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ALPINE, TEXAS

LETTER
FROM
THE SECRETARY OF THE ARMY
TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY, DATED SEPTEMBER 15, 1972, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND AN ILLUSTRATION, ON ALPINE, TEXAS, REQUESTED BY A RESOLUTION OF THE COMMITTEE ON PUBLIC WORKS, HOUSE OF REPRESENTATIVES, ADOPTED JUNE 3, 1959



September 5, 1973.—Referred to the Committee on Public Works and ordered to be printed with an illustration

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1973

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LETTER OF TRANSMITTAL



DEPARTMENT OF THE ARMY

WASHINGTON, D.C. 20310

August 21, 1973

Honorable Carl Albert
Speaker of the House of Representatives
Washington, D. C. 20515

Dear Mr. Speaker:

I am transmitting herewith a favorable report dated 15 September 1972, from the Chief of Engineers, Department of the Army, together with accompanying papers and an illustration, on Alpine, Texas, requested by a resolution of the Committee on Public Works, House of Representatives, adopted 3 June 1959.

The views of the Governor of Texas, the Departments of the Interior, Agriculture, Transportation, Health, Education, and Welfare, and the Environmental Protection Agency are set forth in the inclosed communications. The environmental statement required by the National Environmental Policy Act of 1969 has been submitted to the Council on Environmental Quality.

Since this project meets all the requirements of Section 201 of the Flood Control Act of 1965 and involves little or no controversy, I recommend that the project be approved for appropriations.

The Chief of Engineers has informed me that the use of the interest rate of 5-1/2 percent would reduce the benefit-cost ratio to 1.5. Use of the currently prescribed interest rate of 5-5/8 percent would result in no appreciable change in project justification.

The Office of Management and Budget advises that there is no objection to the submission of the proposed report to the Congress; however, it states that no commitment can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary objectives as determined by the then prevailing fiscal situation. A copy of the letter from the Office of Management and Budget is inclosed as part of the report.

Sincerely,

A handwritten signature in cursive script that reads "Howard H. Callaway".

Howard H. Callaway
Secretary of the Army

1 Incl
As stated



COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

July 2, 1973

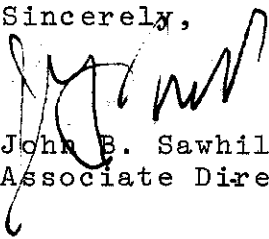
Honorable Howard Callaway
Secretary of the Army
Washington, D.C. 20310

Dear Mr. Secretary:

Mr. Kenneth BeLieu's letter of April 23, 1973, submitted the favorable report of the Chief of Engineers on Alpine, Texas requested by the Committee on Public Works of the House of Representatives, approved June 3, 1959.

You are advised that there would be no objection to the submission of the report to the Congress. No commitment, however, can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary objectives as determined by the then prevailing fiscal situation.

Sincerely,



John B. Sawhill
Associate Director

COMMENTS OF THE GOVERNOR OF TEXAS



PRESTON SMITH

GOVERNOR OF TEXAS

July 20, 1972

Lieutenant General F. J. Clarke
Chief of Engineers
Department of the Army
Building T-7, Gravelly Point
Washington, D. C. 20310

Re: DAEN-CWP-D
Alpine Lake Project, Texas

Dear General Clarke:

In response to your request of February 24, 1972, I requested the Texas Water Rights Commission to study and hold a hearing on your proposed "Alpine Lake Project, Texas" in accordance with Section 6.073 of the Texas Water Code. Following a public hearing on July 11, 1972, the Commission made its findings and submitted recommendations for my consideration.

I concur in the findings and recommendations set out in the July 11, 1972, Order of the Texas Water Rights Commission concerning the "Alpine Lake Project, Texas", and recommend the project be authorized by the Congress and funded in the public interest in accordance with your policy.

A copy of the Commission Order is enclosed for your information.

Sincerely,

A handwritten signature in cursive script that reads "Preston Smith".
Preston Smith

Enclosure

TEXAS WATER RIGHTS COMMISSION



AN ORDER approving the feasibility of a proposed Federal project of the United States Army, Corps of Engineers, as presented in a report entitled "Alpine Lake Project, Texas."

On July 11, 1972 came on to be considered before the Texas Water Rights Commission the engineering report prepared by the United States Army, Corps of Engineers, entitled "Alpine Lake Project, Texas," in accordance with Section 6.073 of the Texas Water Code.

After hearing and considering the evidence submitted, the Commission makes the following findings of fact:

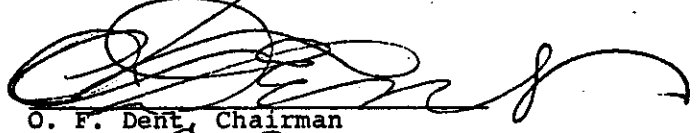
1. On April 6, 1972, the Honorable Preston Smith, Governor of Texas, requested the Commission to determine the feasibility of the proposed project as required by law.
2. Notice of hearing was given in accordance with Section 6.073, Texas Water Code, and jurisdiction to consider the report is established.
3. The criteria set forth in Section 6.073(e), Texas Water Code, relating to feasibility have been met and the project is feasible and the public interest will be well served, provided:
 - (a) That no contracts or other agreements between the Federal government and a designated local sponsor be made which would during droughts or other periods of critical need restrict or prevent a holder of a permit issued by the Commission from diverting and using for municipal purposes any water contained in the proposed Alpine Lake.

(b) That failure of a local sponsor to purchase the proposed water-supply portion of the project or to participate in the proposed recreational development will not nullify feasibility of the project for flood control.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS WATER RIGHTS COMMISSION that the proposed Federal project prepared by the United States Army, Corps of Engineers, entitled "Alpine Lake Project, Texas," be and the same is hereby approved and recommended to the Governor as feasible and in the public interest subject to the preceding provisos.

Executed and entered of record, this the 11th day of July, 1972.

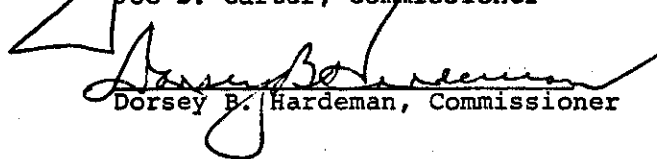
TEXAS WATER RIGHTS COMMISSION



O. F. Dent, Chairman



Joe D. Carter, Commissioner



Dorsey B. Hardeman, Commissioner

(SEAL)


ATTEST:


Audrey Strandtman, Secretary

STATE OF TEXAS X
 X
COUNTY OF TRAVIS X

I, Audrey Strandtman, Secretary of the Texas Water Rights Commission, do hereby certify that the foregoing and attached is a true and correct copy of an order of said Commission, the original of which is filed in the permanent records of said Commission.

Given under my hand and the seal of the Texas Water Rights Commission, this the 11th day of July, A.D. 197 2.


Audrey Strandtman, Secretary

COMMENTS OF THE DEPARTMENT OF THE INTERIOR



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-72/248

August 28, 1972

Dear General Clarke:

This is in reply to your letter of February 24, 1972, requesting our views and comments on the proposed report and draft environmental statement for the Tributaries of the Pecos River at and in The Vicinity of Alpine, Texas.

The proposed project will not adversely affect any existing, proposed or known potential units of the National Park System. Further, it will not impact on any historic, natural or environmental education sites eligible or potentially eligible for inclusion in the National Landmark Programs.

The proposed recreation and fish and wildlife developments are deemed satisfactory and in accordance with the State plan. The use and benefit estimates ascribed to the project appear reasonable. We were, however, unable to identify the acreage and separable cost of recreation lands and such information is essential to the recreation planning mission of this Department.

We also note the crediting of benefits for future development within the floodway. This would appear to constitute an indirect sanction of building additional structures in the floodway. The report should discuss how such development will be compatible with good flood plain management practices.

Certain details of the project are neither discussed nor identified in the report or the environmental statement. For example, such information as the location of borrow areas, acres of vegetation to be removed, plans for its disposal, types of diversion channels, pool characteristics, AUM which will be lost, the secondary effects of increased recreation use, water quality effects, project induced land use changes and the effect and character of downstream flows would be helpful in understanding and analyzing project effects.

We have no data that would indicate that this project would adversely affect the mineral resources of the area. However, in order to demonstrate that mineral resources were considered in the planning process both the report and environmental statement should provide a discussion on the mineral resources of the study area.

We have reviewed the draft environmental statement for this project and submit the following comments for your consideration and use in preparing the final statement.

Project Description

We suggest that this section be modified to provide information on the location and size of the borrow area site and a clearer description of the diversion channels since each activity can significantly impact on the present environmental setting.

Environmental Setting

This section should contain a discussion on historical and archeological values. An archeological survey of the site should be made to (1) determine the presence or absence of such values, (2) provide a basis for evaluating and identifying impacts, and (3) define any salvage program and cost needed to mitigate or avoid damage to this resource.

The statement should contain (1) a sentence indicating that the National Register of Historic Places was consulted, with "Criteria for Effect" applied and that no National Register properties are affected by the project, or (2) a listing of the properties to be affected, an analysis of the nature of the effects taken into account and an account of the steps taken to assure compliance with Section 106 of the National Historic Preservation Act of 1966 (80 Stat. 915) in accordance with the procedures of the Advisory Council on Historic Preservation as they appear in the Federal Register of March 15, 1972.

The statement should contain evidence of contact with the Historic Preservation Officer of the State (Executive Director, Texas State Historical Survey Committee, P. O. Box 12276, Capitol Station, Austin, Texas 78711).

A copy of his comments concerning the effects of this project upon historical and archeological resources which may be in the process of nomination to the National Register should be attached to the final statement.

This section could also be expanded to discuss existing water supplies, water quality and mineral resources.

Environmental Impacts

This section could identify the acreage of land which is being protected from flooding, land use changes induced by the project, the project's effect on water quality, fish and wildlife and other elements of the biota.

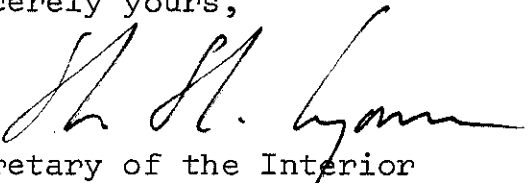
The section could also indicate that significant adverse environmental impacts due to geologic or hydrologic conditions are not anticipated. It might also indicate that there is no evidence that this project would not materially affect the mineral resources of the area.

Alternatives

A discussion of alternatives and their environmental impacts regardless of their benefit-cost ratio or whether they can provide all of the benefits of the proposed action would be consistent with the objectives of NEPA. Additional information on the downstream effects of the proposed structural alternatives would be helpful.

We wish to thank you for the opportunity to review the report and environmental statement for this proposal.

Sincerely yours,



Secretary of the Interior

Deputy Assistant

Lt. General F. J. Clarke
Chief of Engineers
Attn: DAEN-CWP-D
Department of the Army
Washington, D. C. 20314

COMMENTS OF THE DEPARTMENT OF AGRICULTURE



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

May 24, 1972

Honorable Robert F. Froehlke
Secretary of the Army

Dear Mr. Secretary:

This is in reply to the Chief of Engineers' letter of February 24, 1972, transmitting for our review and comment his proposed report and pertinent papers, including the environmental statement, on Alpine, Texas, Tributaries of the Pecos River.

The report recommends construction of a dam and reservoir on Alpine Creek with diversion channels on West Moss and Paisano Creeks to provide flood protection, municipal and industrial water supply and recreation for the community of Alpine.

We recommend that the Corps of Engineers actively coordinate project planning, construction and operation activities with the Texas Forest Service in order to minimize the risk of fire in the area.

One alternative to the project as proposed, which could be more fully considered, is the possibility of staging the plan of development. The Alpine Dam alone, without the saddle dam or diversion structures, appears to provide for all needs through the year 2020. At that time, as M&I water requirements increase, the saddle dam and diversion channels to bring water from Paisano and Moss Creeks could be added.

We suggest that the last paragraph of the "environmental impact" section of the draft statement be revised considering that (1) application of conservation practices in the contributing watershed would reduce sediment production to some degree, and (2) most conservation practices in this area are applied on private land and involve very little, if any, loss of the use of land.

The proposed project will have no adverse effects on projects or programs of the Department of Agriculture.

We appreciate the opportunity to review this material.

Sincerely,

T. K. COWDEN
Assistant Secretary

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

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

April 6, 1972

- Lt. General F. J. Clarke
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Clarke:

This is in response to your letter of 24 February 1972 addressed to Secretary Volpe concerning your proposed report, draft environmental statement and other pertinent papers on the multipurpose Dam and Reservoir, Alpine Creek, Alpine, Brewster County, Texas for flood protection and other purposes.

The concerned operating administrations and staff of this Department have reviewed the material submitted. We have no comments to offer on either the draft environmental impact statement or the survey report. This Department has no objection to the Alpine Creek Dam and Reservoir which, in addition to providing flood protection in the immediate region will also provide water for municipal and industrial use and recreation.

The opportunity for the Department of Transportation to review and comment upon your proposed report and impact statement on the Alpine Creek project is appreciated.

Sincerely,

J. M. AUSTIN
Captain, U. S. Coast Guard
Acting Chief, Office of Marine
Environment and Systems

COMMENTS OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

WASHINGTON, D.C. 20201

OFFICE OF THE SECRETARY

March 21, 1972

F. J. Clarke
Lieutenant General, USA
Chief of Engineers
Washington, D. C. 20314

Dear Lt. Gen. Clarke:

Secretary Richardson has asked me to respond to your letter dated February 24, 1972, wherein you requested comments on the proposed report and draft environmental impact statement for the Alpine Lake Project, Alpine, Texas.

This Department has reviewed the health aspects of the above project as presented in the documents submitted. This project does not appear to represent a hazard to public health and safety.

The opportunity to review the proposed report and draft environmental impact statement is appreciated.

Sincerely yours,

A handwritten signature in black ink that reads "Merlin K. DuVal, M.D." The signature is written in a cursive style.

Merlin K. DuVal, M.D.
Assistant Secretary for
Health and Scientific Affairs

COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1600 PATTERSON, SUITE 1100
DALLAS, TEXAS 75201

March 22, 1972

OFFICE OF THE
REGIONAL ADMINISTRATOR

F. J. Clarke, Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Re: 06-2-157
Your Re: DAEN-CWP-D

Dear General Clarke:

We have reviewed the survey report and the Draft Environmental Statement on the proposed project for Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas. The proposed project will consist of an earthfill dam on Alpine Creek with gated outlet works and a spillway from the dam. In addition, diversion channels will be constructed from Paisano and West Moss Creeks to convey runoff into the reservoir. The improvement provides storage for a municipal and industrial water supply, flood control, fish and wildlife and general recreation.

The revised survey report and Draft Environmental Statement adequately portrays the water quality of the area and covers most of the environmental effects.

We suggest you consider the following general comments in the preparation of the Final Environmental Statement:

1. Socio-economic impact of displaced people and businesses, if any, should be discussed in enough detail to permit an evaluation of the possible effect of the displacement and relocation on potential pollution.

2. The alternatives considered but rejected should be discussed in more detail, particularly as to how these alternative actions might avoid some or all of the adverse environmental effects. The results of an analysis of such alternatives and their costs and impact on the environment would strengthen the statement.

3. A map of the proposed project area would provide the reader with a better idea of the environmental setting and changes that will be made if the proposed action is taken.

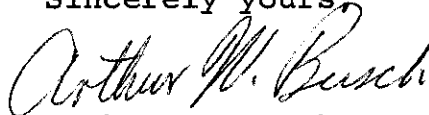
4. Clearing and disposing of the brush, vegetation, and residential and commercial buildings, if any, in the project area should include provisions for prevention of undue effects on the environment. Methods of disposal should be covered in the statement. Open uncontrolled burning should not be permitted, in order to meet the requirements given in 42 CFR 76.8.

5. Measures to prevent the effects of accidental spillages should be incorporated into the design features of the project.

6. Where appropriate, sanitary facilities should be provided and operated to treat and dispose of domestic wastes in conformance with State and Federal water pollution control regulations.

We appreciate the opportunity to review the statement and would like to receive two copies when it is placed in final form.

Sincerely yours,

A handwritten signature in cursive script that reads "Arthur W. Busch".

Arthur W. Busch
Regional Administrator

ALPINE, TEXAS

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY



DEPARTMENT OF THE ARMY OFFICE OF THE CHIEF OF ENGINEERS WASHINGTON, D.C. 20314

September 15, 1972

IN REPLY REFER TO

DAEN-CWP-D

SUBJECT: Alpine, Texas

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress the report of the Board of Engineers for Rivers and Harbors, accompanied by the reports of the District and Division Engineers, in response to a resolution of the Committee on Public Works of the House of Representatives, United States, adopted 3 June 1959, with a view to determining whether any additions or modifications should be made at this time with respect to flood protection on tributaries of the Pecos River at and in the vicinity of Alpine, Texas.
2. The District and Division Engineers recommend construction of a multiple-purpose dam and reservoir on Alpine Creek with diversion structures and channels on West Moss and Paisano Creeks to provide flood protection, municipal and industrial water supply, and recreation for the community of Alpine, contingent upon certain items of local cooperation. They estimate the first cost to be \$3,654,000 of which \$3,384,000 is the Federal cost for construction and \$270,000 the non-Federal cost for lands, easements, and rights-of-way. The net cost to the United States after reimbursement by non-Federal interests for water supply and one-half the separable cost for recreation facilities, presently estimated to be \$1,801,400, is estimated to be \$1,582,600. Based on an interest rate of 5-1/8 percent, the annual charges are estimated at \$255,000, including \$58,200 for operation, maintenance, and replacements, and the annual benefits are estimated at \$438,300. The benefit-cost ratio is 1.7.
3. It is the view of the Board of Engineers for Rivers and Harbors that in addition to environmental enhancement, the proposed project would also result in increased regional economic activity and an improvement in the well-being of the community of Alpine. It reports that use of the currently prescribed interest rate of 5-3/8 percent in computing annual charges and benefits would not significantly reduce the benefit-cost ratio. The Board concurs generally in the findings

of the District and Division Engineers and recommends the improvements subject to certain conditions of local cooperation.

4. I concur in the views and recommendations of the Board.

A handwritten signature in black ink, appearing to read 'F. J. Clarke', written in a cursive style.

F. J. CLARKE
Lieutenant General, USA
Chief of Engineers

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
BOARD OF ENGINEERS FOR RIVERS AND HARBORS
WASHINGTON, D.C. 20315

IN REPLY REFER TO

December 14, 1971

DAEN-BR

SUBJECT: Alpine, Texas

Chief of Engineers
Department of the Army
Washington, D. C.

1. Authority. -- This report is in response to the following resolution, adopted 3 June 1959:

Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports of the Chief of Engineers on the Pecos River and Tributaries, Texas and New Mexico, published in House Document No. 339, 84th Congress, 2d Session, with a view to determining whether any additions or modifications should be made in the recommendations contained therein at this time with respect to flood protection on tributaries of the Pecos River at and in the vicinity of Alpine, Texas.

2. Description. -- The area under investigation comprises the watersheds of Alpine, Paisano, and West Moss Creeks, all of which have their sources in the Puertacitas Mountains southwest of the city of Alpine, Texas, and are tributary to the Pecos River. The combined area of the adjacent watersheds of the three ephemeral streams from their sources to their confluence just below the city is 71 square miles. Alpine is located at the edge of a high plain at about elevation 4,500 feet and is almost surrounded by mountains and foothills that rise abruptly to elevations up to 6,000 feet. The drainage area is characterized by high, steep slopes thinly covered with native grasses and scattered areas of brush and shrubs.

3. Economic development.-- Alpine, the seat of Brewster County, was settled in 1882. Brewster County is the largest county in Texas with an area of 6,208 square miles, and is one of the most thinly populated, with a 1970 population of 7,780. From its beginning, Alpine has grown slowly as a trade and shipping center for the surrounding cattle, sheep, and goat ranches. The economy has been strengthened in recent years by Sul Ross University, which was founded in 1920, and by the steady growth of the tourist trade which has accompanied the development of Big Bend National Park to the south and the restoration of historic Fort Davis to the north. The Big Bend National Park is famous for its scenic beauty and occupies about 1,100 square miles of the southern tip of Brewster County bordering the Rio Grande.

4. Existing improvements.-- There are no major improvements for prevention of flooding at Alpine. Minor improvements constructed by local interests include several small diversion dams on Paisano Creek to direct floodflows away from the city and a low levee along West Moss Creek to confine flows within banks. The Atchinson, Topeka and Santa Fe Railway has constructed an embankment along the west side of the city to protect its facilities.

5. Water resource problems.-- The following problems and needs concerning water and related land resources of the tributaries of the Pecos River at and in the vicinity of Alpine, Texas, were identified during the course of the study.

a. Flood Control.--Alpine is threatened by floodwaters from Alpine Creek in the central area of the city, Paisano Creek in the northwest section, and West Moss Creek in the extreme east section. Each of these streams is normally dry. On the basis of 1970 prices, a very large flood of standard project proportion would cause damage estimated at about \$2.5 million. The principal flood threat is from Alpine Creek, with a drainage area of 19.3 square miles, which flows through the highly developed business and residential center of the city. Although there is a well-defined channel, it is of limited capacity and large magnitude flash floods overflow the banks. Paisano Creek, with a drainage area

of 28.6 square miles above the city, flows through a canyon west of Alpine. Large floods spread over the mesa northwest of Alpine and pose some threat to residential areas. The Paisano flood plain is a prime area for potential growth. West Moss Creek, with a drainage area of 10.9 square miles above the city, approaches Alpine on a northerly course, and turns northeast near the city limits. The channel becomes nearly indistinguishable in a network of dikes. Floodflows from West Moss Creek threaten a strip of development along the highway at the east edge of Alpine, and large magnitude floods may overflow into the Alpine Creek watershed through a saddle east of the city and cause damage in the highly developed central area.

b. Municipal and industrial water supply.--The entire municipal and industrial water supply of Alpine is obtained from two well fields. One field consisting of nine wells is located in and adjacent to the city. The other field, Sunny Glen, is located 3 miles northwest of the city and also contains nine wells. Present municipal and industrial water supply consumption is about 1,200 acre-feet per year. Projections for the future indicate that 1,700 acre-feet per year will be needed by the year 1995, 2,250 acre-feet by the year 2020, and 3,150 acre-feet per year by the year 2070. The water table in the vicinity of Alpine is steadily dropping because of continuous pumping, and consultants have concluded that existing wells are producing water at their maximum capacity.

c. Recreation.--At present, the major water-associated recreation areas closest to Alpine are: Red Bluff Lake, about 145 highway miles to the northwest; Amistad Reservoir, about 185 highway miles southeast; and several reservoirs in the San Angelo area, about 230 highway miles northeast. The desert environment of the area enhances the value of water-related recreation and a large unsatisfied demand exists in the area.

6. Improvements desired.-- Local interests desire flood protection, municipal and industrial water supply, and a source of water-related recreation for the community of Alpine.

7. Proposed plan.-- The District Engineer finds that a multiple-purpose reservoir would satisfy the current and foreseeable water resource needs of Alpine, Texas. The Alpine Lake project would comprise an earthfill dam

located on Alpine Creek, near the southern city limits, a small saddle dam near the divide between the Alpine and West Moss Creeks watersheds, and diversion channels leading from Paisano and West Moss Creeks to convey runoff from these streams to the reservoir. The project would afford varying degrees of flood protection from the three creeks and provide storage for municipal and industrial water supply and recreation. At spillway crest, the reservoir would have a storage capacity of 12,710 acre-feet, of which 2,080 acre-feet would be reserved for sediment detention, 1,000 acre-feet would be allocated to recreation, 5,100 acre-feet to municipal and industrial water supply, and 4,530 acre-feet to flood control.

8. Economic evaluation.-- Using July 1970 prices, the District Engineer estimates the construction cost of Alpine Lake project at \$3,654,000. The Federal cost for the project would be \$1,582,600 and the non-Federal cost would be \$2,071,400. Annual charges are estimated at \$255,000, including \$58,200 for non-Federal operation, maintenance, and replacements. Average annual benefits are estimated at \$438,300, consisting of \$57,300 for flood control, \$147,000 for water supply, \$159,000 for recreation, and \$75,000 for fish and wildlife enhancement. Based on an interest rate of 5-1/8 percent and a 100-year period of analysis, the benefit-cost ratio is 1.7. The District Engineer recommends improvements in accordance with his plan, subject to certain items of local cooperation. The Division Engineer concurs.

9. Public Notice.-- The Division Engineer issued a public notice stating the recommendations of the reporting officers and affording interested parties an opportunity to present additional information to the Board. Careful consideration has been given to the communications received.

Views and Recommendations of the Board of Engineers for Rivers and Harbors.

10. Views.-- The Board of Engineers for Rivers and Harbors concurs in general in the views and recommendations of the reporting officers. The proposed project is needed and is economically justified, and the requirements of local cooperation are appropriate. The Board carefully considered the environmental effects of the proposed improvements, including those discussed in the preliminary draft environmental statement dated 30 March 1971.

It is the view of the Board that, in addition to environmental enhancement, the proposed project would result in increased regional economic activity and in improvement of the well-being of the community of Alpine. The Board notes that the flood control to be provided by the multiple-purpose reservoir is essentially local in nature and that the first costs for lands, easements, and rights-of-way, and the annual costs for operation, maintenance, and replacements for this purpose are properly charged in accordance with current policy as a local expense. The Board also notes that population data obtained subsequent to completion of the District Engineer's report indicate the project benefits, as stated, to be conservative. The Board also finds that analysis of the proposed project, using an interest rate of 5-3/8 percent, would not significantly reduce the benefit-cost ratio.

