

Ref # 416, R-1

**Relocation of Salvage Wells
Closed Basin Division
San Luis Basin Project, Colorado**

**FINDING OF NO SIGNIFICANT IMPACT AND
ENVIRONMENTAL ASSESSMENT
BIOLOGICAL ASSESSMENT**

FINAL

United States Department of the Interior
Bureau of Reclamation
Upper Colorado Region
Albuquerque Area Office

February 2003

Acronyms and Abbreviations

| | |
|----------------------|---|
| BA | Biological Assessment |
| BIA | Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| cfs | cubic feet per second |
| CDOW | Colorado Division of Wildlife |
| Closed Basin Project | Closed Basin Division of the San Luis Project |
| Compact | Rio Grande Compact of 1939 |
| conveyance channel | Franklin Eddy Conveyance Channel |
| EA | environmental assessment |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| EWs | elevation wells |
| FES | Final Environmental Statement |
| ft/day | feet per day |
| FWS | U.S. Fish and Wildlife Service |
| ITAs | Indian trust assets |
| mg/L | milligrams per liter |
| NDVI | Normalized Difference Vegetation Index |
| NWI | National Wetland Inventory |
| NWR | National Wildlife Refuge |
| PVC | polyvinyl chloride |
| Reclamation | Bureau of Reclamation |
| RGWCD | Rio Grande Water Conservancy District |
| Secretary | Secretary of the Interior |
| SHPO | State Historic Preservation Office |
| SWA | State Wildlife Area |
| TDS | total dissolved solids |
| USGS | United States Geological Survey |
| WHA | Wildlife Habitat Area |
| WMA | Waterfowl Management Area |

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Reclamation
Upper Colorado Region
Albuquerque Area Office
Alamosa Field Office

Finding of No Significant Impact

Relocation of Salvage Wells
Closed Basin Division
San Luis Basin Project, Colorado

Lon Roberts

Manager, Environment and Lands Division

1/28/03

Date

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for _____
Area Manager, Albuquerque Area Office

1/28/03

Date

FONSI Number: AAO-03-05

**Relocation of Salvage Wells
Closed Basin Division
San Luis Basin Project, Colorado**

In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and the Council of Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-15-8), the Bureau of Reclamation has determined that relocating salvage wells in the Closed Basin will not have significant adverse impacts on the quality of the environment. Therefore, an environmental impact statement will not be prepared. Implementation of the proposed action may take place immediately if funding and authorization to expend funds are approved.

Background

Reclamation operates 170 salvage wells that collect water from the unconfined aquifer of the Closed Basin, between the Sangre De Cristo and San Juan Mountains in the San Luis Valley, Colorado. This collected water is delivered to the Rio Grande to partially fulfill commitments under the Rio Grande Compact and the treaty between the United States and Mexico dated May 21, 1906, for water deliveries downstream.

The wells originally were expected to produce 66,000 to 104,000 acre-feet of water per year. However, because of severe biofouling, the performance of numerous wells has significantly declined. Since 1997, production has declined at a rate of 15 to 20 percent per year, and the wells currently produce about 20,000 acre-feet per year. Because of this decline in production, the amount of water delivered to the Rio Grande from the Closed Basin has been below anticipated annual deliveries.

Proposed Action

The goal of the proposed action is to reach and maintain a sustainable level of pumping from the salvage wells to meet the authorized purposes of the Closed Basin Division, while operating within the legislative constraints.

To accomplish this goal, Reclamation will re-drill up to 170 new salvage wells within the 1-acre sites of the existing salvage wells, and install pipeline to connect the new wells to the existing wells. The existing wells will continue to be operated as monitoring wells. Re-

drilling of the new wells will occur over a 10-to-15-year period. Reclamation expects the new well design to sustain a production of 60,000 acre-feet a year.

Modified Design.—The new wells will feature a modified design based on knowledge gained since the original wells were drilled. Modifications will include a larger bore hole and a coarser gravel in the gravel pack to allow water and chemicals to move more freely. The new wells will have larger screen openings, which will allow water to flow into the well more readily and reduce clogging. Under the new well design, a concrete plug will be installed at the bottom of the wells rather than a steel bottom plate permanently welded to the well screen.

Monitoring Water Quality.—The Rio Grande Compact provides that the State of Colorado shall not be credited with delivered project water “unless the proportion of sodium ions shall be less than 45 percent of the total positive ions in that water when the total dissolved solids in such water exceeds 350 parts per million.”

Currently, total dissolved solids (TDS) are monitored hourly using the conductivity probe at the main outlet to the Rio Grande. Twice a week, water samples are brought to Reclamation's laboratory at the Alamosa Field Office, where the TDS are determined gravimetrically, and the readings obtained by the conductivity probe are verified. This will continue under the proposed action.

Chemical Treatment Plan.—Reclamation will extend the life of the wells by making them easier to maintain through a prescribed chemical treatment plan. Once a new well has been fully developed, production volume and chemical and microbiological water quality will be monitored to determine if and when biofouling is affecting the well. Because aquifer conditions vary, chemical treatment intervals will be determined for individual wells. Reclamation will determine a sustainable level of pumping while minimizing air infiltration, which has been shown to increase bacterial growth in the wells.

Reclamation has used a number of chemical treatments, with varying success. On the basis of past experimentation, the proposed treatment plan promises to be the most effective and also poses no environmental hazards.

Monitoring Groundwater Drawdown.— A monitoring system will continue to ensure that the water table outside the project area will not be drawn down more than 2 feet, as provided in the authorizing legislation, Public Law 92-514, as amended. Monitoring will determine whether salvage well pumping rates need to be adjusted.

Readings will continue to be furnished to the three-member Operating Committee, which is responsible for determining if the operation complies with the requirements of the Closed Basin Division Act.

