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

November 4, 1966

Memorandum

To: Regional Director, Bureau of Reclamation, Region 5, Amarillo, Texas

From: Regional Director

Subject: Brantley Project, New Mexico--Bureau of Sport Fisheries and Wildlife revised report

This memorandum is the Bureau of Sport Fisheries and Wildlife revised report on the Brantley Project and supersedes an earlier detailed report dated April 30, 1959. It has been 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.) and is intended to accompany your feasibility report. The New Mexico Department of Game and Fish concurs in this report as indicated by the enclosed letter dated September 8, 1966, signed by Director Ladd S Gordon.

The project area lies in central Eddy County in southeastern New Mexico. The main purposes of the project are to replace the terminal irrigation capacity presently contained in Lake McMillan which is losing its effectiveness because of sediment accumulation, and to provide flood protection for the City of Carlsbad.

DESCRIPTION OF THE AREA

The Pecos River is the principal tributary of the Rio Grande in the United States. It rises in high altitudes in the southern terminus of the massive Sangre de Cristo uplift in north-central New Mexico and flows southward some 900 miles to join the Rio Grande in the international reach of the master stream. The Pecos River drains 25,000 square miles in New Mexico and 19,000 square miles in Texas. Watershed elevations in the basin vary from above 13,000 feet at the river's head to about 1,000 feet at its mouth. Most of the valley's 28 million acres are semiarid and grazed by cattle and sheep; but

where water and arable land are available, irrigated farming is the dominant agricultural activity. In recent years, the petroleum and potash industries near Carlsbad, New Mexico, have made important contributions to the basin's economy.

For its size, the basin of the Pecos River presents a great aggregation of problems associated with land and water use. These problems involve both quantity and quality of water supplies--the problem of salinity being particularly accute; the erosion and silting of reservoirs and channels; damage from floods; and interstate controversy over the use of waters. The use of the water of the river has been appropriated fully.

In the project area, the soil and underlying rocks contain gypsum and many other soluble minerals. Moisture erodes the land into sink holes and numerous underground formations such as those found in the nearby Carlsbad Caverns National Park. Consequently, the Pecos River Channel is hardly a typical, well-defined path of drainage, but more a coalescence of surface sink holes with the resultant sinuous, ever-changing channel.

Historic flows in the project area have ranged from about 24 second-feet, representing the return of leakage from the upstream McMillan Reservoir, to ravaging floods in the magnitude of 50,000 second-feet. Downstream from Carlsbad in the Malaga Bend area, brine aquifers contribute about 135,000 tons of salt a year to the river already high in minerals.

PLAN OF DEVELOPMENT

Brantley Dam, to be constructed on the Pecos River about 4 miles downstream from the existing McMillan Dam would be the main project feature, as shown on Plate 1. Under initial conditions, Brantley Reservoir would have a conservation pool capacity of 144,000 acre-feet of which 42,000 acre-feet would be for conservation storage and 102,000 acre-feet for sediment deposition. Flood control capacity would be 376,000 acre-feet and surcharge capacity 360,000 acre-feet, including an allowance for 14,000 acre-feet of sediment deposition in these two pools. The existing McMillan Reservoir would be inundated by Brantley Reservoir except during periods of reduced storage. During such periods, Brantley Reservoir would be reduced to 1,000 acre-feet and the McMillan Reservoir portion would be dry except during the months of October through January when 4,500 acre-feet would be retained for preservation of waterfowl habitat. The full 4,500 acre-feet would be available in McMillan Reservoir approximately 73 percent of the time over the life of the project. Water released from Brantley Reservoir would flow down the Pecos River

a distance of 9 miles into Avalon Reservoir, the existing terminal storage and diversion feature for irrigable land belonging to the Carlsbad Irrigation District.

As proposed, the project would acquire approximately 29,600 acres in fee title, with flowage easement being taken on an additional 12,310 acres of land.

Table 1 summarizes the proposed operation for Brantley Reservoir.