11. Recommendations.-- Accordingly, the Board recommends construction of the multiple-purpose Alpine Lake project in the interest of flood control, water supply, recreation, and fish and wildlife enhancement; all generally in accordance with the plan of the District Engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost to the United States of \$3,384,000 for construction: Provided that, prior to construction, local interests furnish assurances satisfactory to the Secretary of the Army that they will:

a. Hold and save the United States free from damages due to construction and operation of the project;

b. Prevent encroachments on the channel of Alpine Creek below the project and maintain a minimum capacity of 1,200 cubic feet per second;

c. Administer, maintain, and operate the works after completion in accordance with regulations prescribed by the Secretary of the Army;

d. Accomplish without cost to the United States all alterations to existing improvements, other than railroad bridges and approaches connected therewith, which may be required because of the construction works;

e. Periodically inform all concerned, in a manner satisfactory to the Secretary of the Army, that some flooding will continue to occur from flows greater than the design flow;

f. Provide all lands, easements, rights-of-way, and relocations, except railroads, presently estimated at \$270,000, the relocations to be made in compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970;

g. Adopt and enforce flood plain regulations appropriate to the non-structural measures of the plan of improvement which, combined with the structural measures, would minimize damages to future development in the flood plain of Paisano and West Moss Creeks that would be inundated by a flood that could be expected to occur once in 100 years;

h. Consider the adoption of flood plain regulations for areas other than those covered by the plan of improvement as necessary to assure compatibility between future developments within the flood plain and the protection afforded by the improvements;

i. Publicize the flood plain information contained in Appendix A, Flood Plain Information, and make it readily available to all interested persons;

j. Repay all costs allocated to water supply in accordance with the Water Supply Act of 1958, an amount presently estimated at \$1,663,800, including \$117,600 for lands, easements, rights-of-way, and relocations (which will be furnished by local interests and for which they will be given credit toward their reimbursable water supply costs);

k. Pay, contribute in kind, or repay (which may be through user fees) with interest, one-half of the separable first cost of the project allocated to recreation and fish and wildlife enhancement, an amount presently estimated at \$327,500, including \$72,300 for lands, easements, rights-of-way, and relocations (which will be furnished by local interests, and for which they will be given credit toward their reimbursable half of the separable first cost of recreation and fish and wildlife enhancement);

l. Bear all costs of operation, maintenance, and replacement of flood control, water supply, recreation, and fish and wildlife areas and facilities, presently estimated at \$58,200 on an average annual basis; and

m. Provide storage rights and hold and save the United States free from water rights claims due to construction and operation of the project.

12. The net cost to the United States for the recommended improvements is estimated at \$1,582,600.

FOR THE BOARD:



W. ROPER
Major General, USA
Chairman

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

This report presents the results of a review survey of the flood and water-related problems and needs on the tributaries of the Pecos River at and in the vicinity of Alpine, Texas. The area under investigation comprises the watersheds of Alpine, Paisano, and West Moss Creeks, all of which have their sources in the Puertacitas Mountains southwest of the city of Alpine, Texas. The combined area of the adjacent watersheds of the three ephemeral streams from the source to their confluence just below the city is 71 square miles. Alpine is located at the edge of a high plain at about elevation 4,500 feet and is almost surrounded by mountains and foothills that rise abruptly to elevations up to 6,000 feet. Alpine is threatened by floodwaters from the three drainage areas. In addition, there is need for reservoir storage for municipal and industrial water supply, recreation, and fish and wildlife enhancement.

The plan of improvement considered to be the most feasible and therefore selected as the most suitable, would comprise an earthfill dam located on Alpine Creek, near the southern city limits of Alpine, a small saddle dam near the divide between the Alpine and West Moss Creeks watersheds, and diversion channels leading from Paisano and West Moss Creeks to convey runoff from these streams into the reservoir. The project would afford various degrees of flood protection from the three creeks, and provide storage for municipal and industrial water supply and recreation and fish and wildlife enhancement. At spillway crest, the reservoir would have a storage capacity of 12,710 acre-feet of which 2,080 acre-feet would be reserved for sediment detention, 1,000 acre-feet would be allocated to recreation, 5,100 acre-feet for municipal and industrial water supply and 4,530 acre-feet to flood control.

During the investigations for this report, numerous meetings were held to apprise local interests of the improvements considered, their estimated costs and effects, and the requirements of local cooperation. Local interests have expressed concurrence in the selected plan of improvement and have indicated their willingness to cooperate in the construction, operation, and maintenance of the project following a final public meeting held on 18 February 1971.

The total first cost of the Alpine Lake Project is estimated at \$3,654,000 of which \$1,582,600 would be Federal and \$2,071,400 non-Federal. The Federal and non-Federal annual charges amount to \$85,000 and \$170,000, respectively, a total of \$255,000. The average annual benefits are estimated at \$438,300 yielding a benefit-cost ratio of 1.7.

Accordingly, the District Engineer recommends that the Alpine Lake Project be authorized for construction by the United States, subject to the conditions of local cooperation.

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1580
ALBUQUERQUE, NEW MEXICO 87103

April 1971

SUBJECT: Report on Review Survey for Flood Control and Allied Purposes:
Tributaries of the Pecos River at and in the Vicinity of
Alpine, Texas

THRU: Division Engineer, Southwestern Division

TO: Chief of Engineers

INTRODUCTION

1. AUTHORITY.- This report is submitted in compliance with the provisions of a resolution by the committee on Public Works, U.S. House of Representatives, adopted June 3, 1959, which reads as follows:

RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE HOUSE OF REPRESENTATIVES, UNITED STATES, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports of the Chief of Engineers on the Pecos River and Tributaries, Texas and New Mexico, published in House Document No. 339, 84th Congress, 2d session, with a view to determining whether any additions or modifications should be made in the recommendations contained therein at this time with respect to flood protection on tributaries of the Pecos River at and in the vicinity of Alpine, Texas.

2. REPORT UNDER REVIEW: HOUSE DOCUMENT NO. 339, 84th Congress.- The basic document referenced above was submitted in response to pertinent directives of the 1938, 1939, and 1950 Flood Control Acts which authorized surveys for flood control on the Pecos River and tributaries in Texas and New Mexico. The investigation was assigned to the Albuquerque District for accomplishment and the report thereon was submitted by the Chief of Engineers under date of September 2, 1954, to the Secretary of the Army for transmittal to the Congress. The report was printed and published as House Document No. 339, 84th Congress, 2d

session. Although the report was comprehensive in scope, the flood problems on tributaries at and in the vicinity of Alpine, Texas, were not made known to this District at that time.

3. PURPOSE AND EXTENT OF INVESTIGATION.- The objective of this review survey was to determine the extent and magnitude of the flood and water-related problems at and in the vicinity of Alpine, Texas, and the feasibility of Federal participation in a plan of improvement which would meet present and foreseeable long-range needs of the area. A public meeting was held at Alpine by the District Engineer, as an initial step in the investigation, to afford local interests the opportunity to discuss their flood and related problems and offer their views regarding improvements to alleviate the conditions. Testimony given during the meeting is summarized under IMPROVEMENTS DESIRED. Representatives of other Federal agencies and the State of Texas were invited to attend the meeting and express their interests in the survey. The area under consideration is shown on Plate 1, Plan of Improvement.

4. Investigations made for this report include field appraisals of the flood plains to determine the extent of economic development and property values, and geologic and soils investigations to determine the suitability of foundation conditions and construction materials at potential project sites. Hydrologic studies were made of the floods which have occurred and those which could occur as the result of large magnitude storms in the area. Results obtained were used as the basis for design of improvements considered. State and local officials and other individuals were consulted to determine trends of development and effects of flooding upon economic activities and property values. Data were collected, correlated, and analyzed to estimate future development of the area with and without improvement, and the benefits which could be expected to accrue to various types and combinations of improvements. Maps and aerial photographs provided by other Federal agencies, State agencies, and local interests were utilized in connection with field surveys and studies made for this report and preparation of the accompanying plates.

5. ARRANGEMENT OF REPORT.- The plan of improvement presented in this report and selected for recommendation was chosen on the basis of detailed technical data, field investigations, research, and related office studies of current and projected conditions, as summarized herein and further reported upon in the following:

- Appendix A: Flood Plain Information
- Appendix B: Report by Bureau of Sport Fisheries and Wildlife
- Appendix C: Coordination with Other Agencies
- Appendix D: Project Formulation
- Appendix E: Design and Cost Estimates
- Appendix F: Hydrology

Appendix G: Water Supply Study
 Appendix H: Area Economic Study
 Appendix I: Supplemental Economic Data
 Appendix J: Environmental Resources
 Information called for by S.R. 148, 85th Congress

DESCRIPTION OF WATERSHED

6. PHYSICAL CHARACTERISTICS.- The area under investigation comprises the watersheds of Alpine, Paisano, and West Moss Creeks, all of which have their sources in the Puertacitas Mountains southwest of the city of Alpine, as shown on Plate 1, Plan of Improvement. The combined area of the adjacent watersheds of the three ephemeral streams from the source to their confluence just below the city is 71 square miles. Alpine is located at the edge of a high plain at about elevation 4,500 feet and is almost surrounded by mountains and foothills that rise abruptly to elevations up to 6,000 feet. The drainage area is characterized by high, steep slopes thinly covered with native grasses and scattered areas of brush and shrubs consisting principally of juniper, mesquite, and cactus.

7. STREAM CHARACTERISTICS.- From their headwaters, the streams flow generally northeastward on steep gradients in well-defined channels to the outwash plains at the foot of the mountains, and then converge upon the city of Alpine. The channels become less distinct and in some reaches vanish completely. Alpine Creek, which bisects the city, is more distinct than the others. Paisano Creek flows through the northwestern section of Alpine and West Moss Creek borders the eastern section. Northeast of Alpine, West Moss and Alpine Creek join Paisano Creek which is tributary to Coyanosa Draw which is, in turn, tributary to the Pecos River. Pertinent data are given in Table 1.

TABLE 1. - Drainage Area Data

	Length (mile)	Slope (ft/mi)	Drainage Area (square mile)
Alpine Creek	10.26	84.48	21.1
West Moss Creek	10.25	89.76	12.6
Paisano Creek	17.6	52.80	37.1

8. CLIMATOLOGY.- The area under investigation is located in the western part of the Gulf of Mexico rainfall province. Moist air which flows intermittently into the region from the Gulf of Mexico provides the source for most of the annual precipitation which averages about 14.9 inches at Alpine, with recorded extremes of 8 inches and 33 inches. The precipitation generally occurs in the form of high intensity, short duration thunderstorms during the summer months. The maximum recorded 24-hour rainfall was 2.9 inches in August 1944. Hurricanes in the Gulf of Mexico can also cause large amounts of rainfall in this region of West Texas. Although no large flood-producing rainfall associated with a hurricane has been recorded at Alpine, adjacent areas have recorded such events. Typical of high continental regions are the large seasonal and diurnal fluctuations in temperature which vary from a high of about 106° F. to a low of -2°. The climate is characterized by low relative humidity, moderately hot summers, and mild winters with occasional cold waves. The air is normally clear, although high winds frequently cause dust storms in the spring months. The only official weather station in the study area is located at Alpine. Precipitation and temperature records are continuous since 1929 and fragmentary records are available from 1900 to 1929. Climatological data for Alpine and adjacent representative stations are given in Appendix F, HYDROLOGY.

ECONOMIC DEVELOPMENT

9. HISTORICAL BACKGROUND.- Alpine, the seat of Brewster County, was settled in 1882 with the arrival of the railroad toward the end of the railroad building boom in Texas. Brewster County was not established until five years later when Presidio County was subdivided into three counties. Brewster County is the largest in Texas with an area of 6,208 square miles, also the most mountainous, and one of the most thinly populated. From its beginning, Alpine has grown slowly as a trade and shipping center for the surrounding cattle, sheep, and goat ranches. The economy has been strengthened in more recent years by Sul Ross University, which was founded in 1920, and the steady growth of tourist trade which has accompanied the development of Big Bend National Park, to the south, and restoration of historic Fort Davis to the north. The Big Bend National Park, famous the world over for its scenic beauty and the only National Park in the State of Texas, occupies the southern tip of Brewster County, an area of about 1,100 square miles bordering the Rio Grande.

10. ECONOMIC STUDY AREA.- The area which would be most strongly influenced by development of the water resources in the vicinity of Alpine is Brewster County. For this reason, Brewster County was selected as the area for economic analyses to establish present and future needs and to develop projections of probable growth in comparison to the State of Texas and the Nation. The area economic study facilitated the appraisal of future effects of potential improvements for flood control and related purposes.

11. POPULATION.- The population of Brewster County in 1900 was 2,356 persons. By 1950 it had grown to 7,309, an increase of 210 percent in half a century, but during the next 10 years the population declined by 12 percent to 6,434. The population of Alpine in 1920 was 931 persons, about 19 percent of the total for Brewster County. By 1950 Alpine with a population of 5,261, constituted 72 percent of the county as a whole. In 1960 the census recorded 4,740 persons living in Alpine, a decrease of 10 percent in 10 years but an increase to 74 percent of the total county. By 1970 the population of Alpine had increased 26 percent to 5,971 persons. Brewster County population increased 21 percent to 7,780 persons. In 1970, 77 percent of the people in Brewster County lived in Alpine.

12. LAND RESOURCES AND USES.- Brewster County is an arid and semiarid region of mountains, deep canyons, and high plateaus with thin, rocky soils which are agriculturally nonproductive. Most of the land is utilized for grazing of livestock, principally cattle. There is a large variety of mineral deposits such as copper, coal, silver, marble and others but the only notable development is the production of quicksilver from mines in the southern part of the county.

13. INDUSTRY, EMPLOYMENT, AND INCOME.- The present economy of Brewster County and Alpine has evolved from large-scale ranching activities. Cattle raising predominates. Brewster and adjoining counties are known for their fine "Highland Herefords," winners of many prizes at stock shows. Although employment in this industry has decreased steadily during the last two decades, the rate of decline in Brewster County has been lower than for Texas or the United States. In 1960 ranching accounted for about 18 percent of the county employment. Other industries in terms of importance are retail trade, services, and public administration, which together accounted for 49 percent of the employment. Per capita personal income for Brewster County in 1960 was estimated at \$1,875 as compared with \$1,929 for Texas and \$2,217 for the United States.

14. MUNICIPAL GOVERNMENT, UTILITIES, AND TRANSPORTATION FACILITIES.- Alpine is governed by a city council composed of a mayor and five councilmen. The city water supply is obtained from underground sources and both the well fields and distribution system are municipally owned. Electricity is supplied by thermal plants through an interconnected West Texas power network system. Telephone service is provided by Southwestern Bell Telephone Company. A network of major transcontinental U.S. and State interconnected highways provides excellent access to the city of Alpine. The city is served by two railway companies, the AT&SF and the Southern Pacific.

15. TRENDS OF GROWTH AND DEVELOPMENT.- The probable future development in the study area was established by projection of pertinent

economic indicators, based on the analysis of available historical statistics of Brewster County. The major growth indicators representative of the area and therefore selected for appraisal were population, employment, per capita income, value of agricultural products sold, and value of new construction. Population and personal income are expected to increase at a rate somewhat higher than for the State because of anticipated growth of Sul Ross University, tourism, and allied services. Agriculture (ranching) will continue to contribute steadily to the general economy of the area. Construction activities are expected to do well, with a growth rate equal to that of the State. A summary of the growth rates expressed in average annual percent change for the years 1960 to 2020 are given in Table 2.

TABLE 2. - Summary of Growth Rates
(Expressed as average annual percent)

Economic Indicator	1960 to 2020
Population:	
U. S.	1.61
Texas	1.73
Study area	1.89
Employment:	
U. S.	1.73
Texas	1.82
Study area	2.08
Per capita income:	
U. S.	2.27
Texas	2.29
Study area	2.34
Alpine	2.32
Value of farm products sold:	
U. S.	1.62
Texas	2.10
Study area	1.57
Value of new construction:	
U.S.	4.06
Texas	4.18
Study area	4.18

FLOOD PROBLEMS

16. EXISTING IMPROVEMENTS.- There are no major improvements for prevention of flooding at Alpine. Minor improvements constructed by local interests include several small diversion dams on Paisano Creek to direct floodflows northeastward away from the city and a low levee along West Moss Creek to confine flows within banks. The AT&SF Ry Company has constructed an embankment along the west side of the city to protect its facilities.

17. FLOOD HISTORY.- Since there are no stream gages on any of the streams under consideration and therefore no reliable records of flood discharges, historical evidence of flooding was obtained from newspaper accounts and interviews with residents of the area. These sources revealed that since 1931, flooding has occurred at least 50 times on one or more of the tributaries, generally during the summer months of June to September. Of these, eight evidently were large-magnitude floods. In addition, it is understood that a major flood occurred in June 1904 but no accounts are available.

18. FLOOD PROBLEMS.- Alpine is threatened by floodwaters from three drainage areas. These are Paisano Creek in the northwest section of the city, Alpine Creek in the central area, and West Moss Creek in the extreme east section of the city. Each of these streams is normally dry. The principal flood threat is from Alpine Creek, with a drainage area of 19.3 square miles above the city, which flows through the highly developed business and residential center of the city. Although there is a well-defined channel, it is of limited capacity, and large magnitude flash floods overflow the banks. Flows are impeded by building encroachments and by vegetation and debris in the channel. Paisano Creek, drainage area 28.6 square miles above the city, flows through a canyon west of Alpine. About two miles west of the city it emerges from the canyon to form an alluvial fan. Large floods spread over the mesa northwest of Alpine and pose some threat to residential areas. The Paisano flood plain is also a prime area for potential future growth. West Moss Creek, with a drainage area of 10.9 square miles above the city, approaches Alpine on a northerly course, and turns northeast near the city limits. The channel becomes nearly indistinguishable in a network of dikes. Flood-threatened strip development along the highway at the east edge of Alpine. Large magnitude floods may overflow into the Alpine Creek watershed through a saddle in the east side of the city and cause damage in the highly developed central area.

19. EXTENT AND CHARACTER OF FLOOD PLAINS.- In the absence of streamflow records and other specific data regarding experienced floods at Alpine, hydrologic studies to establish flood frequencies, potential runoff, and extent of flood plains were based on the records of a nearby stream, Madera Canyon, which were continuous for a 17-year period.

Madera Canyon is located 35 miles north of Alpine and has watershed characteristics very similar to those of Paisano, West Moss, and Alpine Creeks. Precipitation records indicate the same general rainfall pattern at both locations. Estimates were then made of the floods that might be expected to occur in the watersheds as the result of the most severe combination of rainfall and runoff conditions characteristic of the region. These large magnitude floods are designated as "standard project floods" and are used to establish criteria for flood control requirements. The flood plains thus determined are delineated on Plate 8 of Appendix F, HYDROLOGY. The areas and land uses are given in Table 3.

TABLE 3. - Land Uses, Standard Project Flood Plains (in acres)

Flood Plain	Urban	Range and Pasture	Transportation Rights-of-way	Stream Channel	Total
Alpine Creek	214	76	86	59	435
Paisano Creek	202	2,186	120	154	2,662
West Moss Creek	<u>122</u>	<u>334</u>	<u>51</u>	<u>59</u>	<u>566</u>
Total	538	2,596	257	272	3,663

20. In order to assess potential damages in the standard project flood plains, an inventory was made of residential, business, rural, public, and other properties. The value of lands and improvements, based on July 1970 prices, is estimated at \$22,838,000 as itemized in Table 4.

TABLE 4. - Value of Land and Improvements, Standard Project Flood Plains (thousands of dollars) - July 1970 Prices

Land and Improvements	Alpine Creek	Paisano Creek	West Moss Creek	Total
<u>Urban and suburban:</u>				
Residential	\$3,765	\$3,297	\$649	\$7,711
Commercial	4,497	314	604	5,415
Public property ¹	1,624	70	21	1,715
Utilities	517	113	101	731
Land	<u>1,684</u>	<u>1,257</u>	<u>251</u>	<u>3,192</u>
Subtotal	12,087	5,051	1,626	18,764
<u>Transportation facilities:²</u>				
Streets, highways, & bridges	1,478	384	293	2,155
Railroads & bridges	<u>312</u>	<u>431</u>	<u>160</u>	<u>903</u>
Subtotal	1,790	815	453	3,058
<u>Rural:</u>				
Buildings & improvements	0	177	122	299
Land	<u>18</u>	<u>561</u>	<u>138</u>	<u>717</u>
Subtotal	18	738	260	1,016
Total Value	13,895	6,604	2,339	22,838

¹Includes schools and churches.

²Includes right-of-way land.

21. FLOOD DAMAGES.- Flood losses include both tangible and intangible damages. Tangible damages are the primary damages subject to monetary evaluation and include physical damage to property, business and financial losses both in and adjacent to the flood plain, and emergency costs. Intangible damages are those not susceptible of monetary evaluation and include danger to human life, human discomfort, injury and exposure during floods, creation of conditions detrimental to health and security, interruption of utilities, traffic, and normal community activities. The major physical damage to all property is from inundation, including the cost of cleanup, damage to buildings and contents, and damage to improvements and other property. Railroads, highways, streets, roads, utilities, and landscaping inundated by floodwaters also receive some damage from scour and silt deposition. The estimated damages that would occur as the result of the standard project flood amount to almost \$2.5 million, as tabulated in Table 5.

TABLE 5. - Estimated Flood Damages from Standard Project Floods
(in thousands of dollars) - July 1970 Prices

Lands and Improvements	Alpine Creek	Paisano Creek	West Moss Creek	Total
<u>Urban and suburban:</u>				
Residential	\$871.7	\$82.0	\$43.4	\$997.1
Commercial	915.9	15.6	52.8	984.3
Public property ¹	162.0	6.6	4.2	172.8
Utilities	56.9	7.5	.4	64.8
Subtotal	<u>2,006.5</u>	<u>111.7</u>	<u>100.8</u>	<u>2,219.0</u>
<u>Transportation facilities:²</u>				
Streets, highways & bridges	115.4	26.2	10.7	152.3
Railroads & bridges	52.0	31.6	2.6	86.2
Subtotal	<u>167.4</u>	<u>57.8</u>	<u>13.3</u>	<u>238.5</u>
<u>Rural:</u>				
Buildings & improvements	0.0	7.5	17.9	25.4
Land	0.0	7.2	0.0	7.2
Subtotal	<u>0.0</u>	<u>14.7</u>	<u>17.9</u>	<u>32.6</u>
Total	2,173.9	184.2	132.0	2,490.1

¹Includes schools and churches.

²Includes right-of-way land.

22. AVERAGE ANNUAL DAMAGES.- The flood damages which could be expected to occur from future floods in the tributary flood plains were estimated on an average annual basis by analyzing the discharge-damage-frequency relationships, as shown on Plates 1, 2, and 3, Appendix I, SUPPLEMENTAL ECONOMIC DATA. Average annual damages under the existing state of development were thus computed to be \$43,940. With an allowance for future growth, prospective or future average annual damages would amount to \$83,330, as itemized in Table 6.

TABLE 6. - Estimated Average Annual Flood Damages - Standard Project Flood Plains (July 1970 Prices)

Lands and Improvements	AVERAGE ANNUAL DAMAGES									Total Average Annual Damages
	Alpine Creek			Paisano Creek			West Moss Creek			
	Exist. Devel.	Future Growth	Total	Exist. Devel.	Future Growth	Total	Exist. Devel.	Future Growth	Total	
Urban and suburban:										
Residential	\$14,140	\$12,850	\$26,990	\$1,950	\$6,330	\$8,280	\$810	\$620	\$1,430	\$36,700
Commercial	13,980	12,430	26,410	570	510	1,080	750	550	1,300	28,790
Industrial	0	0	0	0	0	0	0	0	0	0
Public property ¹	1,790	670	2,460	250	100	350	10	0	10	2,820
Utilities	1,300	850	2,150	260	170	430	10	10	20	2,600
Subtotal	31,210	26,800	58,010	3,030	7,110	10,140	1,580	1,180	2,760	70,910
Transportation facilities:										
Streets, highways and bridges	3,930	2,870	6,800	1,270	930	2,200	190	140	330	9,330
Railroad and bridges	1,000	0	1,000	870	0	870	50	0	50	1,920
Subtotal	4,930	2,870	7,800	2,140	930	3,070	240	140	380	11,250
Rural:										
Buildings and improvements	0	0	0	260	160	420	320	200	520	940
Crops	0	0	0	0	0	0	0	0	0	0
Irrigation facilities	0	0	0	0	0	0	0	0	0	0
Land	0	0	0	230	0	230	0	0	0	230
Subtotal	0	0	0	490	160	650	320	200	520	1,170
TOTAL, LANDS AND IMPROVEMENTS	36,140	29,670	65,810	5,660	8,200	13,860	2,140	1,520	3,660	83,330

¹Includes schools and churches.

OTHER WATER-RELATED PROBLEMS

23. MUNICIPAL AND INDUSTRIAL WATER SUPPLY.- The entire municipal and industrial water supply of Alpine is obtained from two well fields. One well field is located in and adjacent to the city and consists of nine wells. The other field, Sunny Glen, is located three miles northwest of the city, and also comprises nine wells. The aquifer of the Sunny Glen field is located in a basaltic formation and yields water from approximately two hundred feet below the surface of an alluvial fan which spreads upon the plain eastward from the confluence of Sunny Glen and Haystack Canyons. The water table in the vicinity of Alpine is steadily declining because of continuous pumping from the ground water reservoir. The city is aware of its water supply problem and, in recent years, has retained consulting engineer firms to study the problem. Present municipal and industrial water supply consumption is about 1,200 acre-feet per year. (Projections for the future indicate that 1,700 acre-feet per year will be needed by year 1995, 2,250 acre-feet per year by year 2020, and 3,150 acre-feet per year by year 2070.) Because of the geologic characteristics of the ground water formation, the consultants have concluded that existing wells are producing water at their maximum capacity. The consultants have recommended that the city not drill more wells in the immediate area to increase water production. Their recommended potential sources of additional water supply include a reservoir to collect surface water in Sunny Glen Canyon, immediately upstream of the existing well field, and development of a new ground water supply in the Musquiz Creek area, located about ten miles northwest of Alpine. Extensive testing with installed large capacity wells will be required to determine the adequacy of this new ground water supply.

24. IRRIGATION.- Agricultural activities in the Alpine area are confined to livestock raising. Lack of water appears to preclude further consideration of the beneficial use of water for irrigation either now or in the future.

25. HYDROELECTRIC POWER.- Water resource improvements for hydroelectric power are not feasible because of the small quantity of available surface water supply and lack of reservoir sites with suitable head differential. It is anticipated that increased demands for electric power in the future will be met by expansion of existing thermal plants in use at the present time.

26. RECREATION.- The demands for outdoor recreation have greatly accelerated in recent years. Much of this recreational activity is related to the use and enjoyment of water resources. There is a definite need for water-associated recreation facilities in the study area. At present, the closest major water-associated recreation areas to Alpine are Red Bluff Lake, about 145 highway miles to the northwest;

Amistad Reservoir, about 185 highway miles southeast; and several reservoirs in the San Angelo area, about 230 highway miles northeast. The major water-associated recreation needs in the area appear to be opportunities for boating, swimming, and lake fishing. It is estimated that the projected needs will reach about 150,000 user-days by 1980, 236,000 user-days by 2020, and remain at this level to 2070.

27. FISH AND WILDLIFE.- Fish and wildlife are living natural resources basically associated with the land and water. Preservation and development of fish and wildlife resources are important to the economy and way of living. The recreational value of fish and wildlife is of significance to the well being of people, possibly more so than the food value of this resource. Opportunities to engage in water-associated sports such as hunting and fishing in the area are limited. As the population increases, the demand for such opportunities will also increase. It is estimated that by 1980, the needs will reach 36,000 man-days of fishing opportunities, and the need for fishing would increase to 57,000 man-days by 2020, and remain at this amount through 2070.