Environmental Mitigation and Commitments

Reclamation will continue the project's existing environmental commitment program to ensure that measures to avoid, minimize, and mitigate impacts continue to be carried out. The monitoring program will continue to ensure that impacts do not exceed predicted levels and that mitigation goals are achieved. Monitoring potential impacts to vegetation as a result of increased groundwater drawdowns will continue, as described in the 1982 final supplement to the 1979 Final Environmental Statement (FES) for the Closed Basin Division. Annual reports will document the status of mitigation and monitoring. Most of the new commitments initiated as a result of this well relocation project will involve mitigating short-term disturbance within the 1-acre well sites.

Reclamation will honor the following new environmental commitments in association with the well relocation project:

- ✓ A dust and noise abatement program will be implemented.
- ✓ Storage and transportation of hazardous material at any one location will be limited.
- ✓ A spill prevention control and countermeasure plan will be implemented; accidental spills will be cleaned up immediately.
- ✓ Neutralized spent treatment solution from the chemical treatment of the wells will be released through a 4-inch rubber hose, allowing it to be directed away from vegetation monitoring sites and equipment.
- ✓ Any chemicals used to treat the wells will be stored off site and picked up and transported in accordance with Federal and State laws.
- ✓ After wells have been chemically treated and pump tested, laboratory personnel will monitor water quality for routine parameters, such as metals, bacteria, and major anions.
- ✓ Following construction, the 1-acre well sites will be monitored and (if necessary) treated to prevent the invasion of noxious weeds. If native vegetation does not become established, revegetation will be accomplished by seeding with native grasses to prevent the invasion of noxious weeds.

✓ During advanced planning, Reclamation will identify potential mountain plover habitat within 100 meters of the 1-acre well sites. For all sites where such habitat is found, area searches for mountain plovers will be conducted a few days before any scheduled construction activities (from mid-March to mid-August, if landowner permission is granted). If mountain plovers are found, Reclamation will re-initiate consultation with the Fish and Wildlife Service, and construction at that site will be postponed until the plovers leave the area or mid-August (whichever occurs first).

✓ During advanced planning, Reclamation will identify potential snowy plover habitat within 100 meters of the 1-acre well sites. For all sites where such habitat is found, area searches for snowy plovers will be conducted a few days before any scheduled construction activities (from mid-March to mid-August, if landowner permission is granted). If snowy plovers are found, Reclamation will re-initiate consultation with THE FISH AND WILDLIFE SERVICE.

✓ If the Bureau of Land Management determines that there are any newly discovered populations of little beeplant in the 1-acre well sites, Reclamation will consult with the Bureau of Land Management to assess impacts and develop conservation measures.

✓ Before construction, a Class III cultural resources inventory of the commercial gravel source for well re-drilling will be conducted. The gravel source will be restricted to areas containing no significant cultural resources, based on the results of the inventory.

✓ Reclamation will conduct archeological monitoring of 10 percent of the wells (17) to be drilled; the wells to be monitored are within 210 feet of archeological sites. The State Historic Preservation Office consultation letter (attachment B to this EA) includes the list of wells to be monitored.

Environmental Impacts

The proposed action will not have significant adverse impacts on the quality of the environment. By confining the action to the existing well sites, any new environmental impacts beyond those already mitigated will be minimal or non-existent.

Hydrology.—The project can sustain a yield that will not affect the drawdown in the unconfined aquifer more than originally anticipated. Reclamation will continue to ensure that the water table outside the project boundary is not drawn down more than 2 feet below pre-project depths, as stipulated in the project's authorizing legislation.

Water Quality.—All water conveyed into the Rio Grande will continue to meet water quality terms of the Rio Grande Compact.

Wetlands.— Increased pumping to full capacity could cause greater groundwater drawdowns that could negatively affect wetlands. The amount of wetlands affected could reach the 3,434 acres associated with groundwater pumping that were previously predicted (and mitigated for), but impacts greater than those described in the final supplement to the FES and the Fish and Wildlife Coordination Act Report (1982) are not expected. Reclamation will continue to provide project water to the refuges for wetlands mitigation.

Vegetation and groundwater monitoring will continue. If monitoring reveals that impacts are greater than those described in the final supplement to the FES, then Reclamation, in coordination with THE FISH AND WILDLIFE SERVICE and the Colorado Division Of Wildlife, would determine any new mitigation required to offset additional impacts, as recommended in the second amendment to the Fish and Wildlife Coordination Act report (2001).

Terrestrial Vegetation.—A total of up to 85 acres of terrestrial vegetation will be temporarily disturbed. These impacts have previously been mitigated. Reclamation does not anticipate any effects in addition to those described in the tiered documents. However, monitoring will continue to determine if any impacts exceed those previously predicted.

Fisheries. —The project could result in pumping at full capacity. As a result, impacts could reach the levels predicted (and mitigated for) in the final supplement to the EIS. Depending on Rio Grande Compact requirements, project flows into the Rio Grande could benefit aquatic life downstream in the Rio Grande, especially during low flow periods. The triploid grass carp in the conveyance channel may continue to be maintained for aquatic weed control.

Threatened, Endangered, and Other Special Status Species.

—The project will have a slightly beneficial effect on the Southwestern willow flycatcher, no effect on the yellow-billed cuckoo, whooping crane, or black-footed ferret. The project will not affect the bald eagle with continued delivery of water to refuge wetlands. The project may affect, but not likely adversely, the mountain plover or snowy plover with implementation of conservation measures.

Additional groundwater pumping could possibly affect unknown stands of little beeplant. Reclamation will consult with the Bureau of Land Management if the Bureau of Land Management finds potentially affected stands.

Cultural Resources.—The project will have no effect on significant cultural resources.

Indian Trust Assets.---The project will have no effect on Indian trust assets.

Environmental Justice.---The project will not affect minority and low-income populations and communities, including the equity of the distribution of benefits and risks.

Conclusion

Reclamation has determined that implementation of the proposed action will not have adverse effects on the quality of the environment. This determination is based on analysis of environmental impacts using the best available information, thorough review of the comments received on the draft EA, Endangered Species Act Section 7 consultation, coordination with the Bureau of Indian Affairs concerning Indian Trust Assets, environmental justice implications, and the environmental commitments listed in the final EA.