Table 1. Operating Levels of Brantley Reservoir with 50 Years of Sediment

Item	Elevation (feet)	Capacity (acre-feet)	Surface Area (acres)
Top of conservation pool	3,270.4	87,400	12,020
Average maximum pool	3,267.4	55,800	9,110
Average minimum pool	3,260.3	13,900	3,390
Inactive pool	3,251.8	1,000	290

The period of analysis for project investigations is 100 years.

FISH

Without the Project

The area of project influence on fish includes the existing McMillan and Avalon Reservoirs and 14 miles of the Pecos River between the two reservoirs.

Due to excessive siltation, shallow depth, and frequent drawdowns, McMillan Reservoir affords little in the way of game-fish habitat but abounds with nongame fish. Without the project, fishing would approximate 5,000 man-days annually on the reservoir area of about 1,900 acres.

The 14-mile section of the Pecos River between McMillan and Avalon Reservoirs provides moderate game-fish habitat. Channel catfish, bluegill, white bass, and green sunfish are the predominant game fish with lesser numbers of largemouth bass and crappie. Nongame fish are numerous and include gizzard shad, river carpsuckers, longnose gar,

and carp. The New Mexico Department of Game and Fish attempted to control these nongame species by means of a fishtrap downstream from McMillan Reservoir but their efforts were only partially successful. Consequently, the State now is trying to control nongame fishes by biological control techniques. Heavy introductions of predator species such as walleyed pike and northern pike, if successful, would reduce the numbers of undesirable fishes in the Pecos River to favor game species such as largemouth bass and channel catfish.

The lower 9 miles of the river between Brantley Reservoir site and Avalon Reservoir are stocked with rainbow trout during the cooler months by the New Mexico Department of Game and Fish and receive heavy fishing pressure. During the fishing season, flows vary from 35 to 200 second-feet and average about 80 second-feet. Without the project, approximately 15,000 man-days of fishing could be expected annually on the 14 miles of stream. Of this amount, 3,000 man-days of warmwater fishing would occur on the 5-mile section of the river to be flooded by the proposed Brantley Reservoir. This 5-mile reach frequently incurs much reduced flows when McMillan Reservoir is not releasing water to the river. About 12,000 man-days of fishing, primarily trout fishing, would occur on the 9 miles of river between Brantley Reservoir damsite and Avalon Reservoir. This 9-mile reach maintains permanent flows as a result of accretions.

Avalon Reservoir, the terminal storage and diversion lake for the Carlsbad Irrigation District, is located on the Pecos River about 3 miles north of the City of Carlsbad. It has an area of about 600 acres under normal operating conditions. Fishing has not been very good the last 15 years due to frequent drawdowns and the abundance of nongame fishes. Without the project, fishing at Avalon Reservoir would be about 4,000 man-days annually.

With the Project

Brantley Reservoir would inundate McMillan Reservoir resulting in a loss of the McMillan Reservoir fishery. The proposed operation for Brantley Reservoir indicates that although it would cover 5,500 surface acres during a significant part of the period of May through September, it would be drawn down to a minimum pool of only 1,000 acre-feet, or 290 acres, about 40 percent of the time from May through September. Under a proposed fishery management program to be conducted by the New Mexico Department of Game and Fish, it is expected that 28,000 man-days of fishing would occur annually at Brantley Reservoir.

Approximately 5 miles of the Pecos River would be flooded by Brantley Reservoir with the consequent loss of the 3,000 man-days of stream fishing.

In the 9-mile segment of the river between Brantley Dam and the headwaters of Avalon Reservoir, irrigation releases would be continuous but not constant during the period of March through September. During winter months, irrigation releases would be dicontinuous with intervening periods of zero flow. With the project, it is estimated that there would be 8,000 man-days of fishing on this segment annually.

The proposed operation for Avalon Reservoir indicates that it would be emptied or kept at considerably lower levels than it has been historically. It is estimated that under project conditions, with a normal water area of about 428 acres and with frequent drawdown, only 2,000 man-days of fishing would take place annually.

Table 2 summarizes fishing without the project and with the project.