28. PHREATOPHYTES AND MAJOR DRAINAGE.- There are no known drainage problems or significant phreatophytic growth in the Alpine area.

PROJECT FORMULATION

29. IMPROVEMENTS DESIRED.- The desires of local interests regarding improvements for flood and sediment control and other water-related purposes in the Alpine area were expressed at a public meeting conducted by the District Engineer at Alpine on March 20, 1966. The meeting was well attended by State and local government officials, business and professional men, ranchers, property owners, and representatives of Sul Ross University. Oral and written statements presented at the hearing recalled personal experiences and observations during various flood occurrences and described areas overflowed and depth of water. All of the speakers expressed their anxiety regarding the flood hazard and their fear of future disasters such as experienced at nearby Sanderson, Texas, in 1965. In addition to the flood control problems, several speakers mentioned the problem of limited underground water supply for municipal use. It was pointed out that the supply should be reasonably adequate until the population of Alpine reaches 10,000 but, at that time, the city would be required to seek another source of water. The only solution suggested was the construction of multiple-purpose reservoirs in the canyons for flood control, municipal and industrial water supply, and recreation. When studies for this report were nearing completion and a tentative plan of improvement had been formulated, a meeting was held at Alpine on March 12, 1970, to inform local interests of the plan found to be most feasible, explain the items of local cooperation and to obtain their views regarding the proposed plan. The city of Alpine indicated a preference for the proposed plan of improvement and provided a letter indicating so. This letter is present in Appendix C, COORDINATION WITH OTHER AGENCIES.

30. PLANNING OBJECTIVES.- The basic objective of the survey was to achieve a practical plan of improvement for the solution of present water resources problems at and in the vicinity of Alpine and to satisfy foreseeable needs insofar as possible. Other objectives adopted in the process of project formulation were: (a) The scale of development should provide, where practical, the maximum excess of benefits over costs; (b) The plan of improvement should be complementary to plans of other agencies and permit future development of the natural resources if the need arises; (c) That project planning would be in compliance with existing water rights and priorities of use established by the State of Texas.

31. SOLUTIONS CONSIDERED.- Several basic types of solutions were considered in developing the plan of improvement, taking into consideration the national and regional economic objectives for the development of the water and related land resources, including preservation and enhancement of the environment and the well being of people. Solutions considered included improvement of existing river channels; construction of new channels; detention structures and small impoundments in tributary reaches to reduce floodflows; diversion and training measures to direct the flow of water into outfall channels; multiple-purpose reservoirs to regulate streamflows and store water for beneficial use; nonstructural measures; and combinations of the above. All improvements were formulated on the basis of a 100-year period of economic analysis, an interest rate of 4-7/8 percent, and allowances for future development. The recommended plan of improvement was updated to reflect the recently prescribed interest rate of 5-1/8 percent and July 1970 prices. The increase in interest rate did not affect the formulation process.

32. NONSTRUCTURAL MEASURES CONSIDERED.- Nonstructural measures consist of the methods of controlling the use of lands in the flood plain, in particular those areas having potential for urban development, in a manner as to lessen the damaging effects of floods. These measures include flood plain regulations, zoning, flood proofing of structures, flood forecasting and temporary evacuation, and permanent evacuation of flood prone areas. The usefulness of these techniques is limited in highly developed areas such as the Alpine Creek flood plain. However, nonstructural measures are feasible in areas that are now developing and that would remain subject to flooding even with some degree of structural protection. West Moss Creek and Paisano Creek flood plains are two such areas where nonstructural measures can be used to reduce future flood damages. Consequently, the flood problem at Alpine cannot be completely solved by a single approach and a combination of structural and nonstructural measures is required.

33. CHANNELIZATION AND DIVERSION PLANS CONSIDERED.- Preliminary investigation of channelization of the three creeks through the city disclosed that this type of improvement for Paisano and West Moss Creeks could not be justified for any degree of protection because of the infrequency of large magnitude floods and because only the fringe areas

of the city are threatened. However, since Alpine Creek flows through the highly developed central business district and residential areas of the city, channelization of this creek was studied in detail. Degrees of flood protection analyzed range from 50-year to standard project flood. The floodway would extend along the alignment of Alpine Creek through the city, a distance of about 1.1 miles. Concrete lining, 8 inches thick, would be required throughout because of the steep slope of the creek. Tieback levees about one-half mile long would be provided at the upstream end of the floodway channel. Project first costs would range from \$971,000 for the 50-year design to \$1,520,000 for the standard project flood design. Annual benefit-cost data are given in Table 7. This type of project would not be economically justified for any degree of protection, therefore no further consideration was given to channelization plans.

TABLE 7. - Alpine Creek Channelization (8-inch concrete lining)
(4-7/8 percent Interest)

Item	50-Yr	100-Yr	200-Yr	SPF
Design flow, c.f.s.	8,600	13,000	17,500	21,000
Benefits	\$25,030	\$34,280	\$43,910	\$55,760
Annual charges	\$52,800	\$59,100	\$69,100	\$81,200
B/C ratio	0.6	0.6	0.6	0.7

34. Inasmuch as channelization of the creeks was found to be infeasible, consideration was given to diversion of flood waters around the city for dispersal in nondamageable undeveloped areas. Preliminary estimates of even the simplest plans disclosed that annual charges would greatly exceed the benefits. Therefore, no further consideration was given to diversion of water around the city.

35. RESERVOIR PLANS CONSIDERED.- Single-purpose flood control dams were considered on each of the tributaries. A dam on Paisano Creek would be economically infeasible because of the high cost of relocation of the Southern Pacific railroad tracks. A single-purpose dam on West Moss Creek for protection against flows up to SPF would have a B/C ratio of less than 0.1. Flood control reservoirs to provide various degrees of protection from Alpine Creek were studied at a site located immediately upstream from the city of Alpine. Such a project would be ideal for prevention of flood damages to the most highly developed areas of the city. However, the analysis indicated that the single-purpose project would not be justified for any degree of protection. Feasibility data are given in Table 8.

TABLE 8. - Alpine Creek Single-Purpose Reservoir (Flood Control)
(4-7/8 percent Interest)

Item	100-Yr	200-Yr	SPF
Volume, acre-feet	2,780	4,980	6,390
Benefits	\$51,680	\$55,120	\$58,570
Annual Charges	\$64,000	\$78,000	\$86,000
B/C Ratio	0.8	0.7	0.7

36. The single-purpose reservoir project on Alpine Creek designed for various degrees of flood protection was further analyzed to determine the incremental justification of adding storage for multiple-purpose development for municipal and industrial water supply, fish and wildlife, and recreation. Various combinations of the degree of flood control to be provided, amount of storage allocated to water supply, and the extent of recreational development, were tested for economic feasibility. Seven combinations were found to be feasible, with each purpose justified on a last-added basis. Formulation of the selected plan is more fully described in Appendix D, PROJECT FORMULATION. The plan which has the most potential for flood damage reduction and for the solution of other water resources problems at Alpine has been designated as the Alpine Lake project, and is further described below. The project has been presented to and has the approval of local interests.

SELECTED PLAN OF IMPROVEMENT - ALPINE LAKE PROJECT

37. ENGINEERING FEATURES.- The major features of the Alpine Lake project would comprise an earthfill dam located on Alpine Creek, near the southern city limits of Alpine, a small saddle dam near the divide between the Alpine and West Moss Creeks watersheds, and diversion channels leading from Paisano and West Moss Creeks to convey runoff from these streams into the reservoir. The project, in addition, would afford various degrees of flood protection from the three creeks and, would provide storage for municipal and industrial water supply and recreation. At spillway crest, the reservoir would have a storage capacity of 12,710 acre-feet, of which 2,080 acre-feet would be reserved for sediment detention, 1,000 acre-feet would be allocated to recreation, 5,100 acre-feet for municipal and industrial water supply, and 4,530 acre-feet to flood control. Project features are shown on Plan of Improvement, Plate 1, and described and illustrated in detail in Appendix E, DESIGN AND COST ESTIMATES. They are summarized in the following paragraphs.

38. The Alpine dam embankment would be 6,300 feet long with a 20-foot crown width, rising to elevation 4,587 feet, or 77 feet above

the streambed. Dumped rock fill would be placed at the downstream toe of the dam as protection against tailwater from spillway discharges. Seepage control measures would be installed for protection of the dam and to intercept seepage from the permanent pool. A concrete ogee weir type service spillway would be located in the right abutment of the dam. The spillway would consist of two sections, each 35 feet wide, topped by 35-foot square tainter gates separated by a concrete pier. A 70-foot wide approach channel, about 470 feet long, and a 70-foot wide outlet channel, about 330 feet long, would be excavated in rock for the spillway. The Corps will require that a local operator be hired by the city and trained under the supervision of the Corps of Engineers. In addition, and to provide complete assurance of flood control operations during an emergency condition, automatic gate controls will also be provided as discussed in Appendix E, DESIGN AND COST ESTIMATES. To provide for emergency drainage of the reservoir, a circular opening three feet in diameter would be formed in the bottom of the center pier of the spillway weir. A slide gate with a hand-operated lift would be provided for control. A 2-foot wide approach and outlet channel for the outlet works would be excavated in rock at the center of and about five feet lower than the spillway approach and outlet channel.

39. An earthfill saddle dam about 2,100 feet long, with a maximum height of 42 feet to elevation 4,587 feet, would be constructed in the West Moss Creek drainage area, about 0.5 mile east of the saddle in the divide between the two watersheds. A conveyance channel 3,900 feet long would be excavated through the divide to prevent pooling of water behind the saddle dam.

40. A concrete diversion structure would be constructed across Paisano Creek, about 4 miles west of the center of Alpine, to divert discharges up to 4,000 c.f.s. into an unlined earth channel which would carry the flows into Alpine Lake. Discharges in Paisano Creek in excess of 4,000 c.f.s. would flow over a weir in the structure and return to the natural channel. The diversion channel would be about three miles long with a base width of 20 feet. Concrete stabilizers would be provided at 1,000-foot intervals to prevent head cutting and a short stretch of riprapped levee, 630 feet long, would be required on the downhill side of the channel at a low spot in the natural terrain.

41. The West Moss Creek diversion channel would consist of a 50-foot base width channel with a riprapped levee on the downhill slope. The diversion channel would be 4,400 feet long, terminating near the right abutment of the saddle dam, and would have a capacity of 7,400 c.f.s. Concrete channel stabilizers would be provided every 1,000 feet to prevent head cutting. An earthfill dike with a maximum height of 24 feet would be constructed across West Moss Creek, about 0.4 mile upstream from its crossing of Texas State Highway 118, to divert flows into the channel. A concrete overflow weir, with invert 4 feet below top of the dike, would be provided to return flows in excess of 7,400 c.f.s. to West Moss Creek.

42. The plan of improvement also provides for nonstructural measures in the flood plain areas of West Moss Creek, Paisano Creek, and Alpine Creek. The greatest return would be realized from a combination of the proposed structural measures and nonstructural measures. These nonstructural measures include designation of a floodway and preventive measures within the additional area that would be inundated by a flood that could be expected to occur once in 100 years. Nonstructural measures are particularly effective for undeveloped flood plain areas where they serve to control improvements to minimize flood damages.

43. The floodway is defined as the area of the channel and those portions of the flood plains adjoining the channel which are reasonably required to carry floodwaters. No construction or land filling should be permitted within the floodway if such works would restrict the passage of floodwaters. The approximate limits of the required floodways, as shown on the Plan of Improvement, Plate 1, are further defined as follows:

<u>Stream</u>		<u>Floodway width (ft)</u>
West Moss	State Highway 118 to U.S. Highway 90-67	140
Paisano	West to East projected city limits	800
Alpine	2nd Street to junction with East Fork	100
	East Fork to State Highway 223	250

These limits would be more accurately determined by detailed studies during preconstruction planning. Areas outside of floodways that would be inundated by the modified 100-year flood would be subject to regulations including, but not limited to, the following:

a. No building or structure shall be erected, and no existing building or structure shall be extended or moved, unless the floor elevation of said building or structure is placed above the elevation of the modified 100-year flood. Lower floor elevation may be permitted where effective flood proofing is included in the design of such buildings. No basement floor or other floor shall be constructed below or at a lower elevation than the main floor if the basement is to be used for storage of items that are subject to damage by water, or which may house mechanical or electrical equipment essential to the operation of the building.

b. Necessary vehicular access from higher ground to future improvements for human occupancy should be at least at such elevation that emergency vehicles can pass during floods.

44. In addition to the required floodways, it is recommended that consideration be given to a floodway on the East Fork of Alpine Creek and other drainages that are not protected by the plan of improvement. The East Fork of Alpine Creek floodway should extend from the Southern

Pacific Railroad northerly to the junction with Alpine Creek. The required 100-year floodway would average 80 feet in width from the Southern Pacific Railroad to East "D" Avenue, and 100 feet in width from "D" Avenue to the junction of Alpine Creek.

45. Construction of the project would require relocation of about 11,000 lineal feet of barbed wire fence and a trail road which leads south from Alpine through the center of the reservoir area. The road would be relocated around the left abutment of the dam to provide access to ranches south of Alpine. A 70-foot long timber bridge crossing would be required over the Paisano Creek diversion channel. Removal of one windmill would be required. Minor modifications to telephone and electric lines and construction of new bridges at the crossing of U.S. Highway 90-67 and the Southern Pacific Railroad would be necessary for construction of the Paisano Creek diversion channel.

46. Recreation facilities, consisting of picnic tables and shelters, water supply and sanitation facilities, roads, trails, parking areas, boat launching ramps, and related items, would be provided to promote optimum use of the permanent pool by the public. As recommended by the Bureau of Sport Fisheries and Wildlife, suitable fish cover or attractor devices would be installed in the reservoir prior to filling.

47. Construction of the recommended project would require acquisition of 740 acres of grazing land in fee purchase. Fee purchase would include all lands for the dams and reservoir site up to an elevation 3.0 feet above top of flood control pool. No easement land would be required because the fee purchase area would include all land subject to inundation at maximum pool elevation. An additional 44 acres of grazing land would be acquired in fee purchase for general recreation use.

48. Maintenance of the project would be the responsibility of local interests. Periodic inspection of all elements with necessary repairs to slopes on the dams and spillway outlet channel would be required. Removal of debris from the spillway structure and approach and outlet channels would be needed following periods of high flow. Continual cleanup and maintenance of the recreation facilities would be required, particularly during seasons of intensive public use.

49. In order to obtain the greatest efficiency from the standpoint of both water supply and flood control and, since it is intended that the water supply from the proposed project would complement the water supply from the existing well fields, the reservoir should be operated in the following manner. Water should be released from the reservoir to supply all of the water supply needs immediately following periods of abundant rainfall. As the municipal and industrial water supply pool is lowered, pumping from the wells can be resumed. Through this manner of operation, incidental storage for flood control would become available in the municipal and industrial water supply storage space, and also the time over which the large area of reservoir surface would be subjected to evaporation would be decreased.

50. FLOOD PLAIN MANAGEMENT.- To encourage the prudent use of urban flood plains, Congress, in the Flood Control Act of 1960, authorized a national program of flood plain information studies. Under this authority, the Corps of Engineers provides to States and local governmental agencies the flood plain information and technical assistance needed for planning the best use of urban flood plains.

51. The proposed plan of improvement for Alpine and the adjacent watersheds does not preclude the need for wise flood plain management both before and after construction of the improvements proposed herein. Economic and physical restrictions limit the degree of flood protection which can be provided by structural measures. Some flooding from very large and rare floods can be expected even after completion of the improvements. The use of lands still subject to flooding should be governed by a knowledge of the degree of flood hazard remaining. Flood plain regulations and flood proofing of existing and future structures in these areas could reduce the residual flood damage potential and should be given careful consideration by local interests. A requirement to adopt and enforce flood plain regulations for certain channel reaches is being made an item of local cooperation. The probable effects of a flood plain management program for the city of Alpine have been considered in evaluating benefits for the proposed project. The amounts of residual flooding and other flood plain information available as a result of studies of the Alpine area watershed flood problem are discussed in Appendix A, FLOOD PLAIN INFORMATION. The data in this appendix indicates that under improved conditions, residual flooding to depths of up to 2 feet may be expected adjacent to the East Fork of Alpine Creek, Paisano Creek and West Moss Creek with the occurrence of a standard project flood. While not a requirement of local cooperation, with a minimum of effort and expenditure for floodproofing, such as land fill, local interests could improve the degree of protection from flooding up to the standard project flood for new buildings and when replacing existing structures.

52. ESTIMATED PROJECT COSTS AND ANNUAL CHARGES.- The estimated first cost of the Alpine Lake project is \$3,654,000. The annual charges based on 100-year project life at 5-1/8 percent interest rate, would be \$255,000. A detailed estimate of the first costs, investment, and annual charges is presented in Appendix E, DESIGN AND COST ESTIMATES and summarized in Table 9.

TABLE 9. - Summary of Costs and Annual Charges
Alpine Lake Project (July 1970 Price Levels)

Item	Total
<u>FIRST COST</u>	
Alpine Dam and Saddle Dam	\$2,124,000
Paisano Diversion Channel	522,000
West Moss Diversion Channel	229,000
Recreation Facilities	509,000
Lands and Damages	158,000
Relocations	<u>112,000</u>
TOTAL FIRST COST	3,654,000
Interest during construction (3 years)	<u>221,000</u>
TOTAL INVESTMENT	3,875,000
<u>ANNUAL CHARGES</u>	
Interest and amortization on investment (5-1/8%, 100 years)	196,800
Operation and maintenance	53,600
Major replacements	<u>4,600</u>
TOTAL ANNUAL CHARGES	255,000

53. PROJECT EFFECTS.- Alpine Lake will provide, as a minimum, protection from the 100-year flood on Alpine Creek, the 50-year flood on West Moss Creek and the 10-year flood on Paisano Creek. When operated as outlined in paragraph 49, the degree of protection on Alpine Creek will be greater than the 100-year flood. The project will provide a supplemental water supply of 2,150 acre-feet per year with a 20 percent chance of shortage, or enough water to meet the projected demand until year 2070. Annual use of the recreation facilities is estimated at 179,000 user-days for general recreation and 57,000 user-days for fishing and wildlife-oriented recreation.

54. ESTIMATED BENEFITS.- Annual benefits which would result from the operation of Alpine Lake are estimated at \$438,300 based on a 100-year analysis period. Benefits are briefly described in the following subparagraphs.

a. Flood control benefits.- Flood control benefits would accrue as a result of prevention of damages from inundation, scour,

and sediment deposition to present and future developments in the flood plains. These benefits are estimated at \$57,300 per year and are more fully explained in Appendix I, SUPPLEMENTAL ECONOMIC DATA. The major portion of the flood plain area of Alpine Creek is presently developed for urban use. The flood plain areas of Paisano and West Moss Creeks are largely undeveloped; however, the threat of flooding has not been a deterrent to developments in the past. Due to the relatively low degree of flood protection provided on these two tributaries by the plan of improvement and the state of development on Alpine Creek, it was concluded that land enhancement benefits, as a result of construction of the project, would be negligible.

b. Water supply benefits.- Benefits for water supply are limited by the cost of the least costly alternative water supply project which would probably be developed by local interests in the absence of a federal project. Water supply benefits are estimated at \$147,000 annually and are fully described in Appendices E, DESIGN AND COST ESTIMATES, and I, SUPPLEMENTAL ECONOMIC DATA.

c. Recreation benefits.- Annual benefits for recreation and fish and wildlife enhancement are estimated at \$234,000. Details of the computation of these benefits are contained in Appendix I, SUPPLEMENTAL ECONOMIC DATA, and Appendix J, ENVIRONMENTAL RESOURCES.

d. Intangible benefits.- Other benefits not measurable in monetary terms would be realized through construction of the proposed project. These include prevention of loss of life, removal of mental anguish associated with floods and flood threats, and enhancement of the general welfare and security of the people of Alpine. These benefits would be of great significance to local interests.

e. Summary of benefits.- The evaluated benefits are summarized in Table 10.

TABLE 10. - Summary of Average Annual Benefits
Alpine Lake Project

Type of Benefit	Degree of Protection	Damage Prevention	Total
<u>Flood Control:</u>			
Alpine Creek	100-Year	\$47,670	\$47,670
West Moss	50-Year	2,910	2,910
Paisano Creek	10-Year	6,720	6,720
Subtotal		<u>57,300</u>	<u>57,300</u>
<u>Water Supply Benefits:</u>			
Water for 100-year demand			147,000
<u>Recreation Benefits:</u>			
Fish and Wildlife			75,000
General Recreation			159,000
Subtotal			<u>234,000</u>
Total Annual Benefits			438,300

55. ECONOMIC JUSTIFICATION.- The estimated annual charges for the selected plan of improvement amount to \$255,000. The estimated average annual benefits are \$438,300. The benefit-cost ratio is 1.7, and the excess of annual benefits over annual charges is \$183,300. The project as formulated meets the planning objectives outlined in paragraph 30.

56. ALLOCATION OF COSTS AMONG PURPOSES.- The cost of the proposed project were allocated to flood control, water supply, and recreation by the Separable Cost-Remaining Benefits method. Details of the allocation studies are presented in Appendix I, SUPPLEMENTAL ECONOMIC DATA. A summary of the results of the allocation is given in Table 11.

TABLE 11. Summary of Cost Allocation Data
Alpine Lake Project

Item	Flood Control	Water Supply	Recreation	Total
Construction Cost	\$742,400	\$1,546,200	\$1,095,400	\$3,384,000
Lands, Damages and Relocation	80,100	117,600	72,300	270,000
Total First Cost	<u>822,500</u>	<u>1,663,800</u>	<u>1,167,700</u>	<u>3,654,000</u>
Annual Charges, Operation, Maintenance & Major Replacements	2,500	9,200	46,500	58,200

57. APPORTIONMENT OF COSTS BETWEEN INTERESTS.- The Federal Government would initially bear the construction cost of the entire project. Local interests would be required to:

- a. Furnish all lands, easements, rights-of-way, and relocations except railroads associated with flood control;
- b. Furnish lands, bear costs of relocations except railroads, and repay all costs incurred by the Federal Government which are allocated to municipal and industrial water supply;
- c. Pay, repay, or contribute in kind one-half the separable costs of recreation; and
- d. Bear all costs of all operation, maintenance, and major replacements, presently estimated at \$58,200 annually. Non-Federal first costs are summarized in Table 12.

TABLE 12. - Non-Federal First Cost, Alpine Lake Project

Item	Reimbursable Construction	Lands, Rights-of-way & Relocations	Total
Flood Control	0	\$80,100	\$80,100
Water Supply	\$1,546,200	117,600	1,663,800
Recreation	<u>255,200</u>	<u>72,300</u>	<u>327,500</u>
Total	1,801,400	270,000	2,071,400

LOCAL COOPERATION

58. PROPOSED REQUIREMENTS.- In the event that the selected plan of improvement described in this report is authorized for construction by the United States, local interests would be required to:

- a. Provide all lands, easements, rights-of-way and relocations, except railroads, presently estimated at \$270,000. The relocations would be in compliance with Public Law 91-646, 91st Congress, 2nd Session;
- b. Hold and save the United States free from damages due to construction and operation of the project;
- c. Administer, maintain and operate the works after completion in accordance with regulations prescribed by the Secretary of the Army;
- d. Make any alterations to existing improvements, other than railroad bridges and approaches connected therewith, which may be required because of the construction work;

e. Prevent encroachments on the channel of Alpine Creek below the project and maintain a minimum capacity of 1,200 c.f.s.;

f. Periodically inform all concerned, in a manner satisfactory to the Secretary of the Army, that some flooding will continue to occur due to flows greater than design magnitude;

g. Adopt and enforce flood plain regulations appropriate to the nonstructural measures of the plan of improvement which, combined with the structural measures, would minimize damages to future development in the project area that would be inundated from a flood that could be expected to occur once in 100 years;

h. Consider the adoption of flood plain regulations for areas other than those covered by the plan of improvement as necessary to assure compatibility between future developments within the flood plains and the protection afforded by the improvements;

i. Publicize the flood plain information contained in Appendix A, FLOOD PLAIN MANAGEMENT, and make it readily available to all interested persons;

j. Prior to initiation of construction enter into a contract, satisfactory to the Secretary of the Army, whereby all construction and interest costs incurred by the Federal Government allocated to water supply will be repayed in accordance with the Water Supply Act of 1958, as amended. The amount allocated to water supply is presently estimated at \$1,663,800. Included therein is an amount, presently estimated at \$117,600 for lands, easements, rights-of-way, and relocations which will be furnished by local interests and for which they will be given credit toward their reimbursable water supply cost.

k. Pay, contribute in kind, or repay (which may be through user fees) with interest, one-half of the separable first cost of the project allocated to recreation and fish and wildlife enhancement, an amount presently estimated at \$327,500. Included therein is an amount presently estimated at \$72,300 for lands, easements, rights-of-way, and relocations which will be furnished by local interests, and for which they will be given credit toward their reimbursable half of the separable first cost of recreation and fish and wildlife enhancement.

l. Bear all costs of operation, maintenance, and replacement of flood control, water supply, recreation and fish and wildlife areas and facilities, presently estimated at \$58,200 on an average annual basis.

m. Provide storage rights and hold and save the United States free from water rights claims due to construction and operation of the project.

59. ASSURANCES.- Subsequent to the two meetings described in paragraph 29, IMPROVEMENTS DESIRED, a final public meeting was held on 18 February 1971, to further explain the plan of improvement, describe the requirements of local cooperation, and obtain a letter of intent from the city of Alpine indicating willingness and ability to participate in construction of the Alpine Lake project in the event of its authorization. The meeting was attended by Congressman White, State, City and County officials; representatives of other Federal agencies and local organizations; landowners; and other interested persons. The general consensus of the people attending the meeting was a favorable reaction to the project. A letter of approval and willingness to support the project has been received from the city of Alpine. A copy of the letter is included in Appendix C, COORDINATION WITH OTHER AGENCIES.

COORDINATION WITH OTHER AGENCIES

60. GENERAL.- During the preparation of this report, close coordination of studies relating to the water resources problems and needs and solutions thereto was maintained with the regional and local offices of interested Federal agencies and the State of Texas. The Bureau of Sport Fisheries and Wildlife, the Federal Water Quality Administration, the Soil Conservation Service, the Bureau of Reclamation, the U.S. Public Health Service, the Bureau of Outdoor Recreation, and the U.S. Geological Survey furnished valuable assistance in the formulation and evaluation of the proposed plan of improvement. Cooperative reports were prepared by the Bureau of Sport Fisheries and Wildlife, Appendix B, and by the Federal Water Quality Administration which is included in Appendix C, COORDINATION WITH OTHER AGENCIES.

