANT NAMES - Continued

<u>Common</u>	<u>Scientific</u>
curlycup gumweed	<i>Grindelia squarrosa</i>
dewberry	<i>Rubus (sp.)</i>
dotted gayfeather	<i>Liatris punctata</i>
elbowbush	<i>Forestiera pubescens</i>
engelmanndaisy	<i>Engelmannia pinnatifida</i>
fall witchgrass	<i>Leptoloma cognatum</i>
falsegaura	<i>Stenosiphon linifolium</i>
feather dalea	<i>Dalea formosa</i>
fragrant sumac	<i>Rhus aromatica</i>
hairy grama	<i>Bouteloua hirsuta</i>
halfshrub sundrop	<i>Oenothera serrulata</i>
heartleaf adderstongue	<i>Ophioglossum crotalophoroides</i>
heath aster	<i>Aster ericoides</i>
honey mesquite	<i>Prosopis juliflora glandulosa</i>
indiangrass	<i>Sorghastrum (sp.)</i>
indigobush	<i>Indigofera (sp.)</i>
japanese brome	<i>Bromus japonicus</i>
kleingrass	<i>Panicum coloratum</i>
little bluestem	<i>Andropogon scoparius</i>
lotebush	<i>Condalia obtusifolia</i>
lovegrass	<i>Eragrostis (sp.)</i>
maximilian sunflower	<i>Helianthus maximiliani</i>

PLANT NAMES - Continued

<u>Common</u>	<u>Scientific</u>
meadow dropseed	<i>Sporobolus asper hookeri</i>
mulberry	<i>Morus (sp.)</i>
oak	<i>Quercus (sp.)</i>
pecan	<i>Carya illinoensis</i>
pitcher sage	<i>Salvia pitcheri</i>
plains bristlegrass	<i>Setaria macrostachya</i>
post oak	<i>Quercus stellata</i>
pricklyash	<i>Zanthoxylum clava-herculis</i>
purple threeawn	<i>Aristida purpurea</i>
purpletop	<i>Tridens flavus</i>
red lovegrass	<i>Eragrostis oxylepis</i>
roundhead lespedeza	<i>Lespedeza capitata</i>
russianolive	<i>Elaeagnus angustifolia</i>
sagewort	<i>Artemisia (sp.)</i>
sand dropseed	<i>Sporobolus crytandrus</i>
sand lovegrass	<i>Eragrostis trichodes</i>
saw greenbrier	<i>Smilax bona-nox</i>
scribner panicum	<i>Panicum scribnerianum</i>
sedge	<i>Carex (sp.)</i>
sideoats grama	<i>Bouteloua curtipendula</i>
silver bluestem	<i>Andropogon saccharoides</i>

PLANT NAMES - Continued

<u>Common</u>	<u>Scientific</u>
sugar hackberry	<i>Celtis laevigata</i>
switchgrass	<i>Panicum virgatum</i>
tall dropseed	<i>Sporobolus asper</i>
texas ash	<i>Fraxinus texensis</i>
texas filaree	<i>Erodium texanum</i>
texas grama	<i>Bouteloua rigidiseta</i>
texas mulberry	<i>Morus microphylla</i>
texas pricklypear	<i>Opuntia lindheimeri</i>
texas wintergrass	<i>Stipa leucotricha</i>
velved bundleflower	<i>Desmanthus velutinus</i>
vine ephedra	<i>Ephedra antisiphilitica</i>
vine-mesquite	<i>Panicum obtusum</i>
walnut	<i>Juglans (sp.)</i>
western ragweed	<i>Ambrosia psilostachya</i>
white honeysuckle	<i>Lonicera albiflora</i>
wintergreen hardinggrass	<i>Phalaris tuberosa stenoptera</i>
yellow indiagrass	<i>Sorghastrum nutans</i>
yellow neptunia	<i>Neptunia lutea</i>

LEGEND


- 100-Year Frequency Flood Without Project
- 100-Year Frequency Flood With Project
-  Floodwater Retarding Structure Site
- ① Site Number



Figure 3

URBAN FLOOD PLAIN
 CITY OF MINERAL WELLS
 POLLARD CREEK WATERSHED
 PALO PINTO COUNTY, TEXAS

Uncontrolled mosaic of 1966 photography.



APPROXIMATE SCALE - FEET
 Compiled at 1:15,840 (1" = 1320') and
 reproduced at 1:20,400 (1" = 1700').

April 1974