Table 2. Summary of Man-days of Fishing Annually

Item	Without Project	With Project	Gain or Loss
McMillan Reservoir	5,000	0	-5,000
Avalon Reservoir	4,000	2,000	-2,000
Brantley Reservoir	0	28,000	28,000
Pecos River			
Within Brantley Reservoir area	3,000	0	-3,000
Brantley Dam to headwaters of Avalon Reservoir	12,000	8,000	-4,000

WILDLIFE

Without the Project

The area of project influence on wildlife includes the existing McMillan and Avalon Reservoirs and lands within the Brantley Reservoir site.

There is no big game in the project area. Moderate hunting of scaled quails and mourning doves occurs in the salt-cedar stands in the McMillan

Delta area and adjacent to the river. This habitat would be displaced by the project but hunting would not change significantly. Although there are a few raccoons along the Pecos River, they are not hunted or trapped to any significant degree.

The Pecos River valley in New Mexico is noted for its importance to migratory waterfowl. Historically, waterfowl habitat was much more extensive than today. The loss of waterfowl habitat can be attributed to irrigation diversions which deplete the streamflow; overgrazing which tends to accelerate erosion; and channelization of the river or construction of bypass channels, both of which curtail overflow and dewater potholes, seeps, and other valuable waterfowl habitat.

McMillan Reservoir and its delta contain about 4,000 acres of moderate to low value waterfowl habitat. Without the project, it is estimated that 1,300 man-days of waterfowl hunting would occur annually at McMillan Reservoir. At Avalon Reservoir, about 200 man-days of waterfowl hunting would occur annually.

With the Project

The project would have no significant effect upon big game, upland game, or fur animals.

The proposed plan of operation for the project indicates that McMillan Dam would not be breached and that 4,500 acre-feet of water, with an area of about 2,300 acres, would be retained in the McMillan portion of Brantley Reservoir during the months of October through January when Brantley Reservoir itself occasionally would be drawn down to a minimum pool of 1,000 acre-feet. Considerable numbers of ducks, geese, and sandhill cranes would be attracted to the two pools. It is estimated that there would be 7,900 man-days of waterfowl hunting annually.

With lower water levels proposed for Avalon Reservoir, waterfowl habitat and hunting would be reduced under project operation. Waterfowl hunting would amount to about 100 man-days annually.

Table 3 summarizes the hunting expected annually without the project and with the project.

Table 3. Summary of Man-days of Waterfowl Hunting Annually

Item	Without Project	With Project	Gain or Loss
McMillan Reservoir	1,300	0	-1,300
Avalon Reservoir	200	100	-100
Brantley Reservoir	0	7,900	7,900

DISCUSSION

The proposed operation for Brantley Reservoir indicates that irrigation releases during winter months would be discontinuous with intervening periods of zero flow. Fish habitat would be reduced in quantity and quality under such a regimen resulting in a loss of 4,000 man-days of trout fishing per year on the 9-mile section of Pecos River from Brantley Dam to the headwaters of Avalon Reservoir. To mitigate this loss, a release of 70 second-feet of water during the period May 15 through October 31 and 35 second-feet of water during the period November 1 through May 15 would be required from Brantley Reservoir. It is recognized that in view of the water demands on the Pecos River at the proposed Brantley Reservoir, the complete realization of these flows would not be possible at this time. The above-recommended releases are included as a guideline for possible fulfillment at some future date if the opportunity occurs.

Brantley Reservoir would be drawn down to a minimum content of 1,000 acre-feet about 40 percent of the time from May through September. The inadequate depth of this pool occurring during the hottest months of the year could kill many game fish. A larger minimum pool of 2,000 acre-feet, with a surface area of 490 acres, would carry over more game fish by virtue of its better depth and cooler water, and also would provide a more attractive, larger, more accessible pool for public fishing. Fishing would increase by 10,000 man-days annually. Additional waterfowl habitat and 1,100 man-days of waterfowl hunting annually also would result in Brantley Reservoir if this larger permanent pool could be provided.

Increased benefits amounting to 3,000 man-days of fishing and 800 man-days of waterfowl hunting would occur annually at Brantley Reservoir if public access to the reservoir area could be improved. Under present plans, road access would be limited to areas near the damsite,

sections on the west and north sides, and the area immediately below the existing spillway of McMillan Reservoir. An access point near the damsite would facilitate boat-launching during periods of low water storage. Provision of a secondary road in Section 17, Township 20 South, Range 26 East, would provide access during normal water storage periods. The construction of about one mile of gravel road by the Bureau of Reclamation at an estimated cost of $11,000 would meet the access requirement. The maintenance cost of this road, estimated at $200 annually, and the maintenance of boat-launching and fish and wildlife facilities would be the responsibility of the New Mexico Department of Game and Fish.