Reclamation makes this Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C., 4321 et seq.) and the Council on Environmental Quality implementing regulations (40 CFR 1500).

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Chapter 1

PURPOSE OF AND NEED FOR ACTION

Proposed Action

This document is the environmental assessment (EA) of the Bureau of Reclamation's (Reclamation) proposal to increase groundwater production of existing wells in the Closed Basin Division of the San Luis Project (Closed Basin Project). See figure 1-1, location map. This document also serves as the biological assessment for this proposal, pursuant to Section 7 of the Endangered Species Act (ESA).

Reclamation operates 170 salvage wells that collect water from the unconfined aquifer of the Closed Basin, located between the Sangre De Cristo and San Juan Mountains in the San Luis Valley, Colorado. This collected water is delivered through a conveyance channel to the Rio Grande to partially fulfill compact and treaty commitments for water deliveries downstream. (See "Authorization and Construction.") Development of the wells began in the early 1980s and was completed in the mid-1990s. Over time, the wells have degraded and not sustained their design yield. This first became evident in 1994.

Preferred Alternative

Reclamation's preferred alternative is to re-drill up to 170 new salvage wells within the 1-acre sites in which the existing wells are located. Additionally, electrical and electronics housings may be relocated as deemed appropriate to a location above the existing salvage well vault to improve accessibility during maintenance activities. A pipeline would be installed to connect each of the new wells to the existing ones. The existing wells would be converted to monitoring wells. In association with the new wells, a proposed chemical treatment plan for maintaining production is proposed. The goal of the preferred alternative is to reach and maintain a sustainable level of pumping from the salvage wells to meet the authorized purposes of the Closed Basin Division while operating within the legislative constraints. Based on a combination of past experience, the existing condition of the salvage wells, and the available research, the preferred alternative is the most promising and economical one for yielding sustainable levels of groundwater production. A final environmental statement (FES) (FES 71-14) for the Closed Basin Division originally was filed September 21, 1971 (Reclamation, 1971). Changes in the project resulted in the preparation of a new final environmental statement (FES 79-37) that

was filed August 27, 1979 (Reclamation, 1979). A final supplement to the FES, released in 1982 (FES 82-44), presented a revised plan to mitigate project effects on wetlands and terrestrial vegetation in the Closed Basin and described other project changes that had occurred since 1979 (Reclamation, 1982a). In addition to the final supplement to the FES, the mitigation plan for the project also was summarized in the Fish and Wildlife Coordination Act report and its two amendments (U.S. Fish and Wildlife Service [FWS], 1982; FWS 1992; and FWS, 2001). These original environmental compliance documents provided extensive background material and analyses of impacts associated with developing the well fields. Because the preferred alternative is similar to the original project, this EA addresses in detail only those project features, environmental factors, or impacts that were not previously analyzed.

Purpose of and Need for Proposed Action

The purpose of the proposed action is to regain lost production from the salvage wells within the Closed Basin Division. The water from the wells is needed to partially fulfill compact and treaty commitments for water deliveries downstream. Specifically, under Public Law 92-514, the Secretary of the Interior (Secretary)

. . . is authorized to construct, operate, and maintain the Closed Basin Division, San Luis Valley Project, Colorado, for the principal purposes of salvaging, regulating, and furnishing water from the closed basin area of Colorado; transporting such water into the Rio Grande; making water available for fulfilling the United States obligation to the United States of Mexico in accordance with the treaty dated May 21, 1906 (34 Stat. 2953); furnishing irrigation water, industrial water, and municipal water supplies to water deficient areas of Colorado, New Mexico, and Texas through direct diversion and exchange of water; establishing the Russell Lakes Waterfowl Management Area (WMA) by purchase of required lands with appurtenant water rights and a partial water supply for the operation of the Blanca Wildlife Habitat Area and Alamosa National Wildlife Refuge essentially as shown in the revised Fish and Wildlife Coordination Act Report for the San Luis Valley Project, dated June 1982; providing outdoor recreational opportunities; augmenting the flow of the Rio Grande; and other useful purposes, in substantial accordance with the engineering plans set out in the report of the Secretary of the Interior on this project as modified by the plans shown in the Definite Plan Report of the Water and Power Resources Service, dated November 1979 and as modified by the plans essentially as shown in the Revised Fish and Wildlife Coordination Act Report for the

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Figure 1-1. Project location map.

San Luis Valley Project, dated June 1982. Provided, that no wells of the project, other than monitoring wells, shall be permitted to penetrate the aquiclude, or first confining clay layer.

After the project or any phase thereof has been constructed and is operational the Secretary shall make water available in the following listed order of priority:

(1) To assist in making the annual delivery of water at the gaging station on the Rio Grande near Lobatos, Colorado, as required by article III of the Rio Grande Compact: Provided, that the total amount of water delivered for this purpose shall not exceed an aggregate of 600,000 acre-feet for any period of 10 consecutive years reckoned in continuing progressive series beginning with the first day of January next succeeding the year in which the Secretary determined that the project authorized by this Act is operational.

(2) To maintain the Alamosa National Wildlife Refuge and the Blanca Wildlife Habitat Area: Provided, that the amount of project salvaged water delivered to the Alamosa National Wildlife Refuge and the Blanca Habitat Area shall not exceed 5,300 acre-feet annually. The Secretary is authorized to negotiate and enter into an agreement with the Rio Grande Water Conservation District which provides for the temporary delivery of project salvaged water to the refuge and habitat area in those years in which there is not sufficient water to fully satisfy the purposes of both paragraphs (1) and (2) of this subsection.

(3) To apply to the reduction and elimination of any accumulated deficit in deliveries by Colorado as is determined to exist by the Rio Grande Compact Commission under article VI of the Rio Grande Compact at the end of the compact water years in which the Secretary first determines the project to be operational.