61. To further coordination of the investigation, a draft of this report was submitted to the regional offices of all interested Federal agencies for review at field level and to the Director of Planning Coordination for the State of Texas. Their views and comments are summarized and discussed in the following paragraphs. Copies of written comments are included in Appendix C, COORDINATION WITH OTHER AGENCIES.

62. U. S. DEPARTMENT OF AGRICULTURE.-

a. Soil Conservation Service.- The Texas State Conservationist commented that the report presented the results of the Corps study to the extent and magnitude of the flood and water-related problems at and in the vicinity of Alpine, Texas, along with the Corps determination of the best solution to these problems based on meeting present and long-range needs of the area, engineering feasibility, and economic justification of the selected plan. He also stated that the Soil Conservation Service has no existing or proposed projects that would affect or be affected by the proposed Alpine Lake project.

63. U. S. DEPARTMENT OF COMMERCE.-

a. U.S. Coast and Geodetic Survey.- No comments were received.

b. Weather Bureau, Southern Region.- No comments were received.

64. U. S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT.- No comments were received.

65. ENVIRONMENTAL PROTECTION AGENCY.-

a. Water Hygiene.- The Water Hygiene Representative stated that inasmuch as the proposed supplemental water supply will be from a multipurpose reservoir, complete treatment will be necessary. He recommended that the proposed plan for that treatment be described. The Corps recognizes the need for treatment of water from the reservoir; however, treatment of the water will be the responsibility of the city of Alpine. Water treatment was an integral consideration of water supply studies. Planning and construction of the plant will be done by the city. It is not anticipated that plans will be prepared prior to authorization and funding of construction of the diversion and storage facilities. The representative also stated that the development of the project should result in beneficial health effects provided proper health guides in recreation development, land clearing, vector control, and land use are followed.

b. Water Quality Office.- The Director commented that the report has properly presented their views of the water quality of the area. He stated that the report would be more complete if a copy of their letter dated 13 November 1968, was included in Appendix C. This letter has been included. He also pointed out that the provisions of E. O. 11507 are to be complied with and that the construction, operation, and maintenance of the sanitary facilities for the recreational area will be done in accordance with all State and Federal requirements. He commented that the Environmental Statement should also point out that the contractor will be required to:

1. Exercise care in the relocation of petroleum product pipelines and other hazardous material to prevent accidental spillages that would be harmful to fish and wildlife.
2. Provide and operate sanitary facilities to adequately treat and dispose of domestic wastes in conformance with Federal and State water pollution control regulations.

3. Schedule clearing, excavation and construction operations to reduce erosion, turbidity and siltation to the lowest level practicable.

The Environmental Statement has been revised accordingly and the comments will be incorporated as appropriate in the specifications.

66. U. S. DEPARTMENT OF THE INTERIOR.-

a. Office of the Secretary, Southwest Region.- The field representative commented that the proposed plan of development and the purposes served appear to fulfill the needs of the area within the capability of the resources. He also stated that municipal and industrial water supply was an important part of the proposed plan but noted there was no discussion of the quality of the potential surface water supply. He suggested that water quality as well as on-site quantity data be obtained in the preconstruction investigations. The Federal Water Pollution Control Administration letter dated 13 November 1968 briefly presents the quality of surface water and has been included in Appendix C, COORDINATION WITH OTHER AGENCIES. It is recognized that more data are needed in regard to the quality and quantity of surface water. The Corps of Engineers in cooperation with the U.S. Geological Survey has recently installed three gaging stations in the vicinity of Alpine. As records are accumulated, better data on quality and quantity will become available.

b. Bureau of Reclamation, Region 5.- The Acting Regional Director noted that the water supply estimate was based on transference of records that terminated in 1949 from Madera Creek. He stated that this procedure could provide questionable results. The District responded by letter dated 29 January 1971 explaining the methodology that was used in determining the yields for the project. The Regional Director by letter dated 24 February 1971 stated that the data presented in the District's letter dated 29 January answered the questions raised in the Bureau's letter of 14 January. He also stated that the data presented should be incorporated in the report. The District's letter of 29 January has been included in Appendix C.

c. Bureau of Mines.- The Chief, Intermountain Field Operation Center stated that from their information on minerals and minerals processing it was evident that the mineral industry is relatively unimportant in the Alpine area. He also stated the mercury deposits and mines in the Terlingua area in the southern part of Brewster County should have little effect on developments in the Alpine area and, conversely, flood control programs should not affect any mineral industry in the county.

d. Bureau of Outdoor Recreation.- The Regional Director commented that he was pleased that the project is designed to provide much

needed water-oriented recreation in an area where water is scarce. He also commented that he was in general agreement that the design load capability will be used and that the calculated benefits will be realized. However, he said, the immediate project area is sparsely populated and most of the recreational demand will be exerted by tourists and suggested a strong need to focus use and benefits of the facilities on tourism. He stated that the report apparently includes a value for the recreational experience of tourists but it might also claim benefits to the local economy generated by supporting services. He also stated that he was generally opposed to benefits claimed with respect to future development of floodways. Under present established policies and directive of the Corps, secondary benefits are not included in the national account. The benefits have been credited to the project for development within floodways, since flood plain management measures required, would preclude development from these high hazard areas.

e. Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service.- The Acting Regional Director stated that the treatment of fish and wildlife matters was handled in an excellent manner and was in line with their report dated 22 May 1970. He suggested that cost allocations for fish and wildlife be shown separately from those for general recreation. If a need arises for separation of the figure, the District will suballocate costs upon request between wildlife and general recreation.

f. U. S. Geological Survey, Water Resources Division.- The Regional Hydrologist commented that a study of the computations indicated that the design runoff for the area was reasonable and that he concurred with the recommended hydrological instrumentation as proposed.

g. National Park Service, Southwest Region.- The Director stated that there was no indication of an environmental statement nor was there any discussion of archeological or historical values. Since their review, the National Park Service has been furnished a copy of the Environmental Statement. An archeological reconnaissance of the project limits and borrow areas will be requested during preconstruction planning.

67. U. S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.- The Regional Federal Highway Administrator and the Division Engineer noted local interests would be required to construct a new bridge for U.S. Highway 90-67 across the Paisano Creek diversion channel. They stated that obligations assumed by local interests as a condition to approval of the project cannot be financed with Federal highway funds.

68. FEDERAL POWER COMMISSION.- No comments were received.

69. INTERNATIONAL BOUNDARY AND WATER COMMISSION.- The Commissioner commented that the Water Treaty with Mexico, signed on February 3, 1944,

allocates the entire flow of the Pecos River to the United States, and future development of the potential project would not be contrary to the provisions of the Treaty. He also stated that incorporation of water supply storage in the reservoir would be subject to appropriate action by the Texas Water Rights Commission.

70. STATE OF TEXAS, DIVISION OF PLANNING COORDINATION.- The Director stated that the report was reviewed by the Interagency Natural Resources Council and other interested State agencies and no adverse comments were received on the proposed project or the environmental statement. It was pointed out that the project is subject to further review by the Texas Water Rights Commission under Article 7473e, V.T.C.S., when the report is forwarded to the Governor of Texas.

71. PECOS RIVER COMMISSION.- The chairman commented that it appeared that the proposed project would have no effect on the division of Pecos River water at the New Mexico-Texas State line, and that nothing proposed would adversely affect Federal interests in the Pecos River Basin.

CONCLUSIONS

72. CONCLUSIONS.- The District Engineer concludes that:

a. Participation by the United States in a plan for water resources development on tributaries of the Pecos River at and in the vicinity of Alpine, Texas, is warranted. The project would control floods on Alpine Creek and would reduce flooding from Paisano and West Moss Creeks, provide recreational and fishing opportunities, and would provide supplemental water supply to satisfy up to the 100-year demand.

b. Measures recommended by the Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, are economically justified and should be included in the project.

c. The selected plan of improvement is feasible from an engineering and economic standpoint and is economically justified on the basis of evaluated benefits and annual charges.

d. Groundwater sources are rapidly declining and the city of Alpine must look to other sources for supplemental water supply if it is to continue to grow. The total estimated first cost of including water supply in the project is less than the cost of the cheapest alternative which would provide the same amount of water based on comparable financing.

e. The Alpine Lake project would provide a valuable recreation resource including sport fishing in an area of high demand where no fishery now exists.

f. Local interests concur in the proposed plan of improvement and have indicated a willingness to cooperate in construction, and maintain and operate the project upon completion.

RECOMMENDATIONS

73. RECOMMENDATIONS.- I recommend that the Alpine Lake project be authorized for construction at an estimated first cost to the United States of \$3,384,000 provided that, prior to construction of the local protection project, local interests furnish assurances satisfactory to the Secretary of the Army that they will:

- a. Hold and save the United States free from damages due to construction and operation of the project;
- b. Prevent encroachments on the channel of Alpine Creek below the project and maintain a minimum capacity of 1,200 c.f.s.;
- c. Administer, maintain and operate the works after completion in accordance with regulations prescribed by the Secretary of the Army;
- d. Make any alterations to existing improvements, other than railroad bridges and approaches connected therewith, which may be required because of the construction works;
- e. Periodically inform all concerned, in a manner satisfactory to the Secretary of the Army, that some flooding will continue to occur due to flows greater than design magnitude;
- f. Provide all lands, easements, rights-of-way, and relocations, except railroads, presently estimated at \$270,000. The relocations would be in compliance with Public Law 91-646, 91st Congress, 2nd Session;
- g. Adopt and enforce flood plain regulations appropriate to the nonstructural measures of the plan of improvement which, combined with the structural measures, would minimize damages to future development in the project area that would be inundated from a flood that could be expected to occur once in 100 years;
- h. Consider the adoption of flood plain regulations for areas other than those covered by the plan of improvement as necessary to assure compatibility between future developments within the flood plains and the protection afforded by the improvements;
- i. Publicize the flood plain information contained in Appendix A, FLOOD PLAIN INFORMATION, and make it readily available to all interested persons.

j. Prior to initiation of construction enter into a contract, satisfactory to the Secretary of the Army, whereby all construction and interest costs incurred by the Federal Government allocated to water supply will be repayed in accordance with the Water Supply Act of 1958, as amended. The amount allocated to water supply is presently estimated at \$1,663,800. Included therein is an amount, presently estimated at \$117,600 for lands, easements, rights-of-way, and relocations which will be furnished by local interests and for which they will be given credit toward their reimbursable water supply cost.

k. Pay, contribute in kind, or repay (which may be through user fees) with interest, one-half of the separable first cost of the project allocated to recreation and fish and wildlife enhancement, an amount presently estimated at \$327,500. Included therein is an amount presently estimated at \$72,300 for lands, easements, rights-of-way, and relocations which will be furnished by local interests, and for which they will be given credit toward their reimbursable half of the separable first cost of recreation and fish and wildlife enhancement.

l. Bear all costs of operation, maintenance, and replacement of flood control, water supply, recreation and fish and wildlife areas and facilities, presently estimated at \$58,200 on an average annual basis.

m. Provide storage rights and hold and save the United States free from water rights claims due to construction and operation of the project.



R. L. WEST
Colonel, CE
District Engineer

- 12 Incl
1. Plate 1 - Plan of Improvement
 2. Appendix A: Flood Plain Information
 3. Appendix B: Report by Bureau of Sport Fisheries and Wildlife
 4. Appendix C: Coordination with Other Agencies
 5. Appendix D: Project Formulation
 6. Appendix E: Design and Cost Estimates
 7. Appendix F: Hydrology
 8. Appendix G: Water Supply Study
 9. Appendix H: Area Economic Study
 10. Appendix I: Supplemental Economic Data
 11. Appendix J: Environmental Resources
 12. Information called for by S.R. 148, 85th Congress

[First endorsement]

SWDPL-F

1st Ind

SUBJECT: Report on Review Survey for Flood Control and Allied Purposes:
Tributaries of the Pecos River at and in the Vicinity of
Alpine, Texas

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street,
Dallas, Texas 75202 13 August 1971

TO: Chief of Engineers

I concur in the conclusions and recommendations of the District Engineer.

H. R. Parlett
H. R. PARLETT
Major General, USA
Division Engineer



APPENDIX B - REPORT BY BUREAU OF SPORT FISHERIES AND WILDLIFE,
FISH AND WILDLIFE SERVICE, U.S. DEPARTMENT OF THE INTERIOR



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

May 22, 1970

District Engineer
Corps of Engineers, U. S. Army
Post Office Box 1580
Albuquerque, New Mexico 87103

Dear Sir:

This letter constitutes the Bureau of Sport Fisheries and Wildlife report on proposed improvements on tributaries of the Pecos River at and in the vicinity of Alpine, Brewster County, Texas, and is intended to accompany your Survey Report on the project. Our report was prepared under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Fish and wildlife investigations leading to this report were carried out in cooperation with the Texas Parks and Wildlife Department. The Department has concurred with the views expressed herein as indicated by the letter dated April 28, 1970, signed by Executive Director J. R. Singleton, a copy of which is enclosed.

The project site lies in the mountainous area of far west Texas. The scenic but arid area is centered in the Trans-Pecos Game Region. Typically, the region is a complex of dry grasslands, desert shrub-covered slopes, and mountains. Sparsely populated and remote, the region is well known in the State for its variety of big-game animals. Permanent water, however, is lacking in the Trans-Pecos Game Region, and fishery resources are practically nonexistent. Paisano, West Moss, and Alpine Creeks are the principal streams in the proposed work area and they are intermittent.

Tourism and ranching are the principal sources of income in the area. Big Bend National Park and the Texas Parks and Wildlife Department's Black Gap Wildlife Management Area are located in the southern portion of Brewster County, of which Alpine is the county seat. Big Bend Historical Museum and Sul Ross State College are located at Alpine. Fort Davis National Historic Site and McDonald Observatory are situated only a few miles north of Alpine. Human

population within 75 miles of the project would be about 25,000 by the year 1980, 30,000 by the year 2000, and about 35,000 by the year 2020. The population residing from 75 to 125 miles from the project would be about 49,000 in 1980, 57,000 in 2000, and 72,000 in 2020.

The project plan includes measures to overcome flooding, water supply, and related problems at Alpine, Texas. It consists of a multiple-purpose reservoir on Alpine Creek with suitable works on West Moss and Paisano Creeks to divert floodflows of these streams into the reservoir.

Alpine Reservoir would have an earthfill dam across Alpine Creek that would be about 6,300 feet long and about 77 feet high. The right abutment of the dam would be located on the west slope of "A" Mountain at the south outskirts of Alpine. A 76-foot-wide spillway equipped with two 35- by 35-foot Tainter gates would be provided at the right abutment. The left end of the dam would tie into high ground southwest of Alpine. A gated 3-foot round structure, located in the spillway, would comprise the outlet works. A 2,100-foot saddle dike would be constructed in the West Moss Creek drainage at a location south of "A" Mountain and just west of and parallel to State Highway No. 118. A conveyance channel would be excavated through the divide between the watersheds of Alpine and West Moss Creeks to prevent formation of pools behind the saddle dike.

The total storage capacity in Alpine Reservoir would be 12,710 acre-feet. The capacity includes 4,530 acre-feet for flood control, 2,080 acre-feet for sediment, 5,100 acre-feet for municipal and industrial water supply, and 1,000 acre-feet for a permanent recreation and fish and wildlife pool. At conservation pool level, the reservoir would be about 480 acres. The recreation storage would provide a pool amounting to about 100 acres initially and would increase to 240 acres at the end of 100 years. Pertinent reservoir data are shown in Table 1.

Table 1. Alpine Reservoir, Texas

Item	Elevation (Feet)	Area (Acres)	Capacity (Acre-feet)
Top flood control pool	4580.0	650.0	12,710
Top conservation pool	4572.0	480.0	8,180
Top recreation pool	4559.0	240.0	3,080
Top sediment pool	4554.0	180.0	2,080

West Moss Creek Diversion would consist of a 24-foot-high dike across the creek with a concrete overflow weir and a 50-foot bottom width channel to divert floodflows into Alpine Reservoir. The 4,400-foot-long channel would have a riprapped levee on the downhill slope and would be equipped with concrete channel stabilizers every 1,000 feet. The channel would have a capacity of 7,400 second-feet. The average depth of the flow in the channel would be 10 feet.

Paisano Creek Diversion would consist of structural measures similar to those proposed for West Moss Creek, except that the diversion structure would be constructed of concrete and would be 10 feet high. The diversion channel would be 16,000 feet long with a bottom width of 20 feet and have a capacity of 4,000 second-feet. It would empty into Alpine Reservoir near the west end of the dam.

Alpine Reservoir would be operated to maintain the water level at the top of the conservation pool as often as possible. Flood storage would be released as soon as possible consistent with downstream conditions. Releases would not exceed the safe downstream capacity of 1,200 second-feet through the city of Alpine. Inflows to the reservoir normally would occur only during the summer rainy season. Consequently, conservation pool replenishment and water releases normally would be limited to the summer period. Studies by the Corps indicate that a conservation pool could be maintained in Alpine Reservoir about 4 years of every 5. The recreation pool could be maintained about 9 years of every 10. Although the recreation pool would not be depleted often, it is anticipated that there would be times when water supply needs would require use of the recreation pool.

Approximately 740 acres of land would be acquired in fee title to accommodate the reservoir, the dam, and the diversion works. The guiding elevation for fee acquisition in the reservoir area would be 4,582.0 feet. To provide for temporary ponding in the reservoir headwater area, flowage easement would be acquired on about 100 acres.

FISH

Without the project there would be no permanent water and, consequently, no fishery of any kind in the project area. There are a few ponds that are more or less permanent on ranches in the vicinity but, except for some fishing in these, fishermen must travel many

miles to find suitable sport fishing. In the future, this situation would not improve. A number of Alpine residents pay \$100 annually and travel some 40 miles to fish in San Estaban Reservoir which lies on Alamito Creek south of Marfa, Texas.

Construction of Alpine Reservoir would provide much-needed fishing where none otherwise exists. While the runoff which would fill the reservoir would carry relatively large sediment loads, the quality of the reservoir water is expected to be good. Also, the rich and mineralized desert soil of the contributing drainage should impart high fertility to Alpine Reservoir. San Estaban Reservoir, the only existing nearby fishery of some similarity, has maintained outstanding production of largemouth bass, channel catfish, other game fishes, and forage fishes for many years. The above species would be expected to prosper in Alpine Reservoir. A principal foreseeable factor which may be unfavorable would be the obvious shortage of fish cover in the bowl-shaped reservoir basin. Also, a permanent fishery could not be contemplated unless for several years in succession there would be enough water to maintain a perennial pool of sufficient size and volume to support fish life. It is anticipated that restocking of the reservoir with fishes would be required occasionally because of dewatering. Consequently, it is expected that the reservoir would provide fishing on an average of about 8 years of every 10.

Without specific facilities, access to the entire reservoir shoreline would be possible but some walking and inconvenience would be experienced. With no recreational development except those facilities incidental to project operation, public health, and safety, sport fishing in Alpine Reservoir would average 30,000 man-days annually over a 100-year period of analysis.

It would be unlikely that a commercial fishery would develop in Alpine Reservoir. Commercial fishing for catfishes would be prohibited, and other commercial fishes such as buffalofishes, carp, and river carpsuckers would not be abundant.

WILDLIFE

The country around Alpine is well known for its variety of big game and its excellent hunting. The mountainous area lying south and west of Alpine comprising the watersheds of Alpine, West Moss, and Paisano Creeks supports excellent populations of mule deer, pronghorn antelope, javelina, and scaled quail. The area to be

occupied by Alpine Reservoir and its appurtenant structures, consisting of about 700 acres of grassland, is potentially excellent habitat for pronghorn antelope and scaled quail. However, because this area is so near to Alpine and well within the range of town dogs, the area is essentially unoccupied by pronghorns or other game animals. There is no hunting or trapping and none could be expected in the future.

With the project, there would be no hunting on the reservoir or on adjacent fee lands since it would be unsafe to allow hunting on such a small and intensively used area. It is likely that many wild animals would be attracted to the permanent water area, including a few migratory waterfowl. Sightseers would be able to watch ducks and possibly pronghorns. Wildlife-oriented recreation would amount to an estimated 1,000 man-days annually.

DISCUSSION

The fishery created by Alpine Reservoir would be prized and enthusiastically used by west Texans. However, the same factors that make a fishery unique in this water-deficient area dictate that careful development and management would be needed to maintain it.

There would be danger of oxygen depletion and a subsequent kill of the fish should the level in Alpine Reservoir fall below the top of the recreation pool for any extended period. Frequent depletion of the recreation pool would mean frequent restocking which, in turn, would mean much expense and lost fishing opportunities as well as reduction in the quality of the fishery. On the other hand, there are certain advantages from the standpoint of fishery management in the periodic drying and refilling of the reservoir. Even though the fishery must be started over each time this occurs, the result can be a dynamic and ever-new fishery with none of the problems typical of an aging reservoir. However, the interval between fishery restarts must be long enough to allow for a period of growth and development.

If a perennial pool could be maintained without interruption for 5 to 7 years the optimum fish growth and production potential anticipated for Alpine Reservoir probably could be realized. The Texas Parks and Wildlife Department would be pleased to assist local interests in developing a fishery where none now exists and where the need is great. The Department looks forward to experimental management of the fishery and would restock the reservoir when

needed. At the same time, the Department must keep the effort and expense of restocking as low as possible. It is urged that every effort be made to maintain the recreation pool.

Alpine Reservoir would be practically devoid of fish cover. Only the small stream channel and sparse growths of acacia shrubs would provide cover and areas of fish concentration. Because of the scarcity, it would be advantageous to install suitable fish cover or attractor devices in the reservoir prior to filling. Also, each device should be marked with a buoy. Since preferred natural materials would not be available, substitutes may consist of pre-fabricated structures such as concrete pipe sections, reefs made of old tires, or similar structures. The design and placement of suitable devices should be done under the guidance of the Texas Parks and Wildlife Department. The cost for 10 cover or attractor devices and buoys would be about \$1,500. The benefits to sport fishing would be substantial, an estimated \$7,500 based on 5,000 man-days of increased fishing annually.

Provision of suitable access facilities would enhance fishing at Alpine Reservoir. Two combination parking and access areas of one to two acres each and spaced about the perimeter of the reservoir would be needed. Each area should contain a boat-launching ramp, planned parking area, minimum sanitary facilities, and be served by all-weather access roads. Minimum facilities such as graveled roads and parking lots would be adequate for fishermen, and would limit the cost of each unit to about \$15,000. The total cost for the two units would be about \$30,000 and the annual operation, maintenance, and replacement costs would be about \$2,000. Increased fishing associated with these facilities would be about 10,000 man-days, with a benefit of \$15,000 annually.

Because of the small size of Alpine Reservoir, its configuration, and the expected intensity of recreational use, activities such as speedboating, waterskiing, and hunting should be prohibited or strictly controlled. Possibly, such activities as hunting and waterskiing could be provided for on special days or by some specific arrangement. A plan of control or zoning developed cooperatively by the Corps of Engineers, the Texas Parks and Wildlife Department, and other agencies which have an interest could provide for full realization of all recreation benefits and for public safety. Perhaps the restriction of all power boats to trolling speed or less would constitute sufficient control to allow realization of optimum public safety and recreational use. It is not possible to assign specific benefits until details of a plan of control or zoning are worked out.

In view of the foregoing, it is recommended that:

1. Fish and wildlife conservation, development, and improvement be included among the purposes for which the project is authorized.
2. To enhance fishing, fish cover or attractor devices be installed in the reservoir prior to filling at an estimated cost of \$1,500. The design and placement of such structures should be carried out under the guidance of the Texas Parks and Wildlife Department.
3. To enhance fishing, two access areas including parking, boat-launching and sanitary facilities, and necessary roads be provided at the reservoir. The estimated initial cost of the two areas is \$30,000 with an annual operation, maintenance, and replacement cost of \$2,000.
4. To promote safety and to insure that certain areas or periods of time would be available for fishing and wildlife-oriented recreation, a reservoir-zoning or use-control plan be developed cooperatively by the Corps of Engineers, the Texas Parks and Wildlife Department, and the agency expected to administer the reservoir.

CONCLUSIONS

Alpine Project would provide a valuable sport fishery in an area of high demand where no fishery now exists. A project without recreational development but with minimum facilities for project operation and public health and safety would provide about 30,000 man-days of sport fishing with a benefit of \$45,000 annually. The project would not damage wildlife resources and would enhance wildlife-oriented recreation by about 1,000 man-days with a benefit of about \$750 annually.

Sport fishing would be enhanced by about 5,000 man-days with a benefit of \$7,500 annually by provision of fish cover devices, as outlined in Recommendation No. 2.

Adoption of measures for fisherman access, as covered in Recommendation No. 3, would result in enhancement of sport fishing amounting to about 10,000 man-days for a benefit of \$15,000 annually.

Revised October 6, 1970

Public safety would be provided for and sport fishing would be increased by adoption of a plan of reservoir zoning or control, as requested in Recommendation No. 4.

This report is based upon project data obtained from your District prior to March 27, 1970. Any changes or revisions in the plan of development should be brought to the attention of our Bureau and the Texas Parks and Wildlife Department so that we may revise the report as necessary.

We appreciate the opportunity to comment on the proposed project development and we thank you for your assistance and cooperation.

Sincerely yours,


William T. Krummel
Regional Director

Enclosure

Copies (10)

Distribution:

- (5) Executive Director, Texas Parks & Wild. Dept., Austin, Tex.
- (2) Regional Director, BCF, Reg. 2, St. Petersburg, Fla.
- (2) Laboratory Director, Biol. Lab., BCF, Galveston, Tex.
- (2) Regional Director, BOR, Mid-Cont. Reg., Denver, Colo.
- (2) Regional Director, FWQA, So. Cent. Reg., Dallas, Tex.
- (1) Regional Coordinator, USDI, SW Reg., Houston, Tex.
- (2) Field Supvr., BSFW, Div. of River Basin Studies, Fort Worth, Tex.

PARKS AND WILDLIFE DEPARTMENT

COMMISSIONERS

PEARCE JOHNSON
CHAIRMAN, AUSTIN

L. P. GILVIN
MEMBER, AMARILLO

HARRY JERSIG
MEMBER, SAN ANTONIO



J. R. SINGLETON
EXECUTIVE DIRECTOR
ROBERT G. MAUERMA
DEPUTY DIRECTOR

JOHN H. REAGAN BUILDING
AUSTIN, TEXAS 78701

April 28, 1970

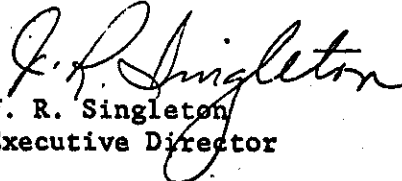
Mr. Robert F. Stephens
Assistant Regional Director
U. S. Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
P. O. Box 1306
Albuquerque, New Mexico 87103

Dear Mr. Stephens:

This is in response to your letter of April 20, 1970 and the attached review draft of a report concerning the Corps of Engineers plan for local flood control in the vicinity of Alpine, Texas.