Avalon Reservoir also would be drawn down to a very small pool or emptied completely during summer and fall months, and particularly during October. Provision of a minimum pool up to 1,000 acre-feet capacity could provide for significant enhancement of fish and wildlife at Avalon Reservoir amounting to 15,000 man-days of fishing and 200 man-days of waterfowl hunting annually. The feasibility of providing water for such a minimum pool should be investigated during later detailed stages of project planning.

The Brantley Project provides an opportunity to enhance fish and wildlife resources in portions of the Pecos River Basin other than in the immediate area of Brantley Reservoir. Specifically, the water rights on 2,888 acres of irrigated land, which Brantley Reservoir would flood, conceivably might become available for fish and wildlife purposes. If part of this water were retained as a permanent pool in Alamogordo Reservoir, an existing Bureau of Reclamation irrigation storage feature located about 150 miles upstream from Brantley Dam site on the Pecos River, considerable benefits to both fishing and waterfowl hunting would result.

Alamogordo Reservoir supports populations of crappie, channel catfish, largemouth bass, and walleyed pike, but the fishery potential of the reservoir never has been attained because of the frequent and drastic reservoir drawdowns. When the water level at Alamogordo Reservoir is drawn below 3,000 acre-feet, many game fish die as a result of extreme turbidity in the reservoir, and significant numbers are swept through the outlet works and down into the Fort Sumner Irrigation Canal or into the Pecos River.

If a permanent pool of 7,000 acre-feet of water were assured at Alamogordo Reservoir, the resultant pool would be 20 feet deep at the dam and cover about 781 acres. In most years, maintenance of such a pool, with the provision that it would never be drawn below the critical 3,000

acre-foot level in dry years, would prevent the recurrence of historic losses of game fish and greatly facilitate effective management of the reservoir fishery. An additional 35,400 man-days of fishing and 4,500 man-days of waterfowl hunting would be expected to occur annually as a result of the minimum pool.

Costs associated with providing a minimum pool and access roads at Brantley Reservoir and minimum pools at Avalon and Alamogordo Reservoirs would be eligible for cost sharing as project features for fish and wildlife in accordance with provisions of the Federal Water Project Recreation Act, P.L. 89-72. These costs would be cost shared equally by the Federal Government and the non-Federal body or bodies assuming administration of the reservoir areas.

To enhance the management of fish and wildlife in the project area, approximately 21,000 acres of land and water, shown on Plate II, should be made available to the New Mexico Department of Game and Fish for a wildlife management area in accordance with the terms of a General Plan as provided for in Sections 3 and 4 of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). It does not appear that any additional lands beyond those to be acquired for project purposes would be needed for fish and wildlife purposes.

All federally acquired project lands, except for sections reserved for safety, efficient project operation, and protection of public property, should be opened to public fishing and hunting consistent with State regulations. Opening the lands would facilitate and provide greater fishing and hunting opportunities for the general public.

Water-oriented recreational uses such as waterskiing, speedboating, swimming, fishing, and hunting on Brantley Reservoir could conflict with each other and pose safety problems unless the reservoir is properly zoned and the uses regulated. Zoning, including the reservation of areas for fishing and hunting without other recreational interference, should be a cooperative endeavor of the Bureau of Reclamation and the New Mexico Department of Game and Fish. Benefits accruing therefrom can be determined after the zoning details are better known.

It is recommended that:

1. The conservation, improvement, and development of fish and wildlife resources be included among the purposes for which the project is authorized.

2. To mitigate fishing losses in the Pecos River, a minimum instantaneous flow of 70 second-feet of water be released at Brantley Dam during the period May 16 through October 31; and 35 second-feet, or the inflow to Brantley Reservoir, whichever is less, be released from Brantley Reservoir during the period November 1 through May 15.