(4) For irrigation or other beneficial uses in Colorado: Provided, that no water shall be delivered until agreements between the United States and water users in Colorado, or the Rio Grande Water Conservation District acting for them, have been executed providing for the repayment of such *construction* costs as in the opinion of the Secretary are appropriate and within the ability of the users to pay, and for the payment of all of the costs of operation and maintenance which are allocable to the production of this priority 4 water.

Because of severe biofouling, the performance of numerous wells has significantly declined, with many wells producing only 1 to 5 percent of their full design capacity. The biofouling consists of iron and iron-related bacteria that have encrusted the wells' screened section, the surrounding gravel pack, and the aquifer material near the wells. The most important of these bacterial masses are aerobic slime producers. The organic growths are the result of the availability of nutrients, organic matter, and oxygen in the impacted wells and the surrounding formation. Well design and operating methods may have been contributing factors to well degradation.

The wells originally were expected to produce 66,000 to 104,000 acre-feet of water per year; they produced an average of about 23,000 acre-feet of water per year between 1986 and 2001. Since 1997, production has declined at a rate of 15 to 20 percent per year, and the wells currently produce about 20,000 acre-feet per year. Because of the decline in production, the amount of water delivered to the Rio Grande from the Closed Basin has been below the anticipated annual deliveries.

Reclamation and expert consultants have conducted numerous studies and tests to thoroughly investigate the decline in production and to identify possible solutions. In addition, Reclamation has sought the advice of a number of well service firms and entered into contracts with some of them. To date, none of the mechanical and chemical methods that have been attempted to rehabilitate the existing wells have provided more than short-term benefits. Reclamation has learned a great deal from these various efforts, however, and because of their limited success, Reclamation now believes a more rigorous approach is necessary. Consultants hired by Reclamation have proposed several options, including the preferred alternative of drilling new wells within the existing 1-acre sites. Reclamation carefully considered other alternatives but eliminated them for various reasons. (See "Alternatives Considered But Eliminated.") Some alternatives do not ensure positive results or are cost prohibitive. Drilling new wells with a modified design and then instituting a regular chemical treatment plan from the outset to prevent the wells from clogging is expected to maintain the system at a sustainable level of production, while remaining within legislated limits.

Authorization and Construction

Public Law 92-514, dated October 20, 1972, authorized construction of the Closed Basin Division. The purpose of the project is to salvage up to 104,000 acre-feet of groundwater per year from the shallow unconfined aquifer in the Closed Basin that

would otherwise be lost to evapo-transpiration. The salvaged water is delivered through a 42-mile-long conveyance channel to the Rio Grande to help the State of Colorado meet its water delivery commitment to the States of New Mexico and Texas under the Rio Grande Compact of 1939 (Compact) and to help the United States meet its water delivery commitment to Mexico under the treaty dated May 21, 1906. The project also provides for the delivery of water to the Alamosa National Wildlife Refuge (NWR), Blanca Wildlife Habitat Area (WHA), and San Luis Lake, to stabilize the lake at about 890 surface acres. The project area totals 130,000 acres. Reclamation's ownership consists of about 680 acres made up of the 1-acre well sites and the right-of-way for the conveyance channel.

The first salvage wells were drilled in the early 1980s, and the last wells were put into service in the mid-1990s. A total of 170 salvage wells grouped into five "stages" constitute the core of the Closed Basin Division water salvage facilities. Stages 1 and 2 are at the south end of the project area; Stage 5 is at the northern end. (See figure 1-2, salvage well and monitoring well location map.) The wells range from 85 to 110 feet deep. The well heads are about 7 feet below the ground surface and are enclosed in entirely subsurface concrete vaults. Below the vaults and typically extending down 30 feet, the well casings consist of steel pipe. Below 30 feet and extending down to about 100 feet, the casing consists of stainless steel screening to allow water to penetrate and to keep sediments out. At a depth of 50 to 65 feet, each well contains a submersible electric pump. A gravel pack surrounds the entire well bore.

Approximately 115 miles of buried polyvinyl chloride (PVC) pipelines collect water pumped from the salvage wells and transport it to the conveyance channel. Except for about 5.5 miles of buried pipeline at the northern end of the project, the conveyance channel is open. It has a design capacity of 45 cubic feet per second (cfs) at the beginning of the channel increasing to a maximum of 160 cfs. The channel bottom ranges from 8 to 22 feet wide, and the water ranges from 3.6 to 5.6 feet deep. To prevent seepage, the open channel is lined with 20-mil-thick PVC lining covered with 12 to 16 inches of aggregate and fill. There are two pumping plants along the length of the channel: the first at San Luis Lake and the second at the lower end of the channel a little more than 1 mile from its end.

In addition to the salvage wells, Reclamation operates a network of 132 monitoring or elevation wells (EWs) within, outside, and along the project boundaries to monitor water level fluctuations for both the shallow unconfined and deeper confined aquifers. (See Chapter 3, Affected Environment, "Hydrology.") The EWs are located at 82 different monitoring well sites. (Some sites have more than one

well.) Sixty-six of the EWs were originally constructed in the unconfined aquifer, and 66 were constructed in the confined aquifer. In 1994, 7 of the 132 EWs were replaced with wells drilled deeper into the confined aquifer. Data collected from the EWs is used to ensure that the water table outside the project area is not drawn down more than 2 feet below pre-project depths, as stipulated in the project's authorizing legislation. The United States Geological Survey (USGS) and the Rio Grande Water Conservancy District (RGWCD) maintain other monitoring wells in and around the project. Also for quality assurance and quality control, the USGS and the RGWCD measure some of Reclamation's EWs.

Reclamation operates and maintains the Closed Basin Division, but RGWCD maintains some project facilities, such as access roads and canal berms. A three-person Operating Committee monitors the overall operation of the project to ensure that pumping is in accordance with the authorizing legislation. The Operating Committee consists of members appointed by the Secretary, Colorado Water Conservation Board, and RGWCD.