We have reviewed this draft and concur with the report as presented.

Yours sincerely,


J. R. Singleton
Executive Director

JRS:KCJ:db

cc: Mr. John Degani, Division of River Basin Studies

APPENDIX C - COORDINATION WITH OTHER AGENCIES

REVIEW SURVEY FOR FLOOD CONTROL AND ALLIED PURPOSES
TRIBUTARIES OF THE PECOS RIVER
AT AND IN THE VICINITY OF ALPINE, TEXAS

APPENDIX C - COORDINATION WITH OTHER AGENCIES

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STATE ENGINEER OFFICE, STATE OF NEW MEXICO, ENGINEER-ADVISOR TO PECOS RIVER COMMISSION	90 10

THE CITY of ALPINE

P. O. BOX 149, ALPINE, TEXAS 79830 — PHONE 915-637-2212

March 12, 1970

MAYOR

W. H. HUDGINS

COUNCILMEN

PAUL W. VOGT

J. N. BEARD

ALBERTO ROJO

MRS. DOROTHY L. McBRIDE

TOM M. CONNOR

SECRETARY

MRS. MARJORIE K. GRAHAM

Col. Richard West, Dist Engineer
Department of the Army
Albuquerque District Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Col. West:

Subsequent to our meeting with the Corp of Engineers of Albuquerque District with Mr. Kurt Groepler, Mr. T. E. Trask, Mr. Bill Muller and Mr. J. J. Cunico, after thoroughly considering all phases of the projected flood control, M. and I. and Reservoir, it is the opinion of the City Council of the City of Alpine that we would prefer to start with Plan G which gives 100 year flood control on Alpine Creek, 55 years on West Moss and 10 years on Paisano Creek; with water supply for a 100 year demand; no stage construction; 1,000 acre feet permanent recreation pool.

We would ask that this project be pursued with all dispatch.

Sincerely yours,


W. H. HUDGINS,
Mayor

cc--Richard C. White

WHH:mg

THE CITY of ALPINE

P. O. BOX 149, ALPINE, TEXAS 79830 - PHONE 915-837-3301

MAYOR

MRS. DOROTHY L. McBRIDE

COUNCILMEN

W. H. HUDGINS

PAUL W. VOGT

J. N. BEARD

TOM CONNOR

EVERETT E. TURNER

SECRETARY

MRS. MARJORIE K. GRAHAM

March 3, 1971

Colonel R. L. West
District Engineer
Albuquerque District
Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

Reference is made to the Public Meeting held on 18 February, 1971, at which time you and members of your staff explained the proposed plan of improvement for the Tributaries of the Pecos River at and in the vicinity of Alpine, Texas.

It is understood that a letter of intent from responsible Local interests indicating their willingness to cooperate must accompany a favorable report to support any recommendations made by the District Engineer for construction of local protection projects as required by Federal laws, policies, and procedures. Moreover, it is the understanding of the Alpine City Council that the required letter of intent does not constitute a binding legal action, since only reasonable assurances of local cooperation are necessary during the preauthorization investigation stage to establish the intentions of the sponsoring agency. However, formal assurances would be furnished by the sponsor upon request from the Corps of Engineers, after the plan of improvement has been authorized and funded for preconstruction planning. Based on the foregoing conditions and understandings, the Alpine City Council desires to cooperate with the Corps of Engineers in the construction of the Alpine Lake project, and will undertake to furnish the following required items of local cooperation:

a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for construction and operation of the project;

b. Hold and save the United States free from damages due to construction and operation of the project;

c. Maintain and operate the works after completion in accordance with the regulations prescribed by the Secretary of the Army;

d. Make any alterations to existing improvements, other than railroad bridges and approaches connected therewith, which may be required because of the construction work;

e. Prevent encroachments on the channel of Alpine Creek below the project and maintain a minimum capacity of 1,200 c.f.s.;

f. Periodically inform all concerned, in a manner satisfactory to the Secretary of the Army, that some flooding will continue to occur due to the flows greater than design magnitude;

g. Adopt and enforce flood plain regulations appropriate to the nonstructural measures of the plan of improvement which, combined with the structural measures, would minimize damages to future development in the project area that would be inundated from a flood that could be expected to occur once in 100 years;

h. Consider the adoption of flood plain regulations for areas other than those covered by the plan of improvement as necessary to assure compatibility between future developments within the flood plains and the protection afforded by the improvements;

i. Publicize the flood plain information contained in the report and make it readily available to all interested persons;

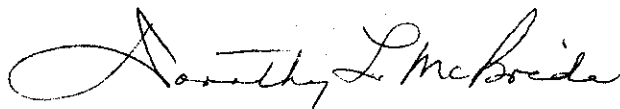
j. Prior to initiation of construction enter into a contract, satisfactory to the Secretary of the Army, whereby local interests will repay all construction and interest costs incurred by the Federal Government and allocated to water supply, in accordance with the Water Supply Act of 1958, as amended. The amount allocated to water supply is presently estimated at \$1,634,800. Included in this amount is \$114,800 for lands, damages, and relocations which will be furnished by local interests;

k. Pay, contribute in kind, or repay (which may be through user fees) with interest, one-half of the separable first cost of recreation and fish and wildlife enhancement, an amount presently estimated at \$327,500. The sizing and responsibility for development, operation, maintenance, and replacement of the recreation features of the reservoir may be modified in accordance with the alternatives provided in PL 89-72;

l. Bear all costs of operation, maintenance, and replacement of flood control, water supply, recreation and fish and wildlife areas and facilities, presently estimated at \$58,200 on an average annual basis;

m. Provide storage rights and hold and save the United States free from water right claims due to construction and operation of the project.

Sincerely yours,

A handwritten signature in cursive script, reading "Dorothy L. McBride". The signature is written in dark ink and is positioned above the typed name.

Dorothy L. McBride
MAYOR

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 648
Temple, Texas 76501

January 12, 1971

Colonel R. L. West
District Engineer
Department of the Army
Albuquerque District, Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

We have completed our review of the draft copy of "Report on Review Survey for Flood Control and Allied Purposes, Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas." The report presents the results of your study of the extent and magnitude of the flood and water-related problems at and in the vicinity of the City of Alpine, Texas, along with your determination of the best solution to this problem based on meeting present and long-range needs of the area, engineering feasibility, and economic justification of the selected plan.

It is our understanding that the recommended plan of improvement provides for a combination of structural and nonstructural measures which will; (1) provide protection from a 100-year frequency flood on Alpine Creek, a 50-year frequency flood on West Moss Creek, a 10-year frequency flood on Paisano Creek, and minimize damages from floods up to and including the 100-year event; (2) provide a water supply of 2,150 acre-feet per year; and (3) provide recreation facilities for 179,000 user-days for fish and wildlife oriented recreation.

Structural measures include; (1) an earthfill dam located on Alpine Creek, near the southern city limits of Alpine; (2) an earthfill saddle dam near the divide between the Alpine and West Moss Creeks watershed; (3) a diversion channel with concrete stabilizers at 1,000 foot intervals leading from a concrete diversion structure across Paisano Creek, four miles west of Alpine to convey runoff into the reservoir; (4) a diversion channel with concrete stabilizer at 1,000 foot intervals leading from an earthfill dyke with a concrete outflow weir across West Moss Creek about 0.4 miles upstream from its crossing by Texas State Highway 118, to convey runoff into the multiple-purpose reservoir; and recreation facilities consisting of picnic tables and shelters, water supply and sanitation facilities, roads, trails, parking areas, boat launching ramps, and related items. In addition, relocation of 11,000 lineal feet of barbed wire fence and a trail road leading through the reservoir area would be required. Three new bridges would be required across the Paisano Creek diversion.

Nonstructural measures include designation of a floodway and preventative measures within the additional area and a flood-plain management plan, including flood proofing, flood-plain regulation, creation of open spaces, and warning signs.

The total first cost of the project is about \$3,654,000 of which \$1,602,800 will be Federal and \$2,051,200 will be non-Federal. The total annual cost is \$255,000 which includes \$53,600 for operation and maintenance, and \$4,600 for major replacements. The estimated total annual monetary benefit is expected to be \$451,030 making a benefit-cost ratio of 1.8:1.0.

The Soil Conservation Service has no existing or proposed projects that would affect or be affected by the proposed Alpine Reservoir project.

We appreciate the opportunity afforded us to review and comment on this report. The draft copy is enclosed. We will appreciate receiving a copy of the final report when it is available.

Sincerely,



Clyde W. Graham
State Conservationist

Enclosure - 1



ENVIRONMENTAL PROTECTION AGENCY

Water Hygiene Program

1114 COMMERCE STREET
DALLAS, TEXAS 75202

January 14, 1971

Your Reference: SWAED-ER

Colonel R. L. West, District Engineer
Albuquerque District, Corps of Engineers
Department of the Army
P.O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

As requested in your letter of December 14, 1970, addressed to the Public Health Service, we have reviewed the draft of your proposed report for flood control and allied purposes, Tributaries of the Pecos River at and in the vicinity of Alpine, Texas. The review is in accordance with implementation of Reorganization Plan No. 3 dated December 2, 1970, which transferred health aspects interests to the Environmental Protection Agency.

It is noted that the basic objective of the survey was to achieve a practical plan of improvement for the solution of present water resource problems at and in the vicinity of Alpine, and to satisfy foreseeable needs insofar as possible. The selected project proposal should afford various degrees of flood protection, and provide storage for municipal and industrial water supply and recreation.

The present source for municipal and industrial water use in Alpine is groundwater of such quality that only partial chlorination is considered necessary for treatment; inasmuch as the proposed supplemental water supply will be from a multi-purpose reservoir, complete treatment will be necessary. We recommend that the proposed plan for that treatment be described.

Development of this water resource project should result in beneficial health effects provided proper health guides in recreation development, land clearing, vector control, and land use are followed. Specifically, compatibility between such uses of the impounded water as recreation and municipal water supply should be assured and in accordance with recommendations of the Texas State Department of Health. Similar

assurance is needed regarding sanitation programs and land use management programs. We also call your attention to the need for vector control.

In addition to State and local requirements, we recommend that the health aspects guidelines for water resource developments being prepared by the Bureau of Water Hygiene be followed when they become available. In the meantime, the following two documents should be used as guides:

Prevention and Control of Vector Problems Associated with Water Resources (Public Health Service monograph, January 1965)

Environmental Health Practice in Recreational Areas (Public Health Service publication no. 1195)

Enclosed as requested in your letter is the draft copy of your report. The opportunity to review your report was appreciated. We look forward to cooperating with you and the Texas State Department of Health in the health aspects of the project as planning progresses.

Sincerely yours,



Charles W. Northington, P.E.
Water Hygiene Representative
Environmental Protection Agency

Enclosure



UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

SOUTH CENTRAL REGION
1402 ELM STREET, 3RD FLOOR
DALLAS, TEXAS 75202

November 13, 1968

District Engineer
U. S. Army Engineer District, Albuquerque
P. O. Box 1580
Albuquerque, New Mexico 87103

Attention: Mr. James L. Redmond
Chief, Planning & Reports Branch

Dear Sir:

The following information is furnished regarding the probable quality of water available from a reservoir project on Alpine Creek in the vicinity of Alpine, Texas. I understand that the project presently being considered would provide storage for flood control, recreation and municipal and industrial water supply purposes.

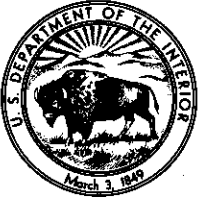
There are no sampling records for surface water quality available on Alpine Creek or other streams in the immediate vicinity of Alpine. Miscellaneous samples have been obtained by the U. S. Geological Survey during 1966 and 1967 on Limpia Creek near Fort Davis, about 25 miles northwest of Alpine, and on Coyanosa Draw near Fort Stockton, about 50 miles northeast of Alpine. These data indicate the following range of values: Sulphates, 5-50 ppm; Chlorides, 4-30 ppm; Total Dissolved Solids, 140-300 ppm; and pH, 6.5-8.0. This limited information indicates that a reservoir project on Alpine Creek would probably yield water of a satisfactory quality for recreational and municipal and industrial uses, although some level of treatment would be necessary prior to use for municipal water supply. However, in view of the limited water quality data available, I recommend that a sampling program be undertaken on Alpine Creek prior to the construction of a multiple-purpose reservoir. The information obtained from such a program would provide the basis for a more accurate determination of the surface water quality and its suitability for recreation and municipal and industrial use.

I hope that the above information will be of some help to you in your studies, and if we can be of further assistance please contact us.

Sincerely yours,

William C. Galegar
WILLIAM C. GALEGAR
Regional Director

cc: Mr. Charles Northington, PHS
Mr. Don Dillon, SW Division,
Corps of Engineer
Mr. Hugh Yantis, TWQB



UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

SOUTH CENTRAL REGION
1402 ELM STREET, 3RD FLOOR
DALLAS, TEXAS 75202

May 28, 1969

District Engineer
U.S. Army Engineer District, Albuquerque
Federal Building, 517 Gold Avenue S.W.
Albuquerque, New Mexico 87103

Dear Sir:

In response to your request, we have made an evaluation of the need for storage for water quality control purposes in the vicinity of Alpine, Texas. This study has been conducted in support of the investigation, "Review Survey for Flood Control and Allied Purposes, Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas." Our conclusions are based in part on population and water use projections contained in the "Water Supply Study, Alpine, Texas," prepared by the U.S. Army Engineer Division, Southwestern, Dallas, Texas, furnished this office by letter dated March 10, 1969.

The study area is located in the arid Trans-Pecos region of southwestern Texas on the southern rim of the Davis Mountains. The major streams in the area are Alpine and Paisano Creeks, ephemeral streams formed by the confluence of several smaller streams which originate in the Davis Mountains west and south of the city of Alpine. Alpine Creek joins Paisano Creek northeast of the city of Alpine and Paisano Creek then continues northeastward about 40 miles to its confluence with Coyanosa Draw at a point about 50 miles from the Pecos River. These creeks and their tributaries are dry streambeds throughout most of the year. Average annual rainfall at Alpine is only about 15.5 inches, most of which occurs in the form of moderate to high-intensity, short duration thundershowers during the summer months. These thundershowers often produce flash flooding in the study area, but rarely contribute significantly to flows in the Pecos River.

The city of Alpine constitutes the only significant source of waste discharge in the study area. The city presently discharges approximately 0.54 million gallons per day (mgd) of treated effluent to a tributary of Alpine Creek about two miles downstream from the city. There are no uses made of the effluent and the waste stream is lost through evaporation and percolation from the stream channel within a few miles of

the point of discharge. Recently completed enlargement and improvement of the waste treatment plant has resulted in a minimum of secondary treatment and the effluent discharged meets the established state standards.

Information contained in the referenced water supply study indicates that future economic growth in the area is expected to center around the city of Alpine. No high water-use industries or agricultural activities are expected, due primarily to continued limitation of available water supplies. Population and water use projections to the year 2070, as reported in the study, have been used as a basis for projecting future water quality control needs in the study area. Expected return flows from Alpine to the year 2070 are shown on the attached figure.

There are no apparent existing or potential water quality problems in the study area. As discussed above, the effluent discharged by the city of Alpine presently receives adequate treatment. Based on projected population growth and anticipated industrial development the city should experience no difficulty in keeping abreast of their future treatment needs. Projected return flow rates are such that, under normal conditions, the effluent stream will continue to be lost through evaporation and percolation. The likelihood of the effluent reaching the Pecos River is remote, even during periods when extreme flood flows occur.

Consideration has been given to the possibility that the effluent from Alpine might contribute to the recharge of water producing formations in the area. No problems of this nature have been experienced in the past and available geology and ground water studies indicate that little, if any, recharge occurs from streamflow below Alpine. Thus the possibility of ground water contamination from Alpine waste discharges is considered negligible.

Utilization of the treated effluent from the city of Alpine for irrigation purposes would seem to be a likely alternative to present disposal methods. As previously noted, there is no use made of the effluent at the present time. The raising of livestock is, and is expected to continue to be, the principal agricultural pursuit in the area. Wells are utilized to provide water for stock watering purposes, but there is little or no agricultural irrigation in the study area, due primarily to the scarcity of water. As the volume of return flow from Alpine increases in the future, it is reasonable to expect that utilization of the return flow for irrigation of pasture lands or other agricultural purposes will be come advantageous.

Because of the degree of treatment, the quantity involved and its ultimate disposition, the effluent from Alpine is not expected to present a pollution problem. Consequently, flow regulation for water quality control will not be needed in the foreseeable future.

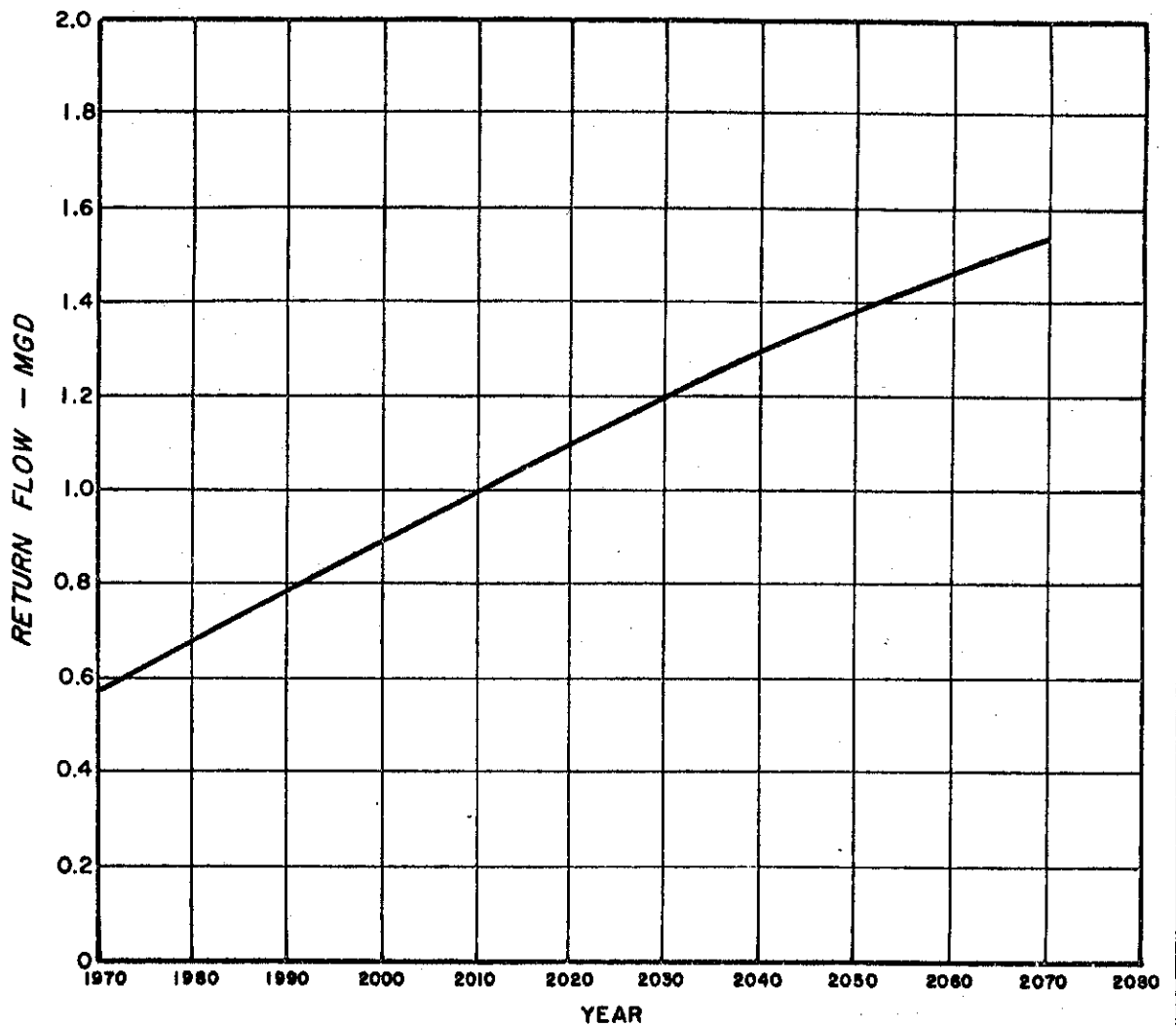
We appreciate the opportunity of working with you on this study.

Sincerely yours,



WILLIAM C. GALEGAR
Regional Director

Enclosure



WATER QUALITY CONTROL STUDY
PECOS RIVER AND TRIBUTARIES
VICINITY OF ALPINE, TEXAS

STUDY AREA RETURN FLOWS

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
SOUTH CENTRAL REGION DALLAS, TEXAS

FIGURE 1



ENVIRONMENTAL PROTECTION AGENCY
UNITED STATES
~~DEPARTMENT OF THE INTERIOR~~
~~FEDERAL WATER POLLUTION CONTROL ADMINISTRATION~~
~~SOUTH CENTRAL~~ REGION VI
1402 ELM STREET, 3RD FLOOR
DALLAS, TEXAS 75202

January 22, 1971

District Engineer
U.S. Army Engineer District, Albuquerque
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Sir:

Reference is made to your letters of December 14 and 31, 1970 requesting review and comments on your draft report, "Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas," and the Environmental Statement for the Alpine Lake Project.

This office has reviewed the report and finds that it has properly presented our views of the water quality of the area. It is noted that you referenced our letter of November 13, 1968 in Appendix G. The letter gives the quality of the water at Alpine for the parameters of sulphates, chlorides, total dissolved solids, and pH. Your report and the quality aspects of the report would be more complete if a copy of our letter dated November 13, 1968, was included in Appendix C.

It is pointed out that the provisions of E.O. 11507 are to be complied with and that the construction, operation, and maintenance of the sanitary facilities for the recreational area will be done in accordance with all state and Federal requirements.

The Environmental Statement adequately covers the question of water quality in the Alpine Lake area, however, the statement should also point out that the contractor will be required to:

1. Exercise care in the relocation of petroleum product pipelines and other hazardous material to prevent accidental spillages that would be harmful to fish and wildlife.
2. Provide and operate sanitary facilities to adequately treat and dispose of domestic wastes in conformance with Federal and state water pollution control regulations.

3. Schedule clearing, excavation and construction operations to reduce erosion, turbidity and siltation to the lowest level practicable.

The above comments on the Environmental Statement are considered informal and are part of the Water Quality Office's responsibility to render technical assistance.

Sincerely yours,



KENTON KIRKPATRICK
Director, Office of Planning
Water Quality Office

cc: Chief, Riv. Bas. Planning



United States Department of the Interior

OFFICE OF THE SECRETARY
SOUTHWEST REGION

Room 4030, Federal Building
Albuquerque, New Mexico 87101

January 28, 1971

Colonel R. L. West
District Engineer
Albuquerque District
Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

We have reviewed the draft of your proposed report for flood control and allied purposes, tributaries of the Pecos River at and in the vicinity of Alpine, Texas, transmitted with your letter of December 14, 1970.

The proposed plan of development and the purposes served appear to fulfill the needs of the area within the capability of the resources. Municipal and Industrial water supply is an important part of the proposal plan but we note there is no discussion of the quality of the potential surface water supply. We would suggest that water quality as well as on-site quantity data be obtained in the pre-construction investigations.

We appreciate the opportunity to review the draft of the proposed report.

Sincerely yours,

D. P. Shoup
Field Representative



United States Department of the Interior
BUREAU OF RECLAMATION

REGIONAL OFFICE - REGION 5
P. O. BOX 1609
AMARILLO, TEXAS 79105

IN REPLY
REFER TO: 5-731

JAN 14 1971

Col. R. L. West
District Engineer
Corps of Engineers
Post Office Box 1580
Albuquerque, New Mexico 87103 Your Ref: SWAED-ER

Dear Colonel West:

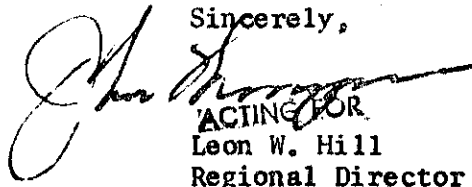
Please refer to your letter of December 14, 1970, transmitting for our review the draft of the proposed report Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas.

We note that the water supply estimate is based on transference of records that terminated in 1949 from Madera Creek. This procedure, although presumably the only one available, could provide questionable results.

Paragraph 53, page 31, states "The project will provide a water supply of 2,150 acre-feet per year with a 20 percent chance of shortage, or enough water to meet the projected demand until year 2070." Year 2070 demands are stated as 3,150 acre-feet per year, and the dependable yield of the existing ground-water supply is stated as 1,000 acre-feet per year. Obviously, no surface water at all will be available in some years. The actual shortage then would be about 50 percent of requirements by 2010 and almost 70 percent by 2070 in such years. Possibly additional ground water supplies exist in the area and could be integrated with surface water to provide a more firm supply for the city of Alpine.

The three draft copies of the report are being returned as requested. We appreciate the opportunity to review your report.

Sincerely,



ACTING FOR
Leon W. Hill
Regional Director

Enclosure



C O P Y
DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1580
ALBUQUERQUE, NEW MEXICO 87103

SWAED-EII

29 January 1971

Leon W. Hill
Regional Director
Bureau of Reclamation
Region 5
P.O. Box 1609
Amarillo, Texas. 79105

Dear Mr. Hill:

Reference is made to your letter 5-731, dated 14 January 1971 furnishing review comments on the draft of our "Report on Review Survey for Flood Control and Allied Purposes, Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas

Your comments appear to relate a misunderstanding of the proposed water supply in Alpine Reservoir. Data used to compute the potential runoff from Alpine, West Moss and Paisano Creeks were developed from streamflow records (1932-1949) for Madera Creek near Toyahvale, Texas. These are the only records in the area considered indicative of the runoff potential from the Alpine watersheds. These records were adjusted for drainage area and rainfall to make them compatible to the Alpine watershed and used statistically to develop required storages necessary to produce firm yields for various chances of shortages.

It was soon determined that it would not be feasible to provide reservoir storage to meet Alpine water supply demands on a 2 percent chance of shortage as is normal for municipal and industrial water supply. However, it was determined that, in this water short area, a feasible project could be developed with a 20 percent chance of shortage in supplying the cities demands. This would reflect shortages on the average of once in 5 years from the reservoir supply but would not indicate municipal shortages when supplemented with ground water supply.