3. To enhance fishing and hunting, a minimum pool of 2,000 acre-feet of water be retained as a permanent pool in Brantley Reservoir.

4. To enhance fishing and hunting, access roads be retained at or near Brantley Dam; in the vicinity of the existing spillway of McMillan Reservoir; and that about one mile of gravel access road be constructed at a cost of $11,000 in Section 17, Township 20 South, Range 26 East.

5. The feasibility of providing a minimum pool up to 1,000 acre-feet capacity in Avalon Reservoir be investigated during later detailed project planning.

6. To enhance fishing and hunting, a permanent pool of 7,000 acre-feet of water be retained in Alamogordo Reservoir except during critical dry years when the minimum content would not be less than 3,000 acre-feet.

7. About 21,000 acres of project lands, shown of Plate II, within the proposed Brantley Reservoir area (including the existing McMillan Reservoir) be made available to the New Mexico Department of Game and Fish for a wildlife management area in accordance with the terms of a General Plan as provided for in Sections 3 and 4 of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

8. Federal lands and waters in the project area, except for sections reserved for safety, efficient operation, and protection of public property, be open to public use for fishing and hunting.

9. The Bureau of Reclamation, in cooperation with other agencies concerned with the administration of Brantley

Reservoir, develop a zoning plan for the reservoir to insure the availability of adequate areas and times for fishing and hunting as well as other recreational purposes.

CONCLUSIONS

Operation of the Brantley Project as currently planned by the Bureau of Reclamation would result in fish and wildlife benefits at Brantley Reservoir. Project operation would cause the loss of 3,000 man-days of warmwater fishing and 4,000 man-days of trout fishing in the Pecos River. It also would cause the loss of 5,000 man-days of warmwater fishing at McMillan Reservoir, and 2,000 man-days of warmwater fishing and 100 man-days of waterfowl hunting annually at Avalon Reservoir.

Increased fishing at Brantley Reservoir would compensate for the above warmwater fishing losses and provide an additional 18,000 man-days of fishing for a benefit of $27,000 annually. Increased waterfowl hunting at Brantley Reservoir would compensate for the above waterfowl hunting losses and provide an additional 6,500 man-days of hunting for a benefit of $29,200 annually. Total annual benefits attributable to the project would amount to $56,200.

Effectuation of Recommendation No. 2 would mitigate 4,000 man-days of trout fishing that would be lost downstream from Brantley Reservoir due to project operation.

Adoption of Recommendation No. 3 would result in 10,000 additional man-days of fishing and 1,100 man-days of waterfowl hunting with annual benefits of $15,000 and $5,000, respectively, at Brantley Reservoir.

Adoption of Recommendation No. 4 would result in an additional 3,000 man-days of fishing and 800 man-days of waterfowl hunting at Brantley Reservoir, for annual benefits of $4,500 and $3,600, respectively.

Provision of a 1,000-acre-foot minimum pool in Avalon Reservoir, as mentioned in Recommendation No. 5, would enhance fish and wildlife and provide an additional 15,000 man-days of fishing and 200 man-days of waterfowl hunting for benefits of $22,500 and $900 annually, respectively. Should provision of a smaller minimum pool be more feasible, our Bureau would be glad to estimate respective benefits.

Implementation of Recommendation No. 6 would result in 35,400 additional man-days of fishing for a benefit of $53,100 annually and 4,500 man-days of waterfowl hunting for a benefit of $20,300 annually at Alamogordo Reservoir.

Making lands available to the New Mexico Department of Game and Fish, as proposed in Recommendation No. 7, would enhance the management of fish and wildlife resources in the project area. Adoption of Recommendation No. 8 would facilitate fishing and hunting in the project area. Benefits from effectuation of Recommendation No. 9 would depend upon the nature of the zoning and cannot be estimated at this time.

Total benefits attributable to the Brantley Project with incorporation of the above recommendations into project plans would be $181,100 annually.

This report is based on data supplied by your Bureau prior to November 1966 and particularly on Operation Study 7-2 dated April 1965. We would appreciate knowing of any changes in your operational plans in order that we may evaluate the effects of such changes on fish and wildlife resources.

John C. Gatlin

Enclosure

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