Previous Environmental Studies and Compliance

As discussed under "Preferred Alternative," a final environmental statement (FES 71-14) for the Closed Basin Division was filed September 21, 1971 (Reclamation, 1971). Changes in the project resulted in the preparation of a new final environmental statement (FES 79-37) that was filed August 27, 1979 (Reclamation, 1979). The final supplement to the FES, released in 1982 (FES 82-44), presented a revised plan to mitigate project effects on wetlands and terrestrial vegetation in the Closed Basin and described other project changes that had occurred since 1979 (Reclamation, 1982). The amount of wetlands and terrestrial vegetation to be affected was found to be significantly less than believed at the time of the 1979 FES. The final supplement described results of pump tests and a vegetation monitoring program as well as updated information on waterfowl production and other bird use. More extensive cultural resource investigations and wetland inventories had been completed and provided a basis for determining project impacts. The final supplement also described other project feature changes, such as conveyance channel alignment and additional wells. The mitigation plan for the project also was summarized in the Fish and Wildlife Coordination Act report and its two amendments (FWS, 1982; FWS, 1992; and FWS, 2001). As discussed previously, these documents provide detailed information on the affected environment within the Closed Basin Division that is incorporated in this EA by reference.

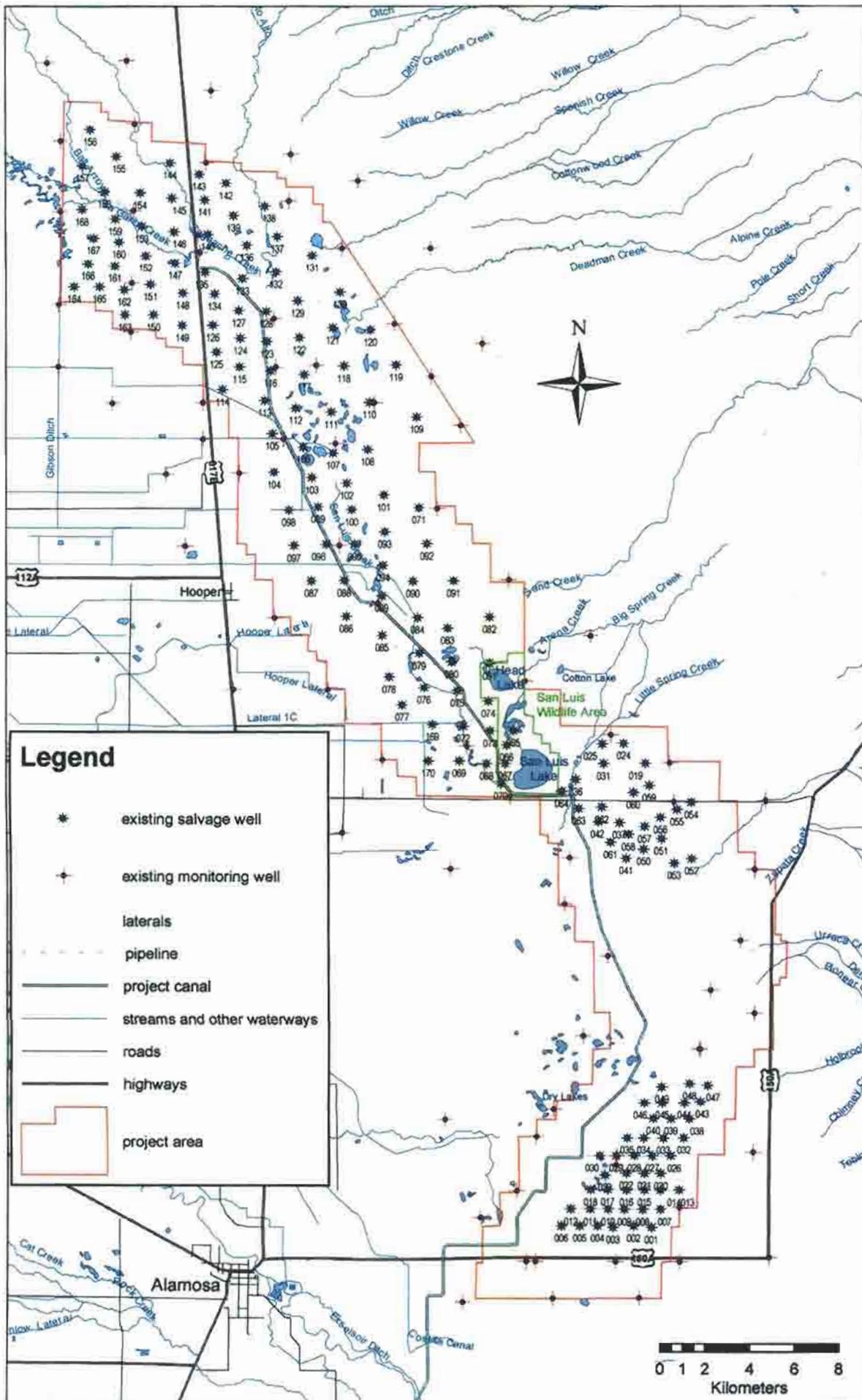


Figure 1-2. Salvage and monitoring well location map

Scoping Summary

Reclamation prepared this document (1) after reviewing the previous environmental compliance documents on the Closed Basin Division, including various reports prepared in recent years by Reclamation consultants/other agencies, and data provided by Reclamation technical specialists and (2) after consulting with various agencies, organizations, and individuals. (Chapter 4 provides a more detailed discussion on public involvement and consultation.)

This document fulfills the disclosure requirements of the National Environmental Policy Act of 1969 (Public Law 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Public Law 94-52, July 3, 1975, and Public Law 94-83, August 9, 1975) and serves as the public involvement summary report.

Chapter 2

ALTERNATIVES

This chapter describes the No Action Alternative, the preferred alternative, and the alternatives considered but eliminated. The chapter also provides a summary comparison of the alternatives and their environmental impacts in table 2-1, found at the end of the chapter.