It is envisioned that the city would withdraw their total demand from the proposed reservoir when water is available. This would reduce evaporation losses and allow time for the ground water supply to

recover. The city could meet present and projected demands from either the reservoir or wells at any given time. The long term safe yield from the present city aquifer is estimated at 1,000 acre-feet per year but on a short term supplemental basis the aquifer could in all probability supply the projected demand. Therefore, even with a dry reservoir on infrequent occasions, there should be no critical water shortage.

Our report indicates the need to firm-up the water supply potential of the proposed project prior to construction. To aid in these pre-construction studies, stream gaging stations were installed on Alpine, West Moss, and Paisano Creeks in November 1970. We plan to install two additional weather observation stations in the area. With the most optimistic view on start of construction we should have 5 years of rainfall-runoff data to correlate with longer term data in our study of yield potential of the watershed.

Sincerely yours,

/Signed/

R. L. WEST
Colonel, CE
District Engineer



United States Department of the Interior
BUREAU OF RECLAMATION

REGIONAL OFFICE - REGION 5

P. O. BOX 1609

AMARILLO, TEXAS 79105

IN REPLY
REFER TO: 5-730

FEB 24 1971

Col. R. L. West
District Engineer
Corps of Engineers
Post Office Box 1580
Albuquerque, New Mexico 87103

Your Ref. SWAED-EH

Dear Colonel West:

Please refer to your letter of January 29 replying to our comments on your "Report on Review Survey for Flood Control and Allied Purposes, Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas."

The data presented in your letter of January 29 answers the questions raised in our letter of January 14. We believe these data should be incorporated in your report.

Sincerely,

Leon W. Hill
Regional Director



Office of
Chief

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Intermountain Field Operation Center

BUILDING 20
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

January 12, 1971

Col. R. L. West, District Engineer
Albuquerque District
U.S. Army Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

This is in reply to your letter of December 14 to our Bartlesville office in which you asked for review comments on the flood control report, Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas.

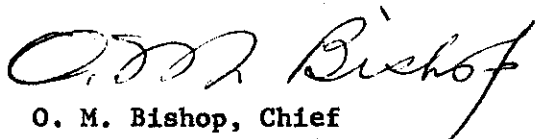
From our information on minerals and minerals processing, it is evident that the mineral industry is relatively unimportant in the Alpine area, although a flotation mill processes Mexican fluorspar there. The mercury deposits and mines in the Terlingua area in the southern part of Brewster County should have little effect on developments in the Alpine area and, conversely, flood control programs should not affect any mineral industry in the county. Although there is a reference to the production of quicksilver in the southern part of the county on page 7 of the report, another reference to mercury in index H-7 leads one to believe that its production is actually in the study area, which is about 70 miles north of the mercury district. Mercury production has been sporadic even in the Terlingua-Study Butte area. Because of company confidentiality restrictions, value of mineral output in recent years has been withheld, but in 1961 the value of clays and gem stones in Brewster County was \$8,700 compared with \$15,000 shown for 1960 on page H-7 of the Alpine report.

A report entitled, Texas Mineral Producers, 1962, by the Bureau of Economic Geology, The University of Texas, also shows that carbonaceous

clay used as filler for fertilizer has been produced at Terlingua; the 1962 Bureau of Mines Minerals Yearbook refers to production of carbonaceous shale by Manning Minerals Corp. open pits 75 miles south of Alpine.

The draft of the report is returned as requested.

Sincerely yours,

A handwritten signature in cursive script that reads "O. M. Bishop". The signature is written in dark ink and is positioned above the typed name.

O. M. Bishop, Chief
Intermountain Field Operation Center

Enclosure



United States Department of the Interior

BUREAU OF OUTDOOR RECREATION

MID-CONTINENT REGION
BUILDING 41, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:

D6427RG

Alpine Creek

JAN 14 1971

Colonel R. L. West, District Engineer
Department of the Army
Albuquerque District, Corps of Engineers
Post Office Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

RE: Draft Report for Flood Control and Allied Purposes,
Tributaries of the Pecos River at and in Vicinity of
Alpine, Texas & Your Letter of 14 December 1970 (SWAED-ER)

We have reviewed the subject draft report. We appreciate the opportunity to review the draft report which includes more complete data than your March 23, 1970 report. It provides the details necessary to perform a more intelligent analysis and evaluation of the recreational values of the proposed project than the type made in our letter dated April 28, 1970. We are hopeful that our comments will assist in firming-up the Recreation Appendix.

The proposed project, in addition to flood protection, would provide storage for municipal and industrial water supply and recreation. A small permanent recreation pool would be made possible by diversion channels to convey runoff from West Moss and Paisano Creeks to Alpine Creek at the proposed dam site. Recreation facilities, consisting of picnic tables and shelters, water supply and sanitation facilities, roads, trails, parking areas, beaches, boat launching ramps, and related items, would be provided to promote optimum recreational development afforded by the project.

We are pleased that the project is designed to provide much needed water-oriented recreation in an area where water is scarce. We assume the planned recreation activities have been cleared with appropriate health authorities.

Recreational benefits are based on optimum recreational development afforded by the project. They represent the recreational value of

the design load capacity having capability for: 150,000 annual user days by 1980 and 236,000 annual user days by 2020. We are in general agreement that the design load capability will be used and that the calculated benefits will be realized. However, the immediate project area is sparsely populated and most of the recreational demand will be exerted by tourists. This is indicated by the attached demand data compiled in this office. It also conforms with statements contained in the Texas SCORP.

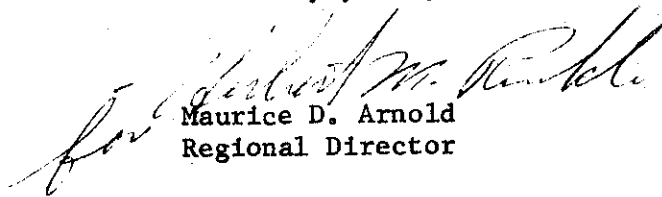
While your report acknowledges tourist use of the proposed recreational facilities it is deficient in supporting data. The spread between project area demand and the capacity capability of the facility design, as reflected in the attached data, suggests a strong need to focus use and benefits of the facilities on tourism. The economic analyses contained in your report views tourism as an important component, but does not sufficiently relate it to recreational benefits.

Tourist use of the proposed recreation facilities together with supporting services they generate might be considered as benefits resulting from the project. The report apparently includes a value for the recreational experience of tourists but it might also claim benefits to the local economy generated by supporting services.

It is our opinion the project warrants full consideration of all benefits in computing the benefit/cost ratio. However, we are generally opposed to benefits claimed with respect to future development in floodways. This in effect constitutes an indirect sanction of building additional structures within an existing floodway. We are pleased, though, to see the report require local sponsors to implement proper flood plain management for at least a part of the flood plains under their jurisdiction.

The draft report is being returned as requested.

Sincerely yours,



Maurice D. Arnold
Regional Director

Enclosure

CORPS OF ENGINEERS PROJECT, TRIBUTARIES OF PECOS RIVER, ALPINE, TEXAS

RECREATION DEMAND DATA

Water-Oriented Activities

(In terms of annual activity days per capita converted to recreation or user days per capita for comparison with Project User Day Estimates.)

	1980		2000	
	Inside Project Area	Outside Project Area	Inside Project Area	Outside Project Area
PARTICIPATION RATES ¹				
(Annual Activity Days Per Capita)				
General Recreation				
Boating	1.32	.75	1.75	.98
Camping	0	.92	--	1.29
Picnicking	2.06	.31	2.29	.34
Swimming	5.07	1.35	6.64	1.76
Hiking	.23	.14	.30	.19
Sightseeing	3.13	1.69	3.75	2.02
Fishing	4.96	2.34	6.12	2.88
Wildlife (Hunting)	<u>1.72</u>	<u>.81</u>	<u>2.15</u>	<u>1.01</u>
TOTAL Annual Activity Days Per Capita	18.49	8.31	23.00	10.47
RECREATION OR PROJECT USER DAYS PER CAPITA ²	7.40	3.32	9.20	4.19
(Total Annual Activity Days Per Capita + 2.5 Activity Days Per Recreation or User Day)				
POPULATION ³	8,400	45,123	10,600	56,854
DEMAND FOR ANNUAL RECREATION OR USER DAYS ⁴	62,160	149,808	97,520	238,218
(User Days Per Capita X Population)				
AREA SUPPLY	Essentially Non-Existent			
CAPACITY DESIGN CAPABILITY ANNUAL USER DAYS (Optimum development estimated by Corps)	150,000		236,000	

¹Source: Brewster County, outside includes all surrounding counties. Rates from Texas SCORP for 1975 projected by use of ORRRC#26; reduced from 12 years and over to all ages; prorated by applying % participation near home and away from home.

²Recreation day conversion: 2.5 activity days - recreation day same as project user day.

³1970 Census projected using report population projections % for Brewster County.

⁴Represents demand or participation patterns -- supply not considered.



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

December 30, 1970

District Engineer
Corps of Engineers, U. S. Army
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Sir:

We have received your letter of December 14, 1970, in which you requested our comments on the draft of your Survey Report on Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas. The two copies of the draft are returned herewith as you requested.

It is noted that the report contains an environmental resources section in which fish and wildlife considerations are included. The treatment of fish and wildlife matters has been handled in an excellent manner and is in line with our report dated May 22, 1970, on the project.

We note the absence of the environmental statement called for in Section 102(2)(c) of the National Environmental Policy Act of 1969. We trust that a draft of the environmental statement for the project will be furnished for our review in the near future.

The Survey Report contains cost allocations for fish and wildlife measures lumped with those for general recreation. This procedure would not allow non-Federal local interests who might be called upon to share in the cost of the measures to determine which portion is assigned to fish and wildlife. It is suggested that cost allocations for fish and wildlife be shown separately from those for general recreation.

Sincerely yours,

W. O. Nelson, Jr.
Acting Regional Director

Enclosures
2 draft reports

cc:
Field Supervisor, BSWF, Div. of River Basin Studies, Fort Worth, Texas



United States Department of the Interior

GEOLOGICAL SURVEY
Denver Federal Center
Denver, Colorado 80225

Water Resources Division

IN REPLY REFER TO:

January 13, 1971

District Engineer
U.S. Army Engineer District, Albuquerque
Corps of Engineers
Albuquerque, New Mexico 87103

Dear Sir:

We appreciate having the opportunity to review a draft of the report on flood control for tributaries of the Pecos River at and in the vicinity of Alpine, Texas. Both copies of the draft report are returned herewith. One copy marked on the cover, "Review, USGS," contains some marks made during the course of review. Our review was limited to Appendix F, Hydrology.

We concur that due to lack of streamflow data in this vicinity the Synthetic Unit Hydrograph method probably provides the best solution.

On Plate 3 (Appendix F), a decimal point was apparently omitted in the ordinate scale. The discharges indicated are 10 times too great. We have shown the log-Pearson Type III frequency curve for comparative purposes.

A study of the computations indicates that your design runoff for this area is reasonable.

We concur with the recommended hydrologic instrumentation as proposed on page F-43.

Very truly yours,

Thad G. McLaughlin
Regional Hydrologist

Enclosures



United States Department of the Interior

NATIONAL PARK SERVICE

Southwest Region

P. O. Box 728

Santa Fe, New Mexico 87501

IN REPLY REFER TO:

L7423

JAN 14 1971

Colonel R. L. West
District Engineer
Albuquerque District, Corps of Engineers
P. O. Box 1520
Albuquerque, New Mexico 87103

Dear Colonel West:

We have just reviewed your survey for Flood Control and Allied Purposes Tributaries of the Pecos River at and in the vicinity of Alpine, Texas and offer the following comments:

There is no indication of an environmental statement nor is there any discussion of archeological or historical values. Significant archeological sites are known to exist in this region of Texas. Whether sites exist within the project area is not known at this time, but can be determined by an archeological reconnaissance of the project limits and borrow areas. We estimate such a reconnaissance survey could be accomplished in a week's time and would cost about \$300.00.

We appreciate this opportunity to express our views.

Sincerely yours,


Director

Enclosures (2)



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION SIX
FORT WORTH, TEXAS 76102

819 Taylor Street

January 7, 1971

IN REPLY REFER TO 06-00.6

Colonel R. L. West
District Engineer
Albuquerque District, Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

Enclosed is Division Engineer Cary's January 4, 1971 reply to your December 14, 1970 letter furnishing a draft copy of your survey report on "Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas".

We have also reviewed the report and have no comments to offer in addition to those furnished by Mr. Cary.

We appreciate the opportunity you have afforded the Division and Regional offices to review and comment on this draft copy of the report. The draft copies are being returned as requested. We would appreciate a copy of the final report.

Sincerely,

James W. White
Regional Federal Highway
Administrator

Enclosures



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF PUBLIC ROADS
REGION SIX

Austin, Texas 78701

January 4, 1971

IN REPLY REFER TO 06-41

Colonel R. L. West
District Engineer
Albuquerque District, Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

Reference is made to your letter dated December 14, 1970 submitting a draft copy of the report for flood control and allied purposes, Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas.

We have reviewed the report and offer the following comment:

It is noted local interests would be required to construct a new bridge for U.S. Highway Nos. 90 and 67 across the Piasano Creek diversion channel. Please be advised that obligations assumed by local interest as a condition to approval of the project cannot be financed with Federal highway funds.

We are returning the copy of your report. We appreciate the opportunity to review it.

Sincerely yours,

FC J. F. Cary
Division Engineer

Enclosure



OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

110 SOUTHWEST CENTER
300 MAIN DRIVE
EL PASO, TEXAS 79950

MAILING ADDRESS:
P. O. BOX 1859

APR 20 1970

Refer to: SWAED-ER

Colonel R. L. West
District Engineer
Albuquerque District,
Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

We appreciate the opportunity to comment on your March 27, 1970, letter describing a potential multiple-purpose reservoir project in the vicinity of Alpine, Texas, being investigated by your office.

The potential project is located on Alpine Creek, a tributary to the Pecos River. The Water Treaty with Mexico, signed on February 3, 1944, allocates the entire flow of the Pecos River to the United States, and future development of this potential project would not be contrary to the provisions of the Treaty. Incorporation of water supply storage in the reservoir would be subject to appropriate action by the Texas Water Rights Commission.

Sincerely,

J. F. Friedkin
Commissioner



**EXECUTIVE DEPARTMENT
AUSTIN, TEXAS 78711**

PRESTON SMITH
GOVERNOR

February 5, 1971

Colonel R.L. West, CE
District Engineer
Department of the Army
Albuquerque District, Corps of Engineers
P.O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

The proposed draft report, "Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas," has been reviewed by the Division of Planning Coordination, Office of the Governor (the State Planning and Development Clearinghouse), member state agencies of the Interagency Natural Resources Council, and by other interested state agencies. These same agencies have also reviewed the draft environmental impact statement for the Alpine Lake Project, Alpine, Texas.

No adverse comments were received on either the proposed project or the draft environmental statement. The following comments of interest were made:

1. Texas Water Development Board: Concluded that "the multiple purposes of flood control, water supply and recreation have been expertly incorporated into one project. The solution achieved by combining flows of Alpine Creek, Paisano Creek and West Moss Creek into one reservoir appears to be the most economical situation possible. Further, the flows of the three streams would be required to yield a supply of water adequate for municipal, industrial, and recreational purposes. With the added work of flood plain management through the City of Alpine, we believe that all but the most severe storm situation could be handled without major difficulty."

2. Texas Water Quality Board: "The work proposed should be in conformity with the Texas Water Quality Board's requirements for the water quality standards for this area and the work should not interfere with the sewerage systems within this area."

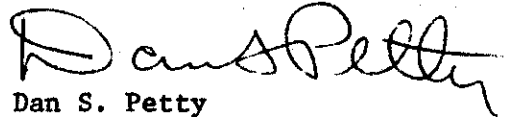
3. Texas Highway Department: "This Department would only be involved to the extent of placing an 80-foot-long structure across U.S. Highways 90 and 67 about one-half mile west of the Alpine city limits to accommodate a diversion channel. No other highways or proposed highway locations would be affected by Plan G of the report."

4. Texas Water Rights Commission: The proposed project appears to be desirable. The water rights related to this proposed project are subject to the municipal water requirements of the Commission. This project is subject to consideration by the Commission under Article 7473e, V.T.C.S., when the final report is made to the Governor of Texas.

The State of Texas is in general agreement with the proposed project as outlined in your draft report and draft environmental impact statement. Thank you for the opportunity to review and comment.

Each agency will retain its copy of the report in a confidential project file until preliminary approval of the final report is received. When the final report is released, please furnish us twelve copies for our distribution to participating review agencies.

Sincerely,



Dan S. Petty
Director, Division of
Planning Coordination

DSP/sct

PECOS RIVER COMMISSION

Room 4301, 200 Northwest 4th Street
Oklahoma City, Oklahoma 73102

January 12, 1971

Colonel R. L. West
District Engineer
Albuquerque District
Corps of Engineers
Albuquerque, New Mexico 87103

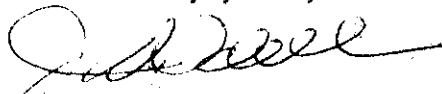
Dear Colonel West:

Attached is the copy of the draft of the review report on "Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas" that was furnished to me for review.

It appears that the proposed project would have no effect on the division of Pecos River water at the New Mexico-Texas state line, and that nothing proposed would adversely affect Federal interests in the Pecos River Basin. Therefore, the report is being returned without comment.

I appreciate the opportunity to review proposed projects in the Pecos River Basin during their consideration for authorization.

Sincerely yours,



J. W. Odell
Chairman



STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

**S. E. REYNOLDS
STATE ENGINEER**

December 23, 1970

**BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87501**

R. L. West, Colonel
District Engineer
Corps of Engineers
P O Box 1538
Albuquerque, New Mexico 87103

Dear Colonel West:

Under date of 14 December 1970 you transmitted a draft of your proposed report for flood control and allied purposes, Tributaries of the Pecos River at and in the vicinity of Alpine, Texas, for review and comment.

New Mexico has no objections to the plan of development presented in the draft report.

The State of New Mexico appreciates the opportunity to comment on proposed water resources development reports and your courtesy in furnishing such reports is appreciated. The draft report is returned herewith as requested.

Sincerely,


S. E. Reynolds
State Engineer

SER:b

TRIBUTARIES OF THE PECOS RIVER
AT AND IN THE VICINITY
OF
ALPINE, TEXAS

*Information Called for by Senate Resolution 148, 85th Congress
Adopted 28 January 1958*

1. *PROJECT DESCRIPTION AND ECONOMIC LIFE.*-

a. *Project description.*- The recommended plan of improvement would comprise an earthfill dam located on Alpine Creek, near the southern city limits of Alpine, a small saddle dam near the divide between the Alpine and West Moss Creeks watersheds, and diversion channels leading from Paisano and West Moss Creeks to convey runoff from these streams into the reservoir. The project would afford various degrees of flood protection from the three creeks, and provide storage for municipal and industrial water supply and recreation. At spillway crest, the reservoir, would have a storage capacity of 12,710 acre-feet, of which, 2,080 acre-feet would be reserved for sediment detention, 1,000 acre-feet would be allocated to recreation, 5,100 acre-feet for municipal and industrial water supply, and 4,530 acre-feet to flood control. A summary of the project features is given in the report text under PLAN OF IMPROVEMENT and details are presented in Appendix E, DESIGN AND COST ESTIMATES.

b. *Economic life.*- An economic life of 100 years was used for project analysis.

2. *PROJECT COSTS.*- Estimates of first costs are based on average bid prices for similar projects constructed or under construction in the Albuquerque District, adjusted to July 1970 prices. All estimates include an allowance for contingencies, and costs for engineering and design and supervision and administration. The estimate of annual charges given in the report is based on a 5-1/8 percent rate for Federal and non-Federal costs, and amortization of the investment over a period of 100 years. Allowance for operation, maintenance, and major replacements is based on past experience for similar projects. The estimated first costs, annual charges, and annual operation, maintenance, and major replacement costs are given in Table 1.

TABLE 1. - Project Costs

Project	First Cost	Annual Charges	Annual OM&R
<u>Alpine Lake:</u>			
Federal Cost	\$1,583,600	\$85,000	0
Non-Federal Cost	<u>2,071,400</u>	<u>111,800</u>	<u>\$58,200</u>
Total	3,654,000	196,800	58,200

3. *BENEFIT-COST RATIOS.*- The benefit-cost ratios, calculated on the basis of tangible benefits and costs for 50- and 100-year periods are shown in Table 2.

TABLE 2. - 50- and 100-Year Benefit-Cost Ratios
July 1970 Prices

Project	Annual Charges	Annual Benefits		Benefit-Cost Ratio
<u>Alpine Lake:</u>				
50-Year	\$274,600	FC	\$56,690	
		REC	234,000	
		WS	<u>151,200</u>	
Total			441,890	1.6
100-Year	255,000	FC	57,300	
		REC	234,000	
		WS	<u>147,000</u>	
Total			438,300	1.7

4. *INTANGIBLE PROJECT EFFECTS.*- Intangible benefits are those which are difficult to evaluate or for which no satisfactory method of evaluation has been established. Construction of the recommended plan of improvement would relieve the anxiety of flood plain residents by reducing dangers accompanying floods and the threat of epidemics which follow. Other intangible benefits include enhancement of the general welfare and security of the people, reduction of delay in normal transportation service which causes appreciable loss from delayed shipments of perishable products, and reduction of interruption to the normal social processes in Alpine, Texas.

5. *PHYSICAL FEASIBILITY AND COST OF PROVIDING FOR FUTURE NEEDS.*- The recommended plan is the most practical plan for providing flood protection, water supply, and recreation improvements at this time. The plan was formulated within the framework of existing water availability to meet the immediate and future needs of the study area. The plan would not preclude consideration of future improvements for flood control and related purposes as the need arises.

6. *ALLOCATION OF COSTS.*- A flood control project including water supply, recreation, and fish and wildlife improvements must have costs allocated to the functions provided by the project so that equitable apportionment of costs may be made among Federal and non-Federal participants. Net benefits assigned to water supply, recreation, and fish and wildlife were used to determine the water supply, recreation, and

fish and wildlife component in the allocation of costs. After the proper allocation of costs to each purpose served by the project was made, the allocated costs were apportioned to Federal and non-Federal interests in accordance with applicable laws and policies. The project costs allocated to the recreation and fish and wildlife purposes were apportioned equally to Federal and non-Federal interests. The cost allocation was computed using the separable costs-remaining benefits method.

7. *EXTENT OF INTEREST IN THE PROJECT.*- The extent of interest in the project is illustrated by the testimony presented at the public meetings and meetings with local interests, as summarized in the report under IMPROVEMENTS DESIRED, and under COORDINATION WITH LOCAL INTERESTS. Local interests have indicated, in writing, their willingness to furnish the required local cooperation in connection with the project. Copies of the letters of intent are included in Appendix C, COORDINATION WITH OTHER AGENCIES.

8. *REPAYMENT SCHEDULES.*- Water supply is a reimbursable function incorporated in the project. A repayment schedule will be made in accordance with the Water Supply Act of 1958, as amended, during pre-construction planning.

9. *APPORTIONMENT OF COSTS AMONG INTERESTS.*- The apportionment of first costs of the recommended plan of improvement is given in Table 1.

10. *EFFECTS OF PROJECT ON STATE AND LOCAL GOVERNMENTS.*- The establishment of a fishery in the Alpine Lake project would require the initial and supplementary stocking of fish by the Texas Parks and Wildlife Department. However, the cost of these additional services would be offset by increased State revenues from fishing licenses and sales taxes. Policing of the recreation areas would be required of the city of Alpine, but additional costs of such services would be absorbed by entrance fees. The establishment and enforcement of flood plain regulations would be carried out by the Alpine Building Department staff. The Corps of Engineers would provide guidance and aid in establishing the regulations. The taxes foregone on land in the reservoir area would be more than offset by increased revenues as a result of higher valuation of protected property and reduction in emergency cost during floods including care of victims.

11. *ALTERNATIVE PLANS.*- As indicated in the report, sufficient consideration was given to alternative improvements to indicate that the recommended plan of improvement is the most practical at this time.

ENVIRONMENTAL STATEMENT

FINAL

ENVIRONMENTAL STATEMENT

**ALPINE LAKE PROJECT
ALPINE, TEXAS**

**OFFICE OF THE CHIEF OF ENGINEERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 20314**

19 SEPTEMBER 1972

Alpine Lake Project, Alpine, Texas

() Draft (X) Final Environmental Statement

Responsible Office: US Army Corps of Engineers, Albuquerque, New Mexico

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

2. Description of Action: Recommendation for Congressional authorization of a small reservoir to provide flood control for the town of Alpine, Texas; other purposes are recreation and water supply for municipal and industrial uses.

3. Environmental Impacts.

a. Reduced flooding, provision of a small permanent pool for recreation and fishery enhancement, loss of about 784 acres of grazing land by inundation and changed land use.

b. Adverse Environmental Effects: Loss of 784 acres of land currently used as wildlife habitat by coyotes and jackrabbits.

4. Alternatives: Channelization, detention structures, diversions, flood plain management and combinations thereof, and a no action alternative.

5. Comments Received:

Bureau of Sport Fisheries and Wildlife, USDI
Bureau of Outdoor Recreation, USDI
Federal Water Pollution Control Administration, USDI
Department of Interior, Office of Secretary, Southwest Region
Geological Survey, USDI
National Park Service, USDI
International Boundary and Water Commission
Soil Conservation Service, USDA
Executive Department State of Texas
Department of Transportation, United States Coast Guard
Department of Health, Education, and Welfare
Department of Agriculture, Office of the Secretary
Environmental Protection Agency, Region VI
Governor of Texas
Department of the Interior, Office of the Secretary

6. Draft statement to CEQ 25 February 1972.

7. Final statement to CEQ 21 AUG 1973.

ALPINE LAKE PROJECT

ENVIRONMENTAL STATEMENT

1. Project description. The recommended plan of improvement provides storage for municipal and industrial water supply, general recreation and fish and wildlife recreation as well as providing for flood control. The proposed improvements would be constructed immediately south of the city limits of Alpine, Texas, and would consist of an earthfill dam on Alpine Creek, diversion channels from Paisano and West Moss Creeks to convey runoff into the reservoir, a saddle dam on West Moss Creek, a gated outlet works from Alpine Dam and a spillway from Alpine Dam. Borrow materials used in construction of the Alpine Creek Dam would be obtained from the excavation of the Paisano Creek Diversion Channel and from within the reservoir area. Riprap, spalls, and dumped rock fill for embankment slope protection would be obtained from the rock excavated for the spillway structure. Concrete aggregates required for the spillway structure would be available from local commercial sources. The channel and levee grades and alignments of the West Moss Creek Diversion Channel would be designed to approximately balance excavation and embankment quantities.