No Action Alternative

The National Environmental Policy Act requires evaluation of a No Action Alternative. The No Action Alternative is the most likely future condition that could be expected without the proposed action and provides a baseline against which the proposed action is compared.

Under the No Action Alternative, Reclamation would continue to operate the 170 existing salvage wells in the Closed Basin and would continue chemical treatments to try to reduce biofouling. Based on past performance, production would continue to decline as biofouling increases. Given the existing poor condition of the wells, chemical treatments would need to be undertaken more frequently, and the cost would become prohibitive. The success of such treatments, as well as other rehabilitation efforts, would probably be limited. Reclamation would not be able to meet compact and treaty commitments or mitigation requirements.

Preferred Alternative

As stated in chapter 1, the goal of the preferred alternative is to reach and maintain a sustainable level of pumping from the salvage wells to meet the authorized purposes of the Closed Basin Division, while operating within the legislative constraints. To accomplish this goal, new wells would be drilled within the 1-acre sites of the existing salvage wells. By confining the action to the existing well sites, any new environmental impacts beyond those already mitigated would be minimal or non-existent. Project costs would also be significantly reduced by not having to acquire additional lands.

New wells would be re-drilled about 125 feet from the existing salvage wells. On the basis of knowledge gained since the original wells were drilled, a modified design would be instituted for the new wells. A larger bore hole typically 36 inches in diameter, with a 14-inch diameter casing and 9-inch gravel pack, would be used

instead of the existing smaller diameter bore hole (between 16 and 20 inches), 12-inch diameter casing, and 3-inch gravel pack. Other modifications would include using a coarser gravel in the gravel pack to allow for movement in the pack and allow water and chemicals to move more freely. The finer gravel originally installed became tightly compacted, which severely reduced water movement as well as the penetration of chemicals used during the maintenance process. As a result, only a small area of the gravel pack and formation wall was actually treated. Under the new well design, a concrete plug would be installed at the bottom of the wells rather than a steel bottom plate permanently welded to the well screen. The new wells would have larger screen openings, which would allow water to flow into the well more readily and reduce clogging. Reclamation expects the new well design to sustain a production of 60,000 acre-feet per year and extend the life of the wells by making them easier to maintain through a prescribed chemical treatment plan. Figure 2-1 shows a plan view of the proposed layout for a new well. Figure 2-2 shows a cross-section of a proposed new well.

Re-drilling of up to 170 new wells would occur over a 10- to 15-year period.

Activities associated with re-drilling the wells are as follows:

- The Rio Grande Water Conservation District, owner of project water rights, would obtain well permits from the State of Colorado for replacement wells. RGWCD would obtain a reclassification of the existing well from salvage to monitoring. Reclamation would be responsible for all construction activities.
- All equipment would be hauled to the well sites on existing roads. Re-drilling activities would be contained within the existing 1-acre well sites. The existing wells are located within the 1-acre sites, usually in the middle of the site. The new well would be located as far away from the existing well as possible and still remain within the 1-acre site.
- A minimum of equipment would be operated or parked on the 1-acre well site to minimize the impact on vegetation. Vegetation monitoring sites would be preserved.
- Spoil excavated during the drilling process would be disposed of in a pit located on the 1-acre well site. The pit would be approximately 25 feet by 25 feet and approximately 4 feet deep.