Reservoir capacity would be 12,710 acre-feet of which 2,080 acre-feet would be allocated for sediment detention, 1,000 acre-feet for a permanent recreation pool, 5,100 acre-feet for municipal and industrial water supply storage, and 4,530 acre-feet for flood control storage. The proposed plan of improvement has a benefit to cost ratio of 1.7 and has been designated as the Alpine Lake Project.

The Paisano Creek diversion channel would be an unlined earth channel 16,000 feet long with a base width of 20 feet. A concrete diversion structure would be constructed across Paisano Creek to divert discharges up to 4,000 c.f.s. into the channel. Discharges exceeding 4,000 c.f.s. would flow over a weir in the structure and return to the natural channel. The channel grade would be designed to produce non-eroding flows of 5 f.p.s. or less up to design discharge. Concrete stabilizers would be provided in the channel at 1,000-foot intervals and a 630 foot long section of the levee would be required on the downhill side of the channel at a low spot in the natural terrain.

The West Moss Creek diversion channel would be 4,400 feet long with a 50-foot base width. It would have a capacity of 7,400 c.f.s. and a rip-rapped levee on the downhill slope. An earthfill dike with a maximum height of 24 feet would be constructed across West Moss Creek to divert flows into the channel. A concrete overflow weir, with invert four feet below top of the dike, would be provided to return flows exceeding design discharge to the existing West Moss Creek channel. Concrete stabilizers would be provided every 1,000 feet to prevent head cutting in the channel. Project features are shown in an inclosed map.

The low degree of flood protection provided by the West Moss Creek Diversion and the Paisano Creek Diversion results in a residual flood problem downstream of the proposed structures. Additionally, there is sufficient drainage area below the proposed Alpine Lake to contribute runoff and create a potential flooding problem in the lower reach of Alpine Creek within the city. To preclude future flood problems in these 3 areas, local interests will be required to establish floodways through these areas and adopt flood plain management ordinances to prevent unwise development from encroaching upon the floodways.

2. Environmental setting without the project. The area under consideration is located in the semi-arid Trans-Pecos region of southwestern Texas, on the southern rim of the Davis Mountains. Typically, the region is a complex of dry grasslands, desert-shrub-covered slopes and mountains. The soils are a deep, stony clay, moderately productive of native grasses which comprise the dominant vegetation. The scenery of the area is not superlative, but does offer an attractive blending of low hills and valleys.

The City of Alpine located 190 miles southeast of El Paso, is the seat of Brewster County which is the largest county in Texas (6,208 square miles). Brewster County is one of the Nation's last frontiers, very sparsely populated with approximately one person per square mile. Ranching is the principal industry, and, the land area is divided into large ranches, some of which encompass over 20,000 acres. These land areas are grazed by herds of cattle and sheep. Alpine is the home of Sul Ross State University and is the principal shipping and marketing center for the surrounding area.

The three streams under study are Alpine, Paisano and West Moss Creeks. They are ephemeral, formed by the confluence of several smaller streams originating in the Davis Mountains west and south of the City of Alpine. These creeks and their tributaries remain dry throughout most of the year. Average annual rainfall at Alpine is 15.5 inches, most of which occur as high intensity, short duration thundershowers during the summer months. These thundershowers often produce flash flooding, but rarely contribute significantly to flows in the Pecos River.

The country around Alpine is well known for its variety of big game and its excellent hunting. The mountainous area lying south and west of Alpine comprising the watershed of Alpine, West Moss and Paisano Creeks support excellent populations of mule deer, pronghorn antelope, javelina, and scaled quail. The area to be occupied by the proposed project and its appurtenant structures is potentially excellent habitat for pronghorn antelope and scaled quail. However, because this area is so near to Alpine and well within range of the town dogs, the area is essentially unoccupied by pronghorns or other game animals. There is no hunting or trapping and none could be expected in the future.

Alpine was founded in 1882 with the coming of the railroad. Historically, Brewster County, of which the city is the seat, is inseparable from the history of the "Big Bend Country" and Texas. It was first explored in 1582 by Antonio de Espejo and this led to subsequent settlement of the area which is now part of the United States. During the development of Texas six different flags have flown over the territory and state from 1519 until the present. Included in these are those from Spain, France, Mexico, Republic of Texas, Southern Confederacy and the United States. Names and places such as Roy Bean and the law west of the Pecos and Fort Davis are synonymous with the early history of the area.

Archeological resources in the region vary from the relics of the Comanche and Apache to the artifacts of the West Texas Cave Dwellers. These later people inhabited cave shelters along many of the tributaries and canyons in the area. In the remains of this ancient group have been found crude cradles, fiber baskets, fish nets, rabbit sticks, seeds including squash, beads, weapons and other implements. From all indications the culture existed continuously for centuries and represented a sedentary people who lived from 2,000 to 8,000 years ago.

If the proposed project is authorized, archeological survey and reconnaissance would be conducted to determine existence or non-existence of these resources in the area. Salvage operations would be programmed and performed through the National Park Service if warranted.

The National Register of Historic Places was consulted and no sites currently recognized or proposed for inclusion on the Register would be affected by the proposed action.

The proposed project would not adversely affect any existing, proposed or known potential units of the National Park System. Further, it would not impact on any historic, natural or environmental education sites eligible or potentially eligible for inclusion in the National Landmark Programs. The Historic Preservation Officer for the State of Texas was contacted relative to the planned action and he was informed of the Corps of Engineers proposals for historical and archeological preservation.

The demands for outdoor recreation have greatly accelerated in recent years. Much of this recreational activity is related to use and enjoyment of water resources. There is a definite requirement for water associated facilities in this area where water oriented recreation is exceedingly deficient. At present, the closest major water-associated recreational areas to Alpine are Red Bluff Lake, about 145 miles northwest; Amistad Reservoir, about 185 miles southeast; and several reservoirs in the San Angelo area, about 230 miles northeast. Opportunities for boating, swimming or lake fishing are non-existent in and around Alpine. Alpine residents travel 40 miles to fish in San Esteban Reservoir located on Alamito Creek south of Marfa.

Some low density recreation such as camping, hiking or picnicking is available at both the Big Bend National Park and the Texas Parks and Wildlife Department's Black Gap Wildlife Management Area located in the southern portion of Brewster County. Significant archeological sites are known to exist in this region of Texas; however, no archeological investigations have been undertaken in the project area to determine if sites of significant importance exist. Such investigations will be accomplished during advanced planning of any project that is authorized by Congress.

The municipal and industrial water supplies for Alpine are obtained from two well fields. One is located in and adjacent to the city and the other is situated three miles northwest. Each field contains nine wells and from all indications the water table in the vicinity of Alpine is steadily declining because of continuous pumping from the aquifer.

Ground and surface water is generally of excellent quality. Water from some of the city wells is used without treatment but chlorination is required at others. Past studies by private consulting engineers have indicated a need for surface storage to meet the future water requirements of Alpine.

Mineral resources in the area include deposits of copper, coal, silver, clay, sand, gravel, marble and others but the only notable development is the production of quicksilver from mines in the southern part of the county. Value of this production is not extensive, amounting to about \$15,000 in 1960. Development of the other mineral resources is insignificant.

No significant changes in land use or environmental conditions are anticipated without adoption of the recommended plan of improvement. The area might remain in its present natural state and be used primarily for grazing.

3. The environmental impact of the proposed action. The physical and aesthetic changes to the existing environmental setting would be substantial should the recommended plan of improvement be initiated. Control of periodic flooding in Alpine and its accompanying damage would allow full development. City parks with recreational playgrounds could be developed. Creation of the reservoir with a permanent pool would provide a much needed fishery in an area where none exists. Through proper development, management, and zoning of the reservoir, limited amounts of water skiing and speedboating would be available.

With the project, there would be no hunting on the reservoir or on adjacent fee lands since it would be unsafe on such a small and intensively used area. Perhaps, wild animals would be attracted to the permanent water area, including a few migratory waterfowl. Sightseers could watch ducks and possibly pronghorns.

Considering the general characteristics of the contributing watershed, the ecological balance would not be altered appreciably as a result of the proposed project. Sediment sources contributing to the proposed reservoir are mountainous areas which are a part of a large mass of intrusive igneous rocks of Cretaceous and Tertiary geologic ages. Conservation practices in this semi-arid area would reduce the sediment load to some degree. However, rainfall is periodic and so concentrated that it would cause flooding regardless of land treatment programs. Watershed management and conservation practices in the lower portions of the watershed and valleys would be conducted primarily on privately owned lands. Ranchers would be required to share in 50 percent of the costs. There would be little loss of land use during implementation of land treatment programs.

The proposed action would not produce significant adverse environmental impacts on geologic or hydrologic conditions in the area nor would it materially affect existing mineral resources. Ground and surface flow water quality is considered excellent and implementation of the project would not alter this rating.

The proposed project would require the use of approximately 748 acres of land for siting structural developments. Other than this commitment, significant land use changes are not expected to occur. The project would provide a local fishery, increase waterfowl and shorebird use of the area, and provide water-based recreation in an area devoid of this opportunity. Impacts on mammalian forms of wildlife would be insignificant.

In addition, the proposed action would provide flood protection for 538 acres of urban land, 257 acres of transportation rights-of-way, and 2,596 acres of rural land in and adjacent to Alpine, Texas.

4. Adverse environmental effects which cannot be avoided should the project be implemented. Implementation of the proposed project would have minimal adverse environmental effects. Seven hundred and forty acres of natural habitat would be permanently lost as a result of construction and subsequent inundation. Wildlife losses would be minimal, since the few jackrabbits and coyotes inhabiting the area would easily migrate to adjacent, uncrowded and suitable habitat.

There would be a temporary loss of natural vegetation during construction. The losses would be limited to the project areas including the contractor's work areas and access roads. Construction vehicles and equipment are expected to cause most of the damage to the natural vegetation. Adequate measures to restore the environment, including seeding and mulching of disturbed areas, will be necessary. No unique plant species or plant communities will be lost as a result of the construction and subsequent development of the project lands.

Littering could become a serious problem during periods of high public use. The administration charged with maintenance of the project lands will be required to provide continual clean-up during these periods. Maintenance and removal of debris will also be required during periods of high flows.

In order to lessen or eliminate any adverse environmental impacts that could arise during construction of this project, the Corps of Engineers would require the contractor and his subcontractors to abide by the Guide Specifications on Environmental Protection for Civil Works Construction Projects. In addition, to further prevent, abate, and control any environmental pollution which could arise from construction activities, the contractor and his subcontractors would be required to comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

5. Alternatives to the proposed action. The proposed improvement will provide the necessary measures required to partially meet needs for flood protection, municipal and industrial water supply and recreation for residents of the area in the vicinity of Alpine, Texas.

An alternative to the recommended plan would be to forego construction of the proposed project. As a result, those people residing in the vicinity would continue without water-oriented outdoor recreation, without future municipal and industrial water supply, and without another means by which they could supplement their economy. In addition, the problems of flood damage would continue to increase.

Several other basic types of solutions were considered in developing the plan of improvement, taking into account national and regional objectives for use of water and land resources including preservation and enhancement of the environment. Paramount in each solution considered was the primary objective of providing flood protection for Alpine. Solutions studied included improvement of existing river channels; construction of new channels; detention structures; diversions and training measures to direct the flow of water, detention reservoirs; flood plain management; and combinations of the above. Preliminary investigations were made to determine the feasibility of channelizing Alpine, Paisano, and West Moss Creeks through the city of Alpine. This study indicated that Paisano and West Moss Creeks affected only fringe areas of the city and due to the infrequency of large magnitude floods, channelization could not be justified for any degree of flood protection. However, since Alpine Creek does flow through the business and residential areas of the city, channelization studies were more detailed. There were four degrees of flood protection explored: 50 year, 100 year, 200 year and Standard Project Flood. These studies presented a need for concrete floodways since the slopes of Alpine Creek were too steep to be stabilized by any other feasible method. In addition, tieback levees would be needed on the upstream end of the channel to direct

stream flows to the floodway. After considering this alternative, it was determined that none of the degrees of flood protection studied would provide an acceptable benefit to cost ratio. These ratios were 0.6 to 1 for the 50,100, and 200 year floods and 0.7 to 1 for the Standard Project Flood. Since channelization was obviously economically infeasible, environmental considerations related to project development were not of sufficient magnitude to warrant justification of the proposal. In addition, implementation of this action would not satisfy the multiple water resource needs of the area.

After determining that channelization would not provide an acceptable project, consideration was given to diverting flood waters around developed areas for dispersal in nondamageable, undeveloped sites. This plan was even more economically infeasible than the channelization proposals. Diversion would not satisfy the water resource needs of the city nor would environmental factors outweigh the lack of economic justification.

Reservoir plans were evaluated when it became evident that channelization and diversion did not satisfy the criteria for a feasible project. Single-purpose flood control dams were considered on each of the tributaries. Relocation of the Southern Pacific railroad tracks made a dam on Paisano Creek economically infeasible and a single purpose dam on West Moss Creek for floods of the Standard Project magnitude exhibited a benefit to cost ratio of less than 0.1 to 1. A single purpose dam on Alpine Creek was ideal for prevention of flood damages to the developed sectors of the city; however, analysis of a one purpose project indicated infeasibility for all degrees of protection. Environmentally, single purpose projects would require land and vegetation commitments without providing beneficial fish, wildlife and recreational values associated with such developments.

Rejection of the single purpose proposals led to the analysis of multiple-purpose developments for municipal and industrial water supply, fish and wildlife, and recreation. Through this evaluation it was determined that the selected plan of action has the most potential for flood damage reduction and would offer the best solution of other water resource problems at Alpine.

In conjunction with the structural protection provided by the recommended project, the plan of improvement also provides for non-structural measures in the flood plain areas of West Moss Creek, Paisano Creek, and Alpine Creek. Nonstructural measures designated a floodway and preventive measures within the additional area that would be inundated by a flood that could be expected to occur once in 100 years. A requirement to adopt and enforce flood plain regulations for certain channel reaches was made an item of local cooperation. These techniques are highly desirable in augmenting and enhancing the selected plan of action, however, it should be noted that use of these measures alone would not provide adequate flood protection to the City of Alpine nor would they prevent damages to existing properties in the flood plain.

6. Relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. The implementation of the proposed plan of improvement would require the present generation to make a commitment of approximately 784 acres of land for purposes of flood protection, recreation, and municipal and industrial water supply. Loss of production on land, loss of stream, loss of mature trees (if any).

Initially 35,000 man-days of fishing would be provided annually increasing to 55,000 visitations by the year 2020 as a result of the development of the fishery. One thousand man-days would be credited to wildlife-oriented recreation annually. An initial visitation of 150,000 recreation days is expected annually three years after project completion.

The proposed plan of improvement would also alleviate the shortage of water for municipal and industrial uses in Alpine. The city has retained consulting engineers to study these problems. Results have indicated that the water table in this area is steadily declining because of continued pumping of the ground water reservoir. Consultants have concluded that existing wells are pumping water at their maximum capacity. Their recommendation is that the city refrain from drilling further wells and, in lieu, consider developing an additional water supply by means of a reservoir to collect surface water. The proposed project provides 5,100 acre-feet of storage to satisfy present and anticipated future municipal and industrial uses.

7. Irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. The main commitment of resources, should the proposed plan of improvement be implemented, would be 784 acres of grazing land, 740 of which would be required for construction of the dam and reservoir and related appurtenances and 44 acres required for the proposed general recreation improvements. There are no critical raw materials that would be permanently lost as a result of inundation. Labor resources associated with and raw materials used in the construction of the proposed facilities would also be irreversibly and irretrievably committed. Future economic growth induced by the proposed project could generate other commitments of land, labor and material in the immediate area; however, it is possible only to recognize this potential at this time.

8. Coordination with other agencies. Project planning has been continuously coordinated with the sponsoring agency, the City of Alpine, Texas. Local proponents strongly support development of this project to provide a municipal and industrial water supply, general recreation and fish and wildlife recreation, and flood control on three streams in the area. There is no significant local opposition to the project.

The draft environmental statement was coordinated with Federal and State agencies. Their comments are summarized as follows:

a. Bureau of Sport Fisheries and Wildlife.

Comment: The Regional Director indicated that the statement gives an excellent treatment to fish and wildlife aspects.

b. Bureau of Outdoor Recreation.

Comment: The Regional Director stated that this environmental statement adequately reflects the recreational impact and that the effects of the environmental damages necessary to implement the project plan would be more than compensated by the favorable effects that would ensue. He felt that the economic impact afforded by tourism was understood and that a greater coverage of the recreational values in terms of benefits to the local economy by supporting services should have been included.

Response: The economic impact due to supporting services is expected to be relatively minor as a result of this small project.

c. Federal Water Quality Administration - Environmental Protection Agency.

Comment: The Administration said that the Environmental Statement adequately covered the question of water quality in the Alpine Lake area; however, it felt that the statement should also point out that the contractor will be required to:

(1) Exercise care in the relocation of petroleum product pipelines and other hazardous material to prevent accidental spillages that would be harmful to fish and wildlife.

(2) Provide and operate sanitary facilities to adequately treat and dispose of domestic wastes in conformance with Federal and State water pollution control regulations.

(3) Schedule clearing, excavation and construction operations to reduce erosion, turbidity and siltation to the lowest level practicable.

Response: The requirements suggested by paragraph (2) and (3) above will be incorporated in construction contracts in the event the project is authorized and subsequently funded for construction. Paragraph (1) does not apply since there are no hazardous materials or pipelines necessitating relocation.

d. Department of Interior, Southwest Region.

Comment: The Departmental Field Representative requested that a statement of existing conditions on the watershed and any proposed corrective action should be made a part of the statement. Environmental effect on the constructed reservoir due to siltation from the watershed should be evaluated in the statement.

Response: Effects of siltation on the proposed reservoir together with the existing conditions on the reservoir and possible corrective actions are discussed in paragraph 3 of the statement. The proposed reservoir design provides storage space for 100-year sediment accumulation.

e. Geological Survey.

Comment: The District Chief, Water Resources Division of the Geological Survey agreed that there is a short supply of ground water in the Alpine area. Its only other comment pertained to the reference of "three major streams in the area of study." It maintains that the streams in the study area are minor tributaries.

Response: Concur; this reference in paragraph 2 was corrected to read "The three streams under study are".

f. National Park Service, Southwest Region.

Comment: The Acting Regional Director stated that the environmental statement did not contain a discussion of archeological resources, even though significant archeological sites are known to exist in this region of Texas. Further, it was stated that it is not known at this time whether or not sites exist in the project area and that the Corps should expend approximately \$300 for a reconnaissance survey.

Response: It is current Federal policy that the National Park Service is responsible for Federal activities and funding related to archeological studies. The Historic Sites Act of 21 August 1935, 49 Stat. 666, authorizes appropriation of funds to the National Park Service for investigation and preservation of archeological sites. This Act is further amplified by the Act of 27 June 1960, 74 Stat. 220, which provides for the National Park Service to continue archeological investigations in connection with Civil Works projects of the Corps of Engineers. It is the policy of the Chief of Engineers to coordinate fully the planning and construction program of the Corps with the National Park Service and other agencies in carrying out their programs and responsibilities on project areas. Appropriate arrangements to conduct archeological survey and salvage will be made as a part of advanced planning of any project authorized by Congress.

g. International Boundary and Water Commission.

Comment: The Commission's Principal Engineer offered two minor editorial suggestions. They were that Sol Ross Teachers College be changed to Sul Ross State University in paragraph 1 and that the problem in Alpine mentioned in paragraph 2 should be defined.

Response: These changes were made:

h. Soil Conservation Service, U.S.D.A.

Comment: The State Conservationist felt that based on knowledge of the area, the statement depicted the effects of the project on the environment.

i. Governor's Office, State of Texas; Interested State Agencies.

Comment: The Director of Planning Coordination of the State of Texas is in general agreement with the draft environmental statement. No adverse environmental effects were surfaced in the State's letter.

LETTERS OF COMMENTS
RECEIVED BY THE DISTRICT ENGINEER
ON THE
PRELIMINARY DRAFT ENVIRONMENTAL STATEMENT

APPENDIX A



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

January 11, 1971

In reply refer to: RB

District Engineer
Corps of Engineers, U. S. Army
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Sir:

Mr. Gordon A. Walhood, by letter dated December 31, 1970, referenced SWAED-TP, requested our comments on your five-point environmental statement on the Alpine Lake Project, Alpine, Texas. My letter of December 30, 1970 commented previously on your survey report on the project.

We have reviewed the environmental statement and find that it gives excellent treatment to fish and wildlife aspects of the natural environment.

Thank you for the opportunity to comment on the statement.

Sincerely yours,

W. O. Nelson, Jr.
Acting Regional Director

cc:

Executive Director, Texas Parks and Wildlife Department, Austin, Texas
Field Representative, USDI, Southwest Region, Albuquerque, New Mexico
Field Supervisor, BSFW, Div. of River Basin Studies, Fort Worth, Texas



United States Department of the Interior

BUREAU OF OUTDOOR RECREATION

MID-CONTINENT REGION
BUILDING 41, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:

D6427RG
Alpine Lake

JAN 21 1971

Mr. Gordon A. Walhood, Chief
Engineering Division
Albuquerque District, Corps of Engineers
Post Office Box 1580
Albuquerque, New Mexico 87103

Dear Mr. Walhood:

We have reviewed your environmental statement on the Alpine Lake Project, Alpine, Texas as requested in your letter dated December 31, 1970.

The project, in addition to the primary objective of providing flood protection for Alpine, would provide storage of municipal and industrial water supply and recreation. The project design, one of several multiple-use plans developed, was selected for its capability of providing water-oriented recreation. This requires water impoundments and minor channelization. Proper flood plain management practices and control is called for in some areas of the flood plain.

Environmental damages, minimal and of limited value, are mostly confined to the effects of inundation of 740 acres of grazing land and to moderate effects of diversion channels necessary to assure a permanent recreation pool. The grazing land provides habitat suitable for certain type wildlife, but is not so populated because of close proximity to the city of Alpine. Displacement of animals now using this land poses no problem. They could migrate to adjacent, uncrowded, suitable lands. Ecosystem disturbances are apparently negligible.

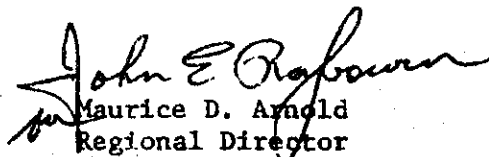
The proposed project provides a means of environmental enhancement in an area where quality environment is scarce. It will provide very desirable recreational opportunities, particularly fishing, in an area where recreational waters are in short supply. Not only will such opportunities foster and promote general welfare, but they will contribute to the local economy.

We concur in the plan selection and believe it will carry out policies and goals set forth under Section 101 of the National Environmental Policy Act of 1969. The effects of the environmental damages necessary to implement the project plan would be more than compensated by the favorable effects that would ensue.

It is our opinion that your environmental statement adequately reflects the recreational impact. However, the economic impact afforded by tourism as stated on page 3, paragraph a, might be understated. Most of the recreation values will accrue to tourists originating from outside the project study area. This affords additional recreational values in terms of benefits to the local economy by supporting services.

We appreciate the opportunity to comment.

Sincerely yours,


Maurice D. Arnold
Regional Director

cc: Regional Coordinator, Southwest Region
BOR, WASO, Water Resources Division



ENVIRONMENTAL PROTECTION AGENCY
UNITED STATES
~~DEPARTMENT OF THE INTERIOR~~
~~FEDERAL WATER POLLUTION CONTROL ADMINISTRATION~~
SOUTH-CENTRAL REGION VI
1402 ELM STREET, 3RD FLOOR
DALLAS, TEXAS 75202

January 22, 1971

District Engineer
U.S. Army Engineer District, Albuquerque
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Sir:

Reference is made to your letters of December 14 and 31, 1970 requesting review and comments on your draft report, "Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas," and the Environmental Statement for the Alpine Lake Project.

This office has reviewed the report and finds that it has properly presented our views of the water quality of the area. It is noted that you referenced our letter of November 13, 1968 in Appendix G. The letter gives the quality of the water at Alpine for the parameters of sulphates, chlorides, total dissolved solids, and pH. Your report and the quality aspects of the report would be more complete if a copy of our letter dated November 13, 1968, was included in Appendix C.

It is pointed out that the provisions of E.O. 11507 are to be complied with and that the construction, operation, and maintenance of the sanitary facilities for the recreational area will be done in accordance with all state and Federal requirements.

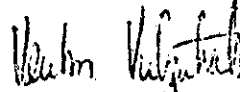
The Environmental Statement adequately covers the question of water quality in the Alpine Lake area, however, the statement should also point out that the contractor will be required to:

1. Exercise care in the relocation of petroleum product pipelines and other hazardous material to prevent accidental spillages that would be harmful to fish and wildlife.
2. Provide and operate sanitary facilities to adequately treat and dispose of domestic wastes in conformance with Federal and state water pollution control regulations.

3. Schedule clearing, excavation and construction operations to reduce erosion, turbidity and siltation to the lowest level practicable.

The above comments on the Environmental Statement are considered informal and are part of the Water Quality Office's responsibility to render technical assistance.

Sincerely yours,



KENTON KIRKPATRICK
Director, Office of Planning
Water Quality Office

cc: Chief, Riv. Bas. Planning



United States Department of the Interior

OFFICE OF THE SECRETARY
SOUTHWEST REGION

Room 4030, Federal Building
Albuquerque, New Mexico 87101

January 22, 1971

Mr. Gordon A. Walhood, Chief
Engineering Division
Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Mr. Walhood:

We have reviewed the environmental statement for the Alpine Lake proposed project in view of its adequacy for meeting the requirements of Section 102(c), Public Law 91-190.

Environmental effects on the constructed reservoir as a result of siltation from the watershed are not evaluated in the report. If a heavy silt yield is to be expected from present levels of vegetation management on the watershed, construction of the reservoir could have less than desired environmental impact. To provide for desirable levels of environmental quality for the proposed impoundment, proper management of the watershed is essential. We believe a statement of the existing conditions on the watershed and any proposed corrective action, if necessary, should be made a part of the statement.

With the above exception, we believe the statement adequately meets the requirements of Section 102(c) of the National Environmental Policy Act.

Sincerely yours,

D. P. Shoup
Field Representative
Southwest Region



United States Department of the Interior

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
FEDERAL BUILDING
300 EAST 8TH STREET
AUSTIN, TEXAS 78701

January 21, 1971

To: D. P. Shoup, Field Representative, Southwest Region
Albuquerque, New Mexico

From: Trigg Twichell, District Chief, WRD

Subject: Environmental Statement on the Alpine Creek Project
(your memorandum 1-11-71)

T. G. McLaughlin, by memorandum of Jan. 14, 1971, asked that I review the environmental statement and submit my comments direct to you because of the shortage of time.