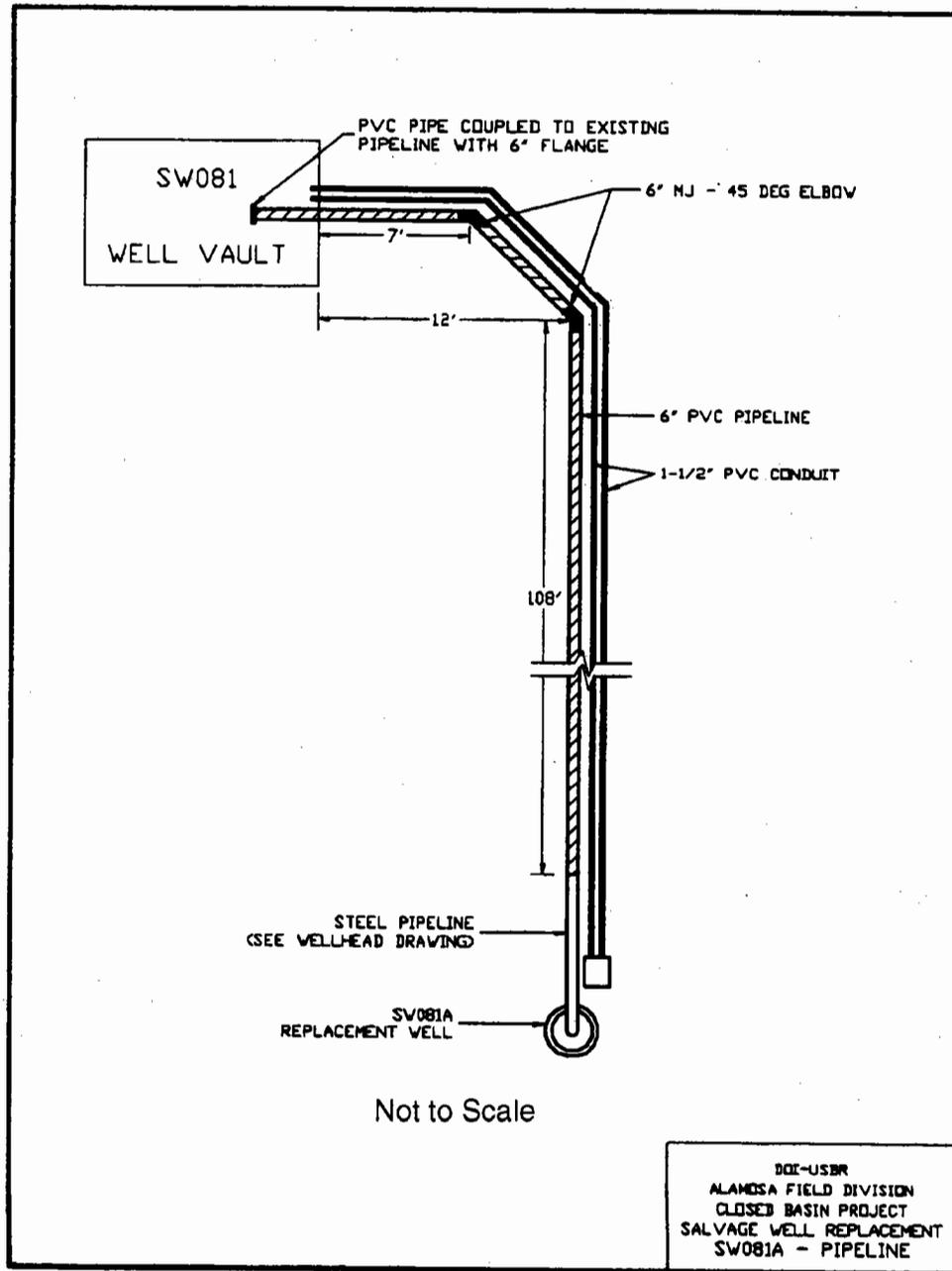


Figure 2-1. Plan view of new pipeline layout for a typical well.

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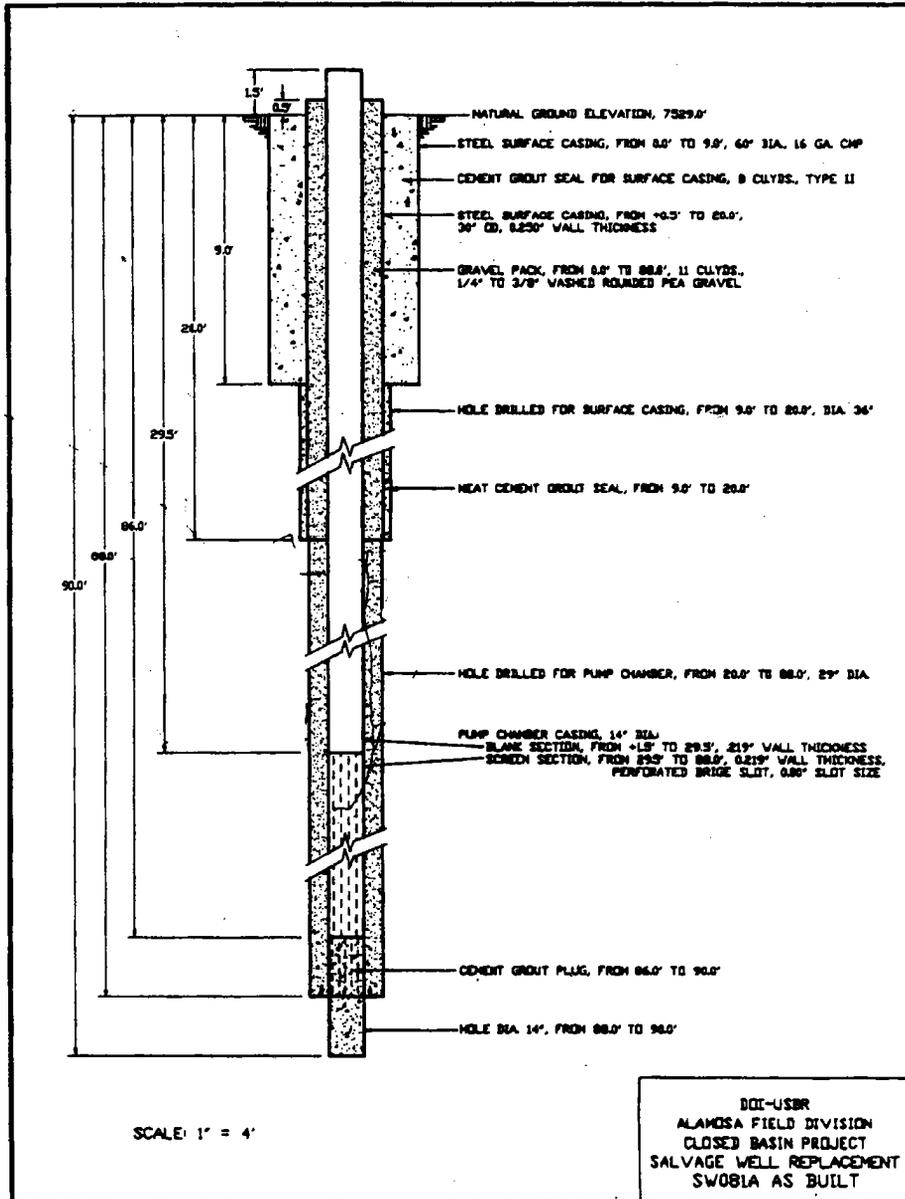


Figure 2-2. Salvage well replacement diagram.

- A dust and noise abatement program would be implemented.
- Storage and transportation of hazardous material at any one location would be limited.
- A spill prevention control and countermeasure plan would be implemented; accidental spills would be cleaned up immediately.
- Water released during drilling and development of the new wells would be directed away from the well so that the released water does not affect the pump test. The wells would not be chemically treated during the redrilling process. Chlorinization of the well would be performed as required by State drilling permits.
- Gravel for the gravel pack would be obtained from an existing private gravel pit. Each well would require approximately 20-22 yards of gravel.
- Additional 4-inch-diameter monitoring wells may be drilled, as needed, to serve as additional water table measuring locations and to allow for additional water quality testing.

Once a new well has been completed, it would be connected to the old well through an underground pipeline. These pipelines would be laid in new trenches with an adequate slope, a maximum of 6 feet deep. Existing control systems and electrical wiring in the original salvage well vault would be used. All monitoring and control wiring and electrical wiring would be installed along the pipeline trench in conduit between the new and old wells. Existing wells would remain in place as monitoring wells.