Attached is a copy of my memorandum to the Regional hydrologist, WRD, Denver, Colo. dated Jan. 8, 1971 commenting on the Corps of Engineers draft on Pecos River and tributaries near Alpine, Texas. These comments relate only to the hydrology and specialized fields of the Geological Survey.

Following are further comments regarding water resources and the environmental statement prepared by the Corps of Engineers:

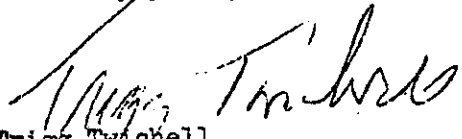
The Corps' statement in the last paragraph of page 4 regarding the short supply of ground-water in the Alpine area is correct.

The only other comment I feel the Geological Survey should make regarding the environmental statement is: The first sentence in the first paragraph, page 2- "There are three major streams in the area of study - Alpine, Paisano and West Moss Creeks." The Geological Survey does not consider these major streams. I would suggest that the statement be corrected to "The three streams under study are Alpine, Paisano and West Moss Creeks."

To the Geological Survey, major streams in west Texas would be those such as the Pecos, Rio Grande and Devils Rivers. The three streams at Alpine are minor tributaries of what the Geological Survey would term major streams. This does not mean to say that the Corps' project is not feasible nor does it reflect the environmental aspects.

Other comments relate primarily to outdoor recreation, fish and wildlife activities, and the effect of the construction of this relatively small reservoir on the natural environment of the area. Comments regarding these certainly should be most appropriate from the Interior Department, National Park Service and the Bureau of Outdoor Recreation. They and the Corps of Engineers should recognize however, that water impounded in this small lake will be relatively low during droughts such as is being experienced now at the San Angelo reservoir which is dry, and other reservoirs in the region which are basically dry or essentially so.

Sincerely yours,



Trigg Twichell
District Chief

TT:vws

cc: T. G. McLaughlin



United States Department of the Interior

NATIONAL PARK SERVICE
Southwest Region
P.O. Box 728
Santa Fe, New Mexico 87501

IN REPLY REFER TO:

L7423-C

JAN 28 1971

Mr. Gordon A. Walhood
Chief, Engineering Division
Albuquerque District, Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

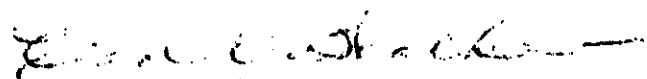
Dear Mr. Walhood:

We have reviewed your five-point environmental statement on the Alpine Lake Project, Alpine, Texas and offer the following comments:

The environmental statement is nothing more than a selective restatement of the contents of your report, Review Survey for Flood Control and Allied Purposes Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas. It contains no discussion of archeological resources, though significant archeological sites are known to exist in this region of Texas. Whether sites exist within the project area is not known at this time, but can be determined by an archeological reconnaissance of the project limits and borrow areas. This reconnaissance survey could be accomplished in a week's time and would cost about \$300.00.

Thank you for this opportunity to express our views.

Sincerely yours,


Acting Director



OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

818 SOUTHWEST CENTER
300 MAIN DRIVE
EL PASO, TEXAS 79950

MAILING ADDRESS:
P. O. BOX 1859

7 1977

Refer to:

Mr. Gordon A. Walhood
Chief, Engineering Division
Department of the Army
Albuquerque District, Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Mr. Walhood:


Your 31 December 1970 letter provided a copy of the draft environmental statement for the Alpine Lake Project for our review and comment.

Two minor editorial suggestions are offered:

1. On the penultimate line, page 1, the present name is Sul Ross State University.
2. Clarification could be considered for the last sentence of the last paragraph page 2, under item 2, Environmental Setting Without the Project. The sentence is not clear as to what problem is referred to and whether the project would create or lessen the problem.

The opportunity to review and comment upon the draft statement is appreciated.

Sincerely yours,


D. D. McNealy
Principal Engineer
Supervising

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 648
Temple, Texas 76501

January 18, 1971

Mr. Gordon A. Walhood
Chief, Engineering Division
Department of the Army
Albuquerque District, Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Mr. Walhood:

In accordance with your request of December 31, 1970, we have reviewed your draft environmental statement for the Alpine Lake Project, Alpine, Texas.

Based on our knowledge of the area, it appears that the statement depicts the effect of the projects on the environment.

We appreciate the opportunity to comment on this environmental impact statement.

Sincerely,



Clyde W. Graham
State Conservationist



EXECUTIVE DEPARTMENT
AUSTIN, TEXAS 78711

February 5, 1971

Colonel R.L. West, CE
District Engineer
Department of the Army
Albuquerque District, Corps of Engineers
P.O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel West:

The proposed draft report, "Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas," has been reviewed by the Division of Planning Coordination, Office of the Governor (the State Planning and Development Clearinghouse), member state agencies of the Interagency Natural Resources Council, and by other interested state agencies. These same agencies have also reviewed the draft environmental impact statement for the Alpine Lake Project, Alpine, Texas.

No adverse comments were received on either the proposed project or the draft environmental statement. The following comments of interest were made:

1. Texas Water Development Board: Concluded that "the multiple purposes of flood control, water supply and recreation have been expertly incorporated into one project. The solution achieved by combining flows of Alpine Creek, Paisano Creek and West Moss Creek into one reservoir appears to be the most economical situation possible. Further, the flows of the three streams would be required to yield a supply of water adequate for municipal, industrial, and recreational purposes. With the added work of flood plain management through the City of Alpine, we believe that all but the most severe storm situation could be handled without major difficulty."

2. Texas Water Quality Board: "The work proposed should be in conformity with the Texas Water Quality Board's requirements for the water quality standards for this area and the work should not interfere with the sewerage systems within this area."

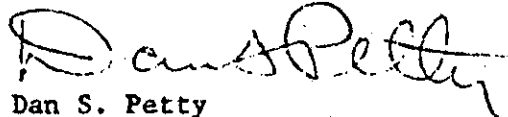
3. Texas Highway Department: "This Department would only be involved to the extent of placing an 80-foot-long structure across U.S. Highways 90 and 67 about one-half mile west of the Alpine city limits to accommodate a diversion channel. No other highways or proposed highway locations would be affected by Plan G of the report."

4. Texas Water Rights Commission: The proposed project appears to be desirable. The water rights related to this proposed project are subject to the municipal water requirements of the Commission. This project is subject to consideration by the Commission under Article 7473e, V.T.C.S., when the final report is made to the Governor of Texas.

The State of Texas is in general agreement with the proposed project as outlined in your draft report and draft environmental impact statement. Thank you for the opportunity to review and comment.

Each agency will retain its copy of the report in a confidential project file until preliminary approval of the final report is received. When the final report is released, please furnish us twelve copies for our distribution to participating review agencies.

Sincerely,



Dan S. Petty
Director, Division of
Planning Coordination

DSP/ect

APPENDIX B

CORRESPONDENCE RECEIVED FROM
INTERESTED STATE AND FEDERAL AGENCIES
DURING DEPARTMENTAL REVIEW

Letters were received from the following agencies:

Department of Transportation, United States Coast Guard
Department of Health, Education, and Welfare
Department of Agriculture, Office of the Secretary
Environmental Protection Agency, Region VI
Governor of Texas
Department of the Interior, Office of the Secretary

1. Department of Transportation, United States Coast Guard.

Comment: The concerned operating administrations and staff of the Department of Transportation, United States Coast Guard reviewed the draft environmental statement for the Alpine Creek project at Alpine, Texas and had no comments to offer.

2. Department of Health, Education, and Welfare.

Comment: The Department of Health, Education and Welfare reviewed the health aspects of the proposal and indicated that the project does not appear to represent a hazard to public health and safety.

3. Department of Agriculture, Office of the Secretary.

Comment: The last paragraph of the "environmental impact" section of the draft statement should be revised to consider that application of conservation practices in the contributing watershed would reduce sediment production to some degree. In addition it should be noted that most conservation practices in this area are applied on private land and involve very little, if any, loss of the use of land.

Response: These comments have been included in the final statement.

Comment: The proposed project will have no adverse effects on projects or programs of the Department of Agriculture.

4. Environmental Protection Agency, Region VI.

Comment: The Draft Environmental Statement adequately portrays the water quality of the area and covers most of the environmental effects.

Comment: Socio-economic impact of displaced people and businesses, if any, should be discussed in enough detail to permit an evaluation of the possible effect of the displacement and relocation on potential pollution.

Response: There would be no people or businesses displaced by the proposed project.

Comment: The alternatives considered but rejected should be discussed in more detail, particularly as to how these alternative actions might avoid some or all of the adverse environmental effects. The results of an analysis of such alternatives and their cost and impact on the environment would strengthen the statement.

Response: These alternatives have been discussed in the final statement.

Comment: A map of the proposed project area would provide the reader with a better idea of the environmental setting and changes that will be made if the proposed action is taken.

Response: The final statement includes a project map.

Comment: Clearing and disposing of the brush, vegetation, and residential and commercial buildings, if any, in the project area should include provisions for prevention of undue effects on the environment. Methods of disposal should be covered in the statement. Open uncontrolled burning should not be permitted, in order to meet the requirements given in 42 CFR 76.8.

Response: Measures for removal and disposal of vegetative materials are presented in the Corps of Engineers Guide Specifications on Environmental Protection for Civil Works Construction Projects. These specifications also include pollution prevention measures relating to air, water, land, noise, solid waste-management and management of radiant energy, radioactive materials, and other pollutant sources. In addition, contractor and subcontractor compliance is required of all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement. Reference is made to adherence of these Guide Specifications, laws, and regulations in the final statement.

Comment: Measures to prevent the effects of accidental spillages should be incorporated into the design features of the project.

Response: These features are included in the Guide Specifications outlined in the preceding response.

Comment: Where appropriate, sanitary facilities should be provided and operated to treat and dispose of domestic wastes in conformance with State and Federal water pollution control regulations.

Response: Sanitary facilities would be provided and strict compliance with all laws and regulations would be mandatory.

5. Preston Smith, Governor of Texas.

Comment: Governor Smith requested the Texas Water Rights Commission to study and hold a public hearing on the proposed "Alpine Lake Project, Texas." There were no comments made on the environmental impact statement.

6. Department of the Interior, Office of the Secretary.

Comment: The draft environmental statement was reviewed and the following comments are submitted for consideration and use in preparing the final statement.

Comment: The "Project Description" section of the statement should be modified to provide information on the location and size of the borrow area site and a clearer description of the diversion channels since each activity can significantly impact on the present environmental setting.

Response: These items have been included in the "Project Description" section of the final statement.

Comment: The "Environmental Setting" section should contain a discussion on historical and archeological values. An archeological survey of the site should be made to (1) determine the presence or absence of such values, (2) provide a basis for evaluating and identifying impacts, and (3) define any salvage program and cost needed to mitigate or avoid damage to this resource.

Response: Historical and archeological discussions have been included in the final statement. Archeological surveys of the area would be conducted during post-authorization studies and the findings made a part of an updated environmental impact statement. Funding for the reconnaissance survey would be a responsibility of the National Park Service, unless in the time frame allowed, it could not finance the activity. In this case, the Corps of Engineers would fund the operation to obtain the necessary archeological survey data. If archeological salvage were warranted, the National Park Service would program and perform this work.

Comment: The statement should contain (1) a sentence indicating that the National Register of Historic Places was consulted, with "Criteria for Effect" applied and that no National Register properties are affected by the project, or (2) a listing of the properties to be affected, an analysis of the nature of the effects taken into account and an account of the steps taken to insure compliance with Section 106 of the National Historic Preservation Act of 1966 (80 Stat. 915) in accordance with the procedures of the Advisory Council on Historic Preservation as they appear in the Federal Register of March 15, 1972.

Response: The final statement indicates that the National Register of Historic Places was consulted and that no National Register properties are affected by the project.

Comment: The statement should contain evidence of contact with the Historic Preservation Officer of the State of Texas. A copy of his comments concerning the effects of this project upon historical and archeological resources which may be in the process of nomination to the National Register should be attached to the final statement.

Response: The Historic Preservation Officer for the State of Texas was contacted by telephone relative to historical and archeological resources which may be in the process of nomination to the National Register. There are no sites currently in the process for nomination and this has been so noted in the final statement. A follow-up letter from the Historic Preservation Office has been requested and will be forwarded for inclusion in the final statement when it is received.

Comment: The "Environmental Setting" section of the statement should be expanded to discuss existing water supplies, water quality and mineral resources.

Response: These items have been included and or expanded in the final statement.

Comment: The "Environmental Impact" section should identify the acreage of land which is being protected from flooding, land use changes induced by the project, the project's effect on water quality, fish and wildlife and other elements of the biota.

Response: This section has been expanded to include these comments.

Comment: The "Environmental Impacts" section should also indicate that significant adverse environmental impacts due to geologic or hydrologic conditions are not anticipated. It might also indicate that there is no evidence that this project would not materially affect the mineral resources of the area.

Response: These points have been included in the final statement.

Comment: A discussion of alternatives and their environmental impacts regardless of their benefit-cost ratio or whether they can provide all of the benefits of the proposed action would be consistent with the objectives of NEPA. Additional information on the downstream effects of the proposed structural alternatives would be helpful.

Response: The discussion of alternatives has been expanded in the final statement. It should be noted that consideration of any Federal construction project requires screening on the basis of economic efficiency. It is through this method that viable project alternatives are derived and pursued for further evaluation. In-depth environmental studies on a project alternative known to be economically infeasible would be warranted only where there are overriding intangible benefits.



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (WS)
400 SEVENTH STREET NW.
WASHINGTON, D.C. 20390
PHONE 202-426-2262

'6 APR 1972

- Lt. General F. J. Clarke
Chief of Engineers
Department of the Army
Washington, D. C. 20314


Dear General Clarke:

This is in response to your letter of 24 February 1972 addressed to Secretary Volpe concerning your proposed report, draft environmental, statement and other pertinent papers on the multipurpose Dam and Reservoir, Alpine Creek, Alpine, Brewster County, Texas for flood protection and other purposes.

The concerned operating administrations and staff of this Department have reviewed the material submitted. We have no comments to offer on either the draft environmental impact statement or the survey report. This Department has no objection to the Alpine Creek Dam and Reservoir which, in addition to providing flood protection in the immediate region will also provide water for municipal and industrial use and recreation.

The opportunity for the Department of Transportation to review and comment upon your proposed report and impact statement on the Alpine Creek project is appreciated.

Sincerely,


J. M. AUSTIN
Captain, U. S. Coast Guard
Acting Chief, Office of Marine
Environment and Systems



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON, D.C. 20201

OFFICE OF THE SECRETARY

MAR 21 1972

F. J. Clarke
Lieutenant General, USA
Chief of Engineers
Washington, D. C. 20314

Dear Lt. Gen. Clarke:

Secretary Richardson has asked me to respond to your letter dated February 24, 1972, wherein you requested comments on the proposed report and draft environmental impact statement for the Alpine Lake Project, Alpine, Texas.

This Department has reviewed the health aspects of the above project as presented in the documents submitted. This project does not appear to represent a hazard to public health and safety.

The opportunity to review the proposed report and draft environmental impact statement is appreciated.

Sincerely yours,

Merlin K. DuVal, M.D.
Assistant Secretary for
Health and Scientific Affairs



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

Honorable Robert F. Froehlke
Secretary of the Army

May 24, 1972

Dear Mr. Secretary:

This is in reply to the Chief of Engineers' letter of February 24, 1972, transmitting for our review and comment his proposed report and pertinent papers, including the environmental statement, on Alpine, Texas, Tributaries of the Pecos River.

The report recommends construction of a dam and reservoir on Alpine Creek with diversion channels on West Moss and Paisano Creeks to provide flood protection, municipal and industrial water supply and recreation for the community of Alpine.

We recommend that the Corps of Engineers actively coordinate project planning, construction and operation activities with the Texas Forest Service in order to minimize the risk of fire in the area.

One alternative to the project as proposed, which could be more fully considered, is the possibility of staging the plan of development. The Alpine Dam alone, without the saddle dam or diversion structures, appears to provide for all needs through the year 2020. At that time, as M&I water requirements increase, the saddle dam and diversion channels to bring water from Paisano and Moss Creeks could be added.

We suggest that the last paragraph of the "environmental impact" section of the draft statement be revised considering that (1) application of conservation practices in the contributing watershed would reduce sediment production to some degree, and (2) most conservation practices in this area are applied on private land and involve very little, if any, loss of the use of land.

The proposed project will have no adverse effects on projects or programs of the Department of Agriculture.

We appreciate the opportunity to review this material.

Sincerely,

A handwritten signature in cursive script, appearing to read "T. K. Cowden".

T. K. COWDEN
Assistant Secretary

ENVIRONMENTAL PROTECTION AGENCY

REGION VI

1600 PATTERSON, SUITE 1100
DALLAS, TEXAS 75201

March 22, 1972

OFFICE OF THE
REGIONAL ADMINISTRATOR

F. J. Clarke, Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Re: 06-2-157
Your Re: DAEN-CWP-D

Dear General Clarke:

We have reviewed the survey report and the Draft Environmental Statement on the proposed project for Tributaries of the Pecos River at and in the Vicinity of Alpine, Texas. The proposed project will consist of an earthfill dam on Alpine Creek with gated outlet works and a spillway from the dam. In addition, diversion channels will be constructed from Paisano and West Moss Creeks to convey runoff into the reservoir. The improvement provides storage for a municipal and industrial water supply, flood control, fish and wildlife and general recreation.

The revised survey report and Draft Environmental Statement adequately portrays the water quality of the area and covers most of the environmental effects.

We suggest you consider the following general comments in the preparation of the Final Environmental Statement:

1. Socio-economic impact of displaced people and businesses, if any, should be discussed in enough detail to permit an evaluation of the possible effect of the displacement and relocation on potential pollution.
2. The alternatives considered but rejected should be discussed in more detail, particularly as to how these alternative actions might avoid some or all of the adverse environmental effects. The results of an analysis of such alternatives and their costs and impact on the environment would strengthen the statement.

3. A map of the proposed project area would provide the reader with a better idea of the environmental setting and changes that will be made if the proposed action is taken.

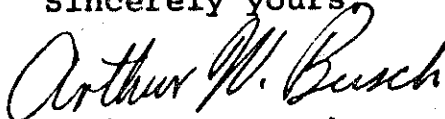
4. Clearing and disposing of the brush, vegetation, and residential and commercial buildings, if any, in the project area should include provisions for prevention of undue effects on the environment. Methods of disposal should be covered in the statement. Open uncontrolled burning should not be permitted, in order to meet the requirements given in 42 CFR 76.8.

5. Measures to prevent the effects of accidental spillages should be incorporated into the design features of the project.

6. Where appropriate, sanitary facilities should be provided and operated to treat and dispose of domestic wastes in conformance with State and Federal water pollution control regulations.

We appreciate the opportunity to review the statement and would like to receive two copies when it is placed in final form.

Sincerely yours



Arthur W. Busch
Regional Administrator



PRESTON SMITH

GOVERNOR OF TEXAS

July 20, 1972

Lieutenant General F. J. Clarke
Chief of Engineers
Department of the Army
Building T-7, Gravelly Point
Washington, D. C. 20310

Re: DAEN-CWP-D
Alpine Lake Project, Texas

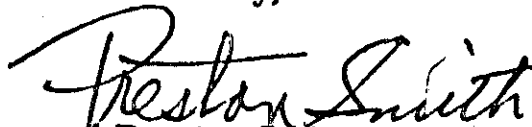
Dear General Clarke:

In response to your request of February 24, 1972, I requested the Texas Water Rights Commission to study and hold a hearing on your proposed "Alpine Lake Project, Texas" in accordance with Section 6.073 of the Texas Water Code. Following a public hearing on July 11, 1972, the Commission made its findings and submitted recommendations for my consideration.

I concur in the findings and recommendations set out in the July 11, 1972, Order of the Texas Water Rights Commission concerning the "Alpine Lake Project, Texas", and recommend the project be authorized by the Congress and funded in the public interest in accordance with your policy.

A copy of the Commission Order is enclosed for your information.

Sincerely,


Preston Smith

Enclosure

TEXAS WATER RIGHTS COMMISSION



AN ORDER approving the feasibility of a proposed Federal project of the United States Army, Corps of Engineers, as presented in a report entitled "Alpine Lake Project, Texas."

On July 11, 1972 came on to be considered before the Texas Water Rights Commission the engineering report prepared by the United States Army, Corps of Engineers, entitled "Alpine Lake Project, Texas," in accordance with Section 6.073 of the Texas Water Code.

After hearing and considering the evidence submitted, the Commission makes the following findings of fact:

1. On April 6, 1972, the Honorable Preston Smith, Governor of Texas, requested the Commission to determine the feasibility of the proposed project as required by law.
2. Notice of hearing was given in accordance with Section 6.073, Texas Water Code, and jurisdiction to consider the report is established.
3. The criteria set forth in Section 6.073(e), Texas Water Code, relating to feasibility have been met and the project is feasible and the public interest will be well served, provided:
 - (a) That no contracts or other agreements between the Federal government and a designated local sponsor be made which would during droughts or other periods of critical need restrict or prevent a holder of a permit issued by the Commission from diverting and using for municipal purposes any water contained in the proposed Alpine Lake.

(b) That failure of a local sponsor to purchase the proposed water-supply portion of the project or to participate in the proposed recreational development will not nullify feasibility of the project for flood control.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS WATER RIGHTS COMMISSION that the proposed Federal project prepared by the United States Army, Corps of Engineers, entitled "Alpine Lake Project, Texas," be and the same is hereby approved and recommended to the Governor as feasible and in the public interest subject to the preceding provisos.

Executed and entered of record, this the 11th day of July, 1972.

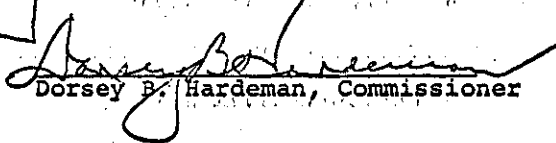
TEXAS WATER RIGHTS COMMISSION



O. F. Dent, Chairman



Joe D. Carter, Commissioner



Dorsey B. Hardeman, Commissioner

(SEAL)

ATTEST:


Audrey Strandtman, Secretary

STATE OF TEXAS
COUNTY OF TRAVIS

X
X
X

I, Audrey Strandtman, Secretary of the Texas Water Rights Commission, do hereby certify that the foregoing and attached is a true and correct copy of an order of said Commission, the original of which is filed in the permanent records of said Commission.

Given under my hand and the seal of the Texas Water Rights Commission, this the 11th day of July, A.D. 197 2.


Audrey Strandtman, Secretary



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-72/248

AUG 28 1972

Dear General Clarke:

This is in reply to your letter of February 24, 1972, requesting our views and comments on the proposed report and draft environmental statement for the Tributaries of the Pecos River at and in The Vicinity of Alpine, Texas.

The proposed project will not adversely affect any existing, proposed or known potential units of the National Park System. Further, it will not impact on any historic, natural or environmental education sites eligible or potentially eligible for inclusion in the National Landmark Programs.

The proposed recreation and fish and wildlife developments are deemed satisfactory and in accordance with the State plan. The use and benefit estimates ascribed to the project appear reasonable. We were, however, unable to identify the acreage and separable cost of recreation lands and such information is essential to the recreation planning mission of this Department.

We also note the crediting of benefits for future development within the floodway. This would appear to constitute an indirect sanction of building additional structures in the floodway. The report should discuss how such development will be compatible with good flood plain management practices.

Certain details of the project are neither discussed nor identified in the report or the environmental statement. For example, such information as the location of borrow areas, acres of vegetation to be removed, plans for its disposal, types of diversion channels, pool characteristics, AUM which will be lost, the secondary effects of increased recreation use, water quality effects, project induced land use changes and the effect and character of downstream flows would be helpful in understanding and analyzing project effects.

We have no data that would indicate that this project would adversely affect the mineral resources of the area. However, in order to demonstrate that mineral resources were considered in the planning process both the report and environmental statement should provide a discussion on the mineral resources of the study area.

We have reviewed the draft environmental statement for this project and submit the following comments for your consideration and use in preparing the final statement.

Project Description

We suggest that this section be modified to provide information on the location and size of the borrow area site and a clearer description of the diversion channels since each activity can significantly impact on the present environmental setting.

Environmental Setting

This section should contain a discussion on historical and archeological values. An archeological survey of the site should be made to (1) determine the presence or absence of such values, (2) provide a basis for evaluating and identifying impacts, and (3) define any salvage program and cost needed to mitigate or avoid damage to this resource.

The statement should contain (1) a sentence indicating that the National Register of Historic Places was consulted, with "Criteria for Effect" applied and that no National Register properties are affected by the project, or (2) a listing of the properties to be affected, an analysis of the nature of the effects taken into account and an account of the steps taken to assure compliance with Section 106 of the National Historic Preservation Act of 1966 (80 Stat. 915) in accordance with the procedures of the Advisory Council on Historic Preservation as they appear in the Federal Register of March 15, 1972.

The statement should contain evidence of contact with the historic Preservation Officer of the State (Executive Director, Texas State Historical Survey Committee, P. O. Box 12276, Capitol Station, Austin, Texas 78711).

A copy of his comments concerning the effects of this project upon historical and archeological resources which may be in the process of nomination to the National Register should be attached to the final statement.

This section could also be expanded to discuss existing water supplies, water quality and mineral resources.

Environmental Impacts

This section could identify the acreage of land which is being protected from flooding, land use changes induced by the project, the project's effect on water quality, fish and wildlife and other elements of the biota.

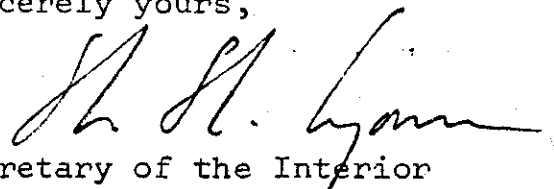
The section could also indicate that significant adverse environmental impacts due to geologic or hydrologic conditions are not anticipated. It might also indicate that there is no evidence that this project would not materially affect the mineral resources of the area.

Alternatives

A discussion of alternatives and their environmental impacts regardless of their benefit-cost ratio or whether they can provide all of the benefits of the proposed action would be consistent with the objectives of NEPA. Additional information on the downstream effects of the proposed structural alternatives would be helpful.

We wish to thank you for the opportunity to review the report and environmental statement for this proposal.

Sincerely yours,



Deputy Assistant

Secretary of the Interior

Lt. General F. J. Clarke
Chief of Engineers
Attn: DAEN-CWP-D
Department of the Army
Washington, D. C. 20314