Monitoring Water Quality

The Compact provides that the State of Colorado shall not be credited with delivered project water “unless the proportion of sodium ions shall be less than 45 percent of the total positive ions in that water when the total dissolved solids (TDS) in such water exceeds 350 parts per million (milligrams per liter).”

During the development phase of each new well and shortly after a new well has been brought on line, the TDS of the water produced by the new wells would be monitored regularly to ensure this water could be added to other project water and

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mixed in a manner that does not compromise the overall water quality of the project. TDS would continue to be monitored at the conveyance channel outlet to ensure that water meets the water quality requirements set forth in the Compact.

Currently, as part of normal operations, water from various wells is blended, as necessary, to ensure the blended water meets Compact water quality requirements before it is delivered downstream. In general, water from wells in the northern end of the project, which is higher in TDS, is mixed with water from wells in the southern end of the project, which is lower in TDS. The water chemistry of each well is tested, and Reclamation uses this information to determine which wells to operate to meet production requirements and to maintain the water quality.

Under the preferred alternative, as currently, TDS would be monitored hourly using the conductivity probe at the main outlet to the Rio Grande. Twice a week, water samples would continue to be brought to Reclamation's laboratory at the Alamosa field office, where the TDS would be determined gravimetrically, and the readings obtained by the conductivity probe would be verified.

Reclamation's laboratory at its Alamosa field office would continue to use standard Environmental Protection Agency (EPA)-approved sampling methods to collect and preserve well samples:

| EPA Method No. | Parameter |
|---------------------------|-------------------------------|
| 120.1 | Conductivity |
| 150.1 | pH of water using electrode |
| 160.1 | TDS |
| 200.7 | ICP/ES metals |
| 300.0 | Ion chromatography for anions |
| 310.1 | Alkalinity |

Methods used for "iron related bacteria" identification and enumeration would include the following:

- BART kits (Biological Activity Reaction Test), Droycon Bioconcepts, Inc.
- *Standard Methods for the Examination of Water and Wastewater*, 19th edition, Section 9240
- Selected culture media from *Practical Manual of Groundwater Microbiology*, Cullimore, D. Roy, 1993

- ASTM method D4412-84 “ Standard Test Methods for Sulfate Reducing Bacteria in Water and Water-Formed Deposits.”

Maintaining Project Facilities (Chemical Treatment Plan)

As stated previously, well production has greatly decreased over the years. In 1994, it first became clear to Reclamation that bacterial growths were responsible for the reduced production. Since then, Reclamation has taken a series of progressive steps to determine the nature and cause of these bacterial slimes, to treat affected wells to remove the growths, and to prevent re-growth of the organisms.

The source of the problem was identified as primarily iron and iron-related bacterias. Initially, it was suspected that the iron bacteria was damaging just the pumps and motors. Some of these were replaced, but the problem persisted. Reclamation then physically lowered some of the pumps in the existing wells in an effort to gain access to the water, but this also did not increase production. Since then, Reclamation has conducted extensive investigations to identify the most successful and cost effective remedies for biofouling. These investigations have involved Reclamation, a variety of consultants, and advice from different experts, including well service firms. Depending on the affected well, one or more bacterial type(s) is growing in the salvage well, on the well screen, in the gravel pack, or on the walls of the aquifer formation in the vicinity of the water producing zones. The large masses of bacteria close off pores in the aquifer formation and plug the gravel pack.

Of various methods attempted to control biofouling, rehabilitation of the wells using chemical treatments has been somewhat successful. Unless performed on a regular basis, however, these treatments are insufficient to prevent the wells from clogging again. Reclamation has found that once wells deteriorate beyond 50 percent of their original full design capacity, they are no longer salvageable. To help sustain well output, an ongoing, regular maintenance plan consisting of chemical treatments would be implemented in association with the redrilling program. From previous experience, Reclamation has also learned that it is important to put wells into production immediately upon drilling and to keep them operating continuously to discourage bacterial growth.

Once a new well has been fully developed, production volume and chemical and microbiological water quality would be monitored to determine if and when biofouling is affecting the well. Because aquifer conditions vary, chemical treatment

intervals would be determined for individual wells. Reclamation would determine a sustainable level of pumping while minimizing air infiltration, which has been shown to increase bacterial growth in the wells.

As stated previously, Reclamation has used a number of chemical treatments, with varying success. On the basis of past experimentation, the proposed treatment plan promises to be the most effective and also poses no environmental hazards. For wells requiring chemical treatment to control iron bacteria, the procedure would include introducing a 2- to 6-percent solution of either sulfamic acid or glycolic acid and sodium hypochlorite into each well through a series of 2-inch tremie tubes attached to the outside of the well casing. (The tubes, which are a new feature of the well design, would help ensure even distribution of the chemicals throughout the gravel pack.) The acid would be used in conjunction with the sodium hypochlorite to penetrate the outer membrane of the slime-forming bacteria, enabling it to kill the bacteria. The chemical mixture would remain in the well until the pH of the water is between 6.5 and 7. At that point, pumping the water out to waste would not present any environmental hazard. Typically, chemical mixture would remain in the well 3 to 7 days before pumping resumes. No heavy metals, other than at acceptable trace levels, or chemical contaminants would be present in the water either before or after it is treated and neutralized.

The following procedure would be used during the well rehabilitation process:

1. Remove pump and column pipe from well.
2. Mechanically brush well and remove sediment from well.
3. Put acid solution (sulfamic or glycolic) into the well, using the tremie pipes where installed.
4. Surge and swab the well with a dual flow mechanical swab at a rate of 6 minutes per foot. Check the pH often and maintain pH at 3 or less; put in more acid if needed.
5. Let solution stand in the well overnight.
6. Surge and swab well at a rate of 5 minutes per foot.
7. Displace or remove solution from well when pH reaches a neutral 7.0.
8. Let the well refill with water to normal static water level.
9. Repeat steps 3 through 7, using the same acid solution, but increase the swab time to 9 minutes per foot.

10. Chlorinate well using a 10-percent solution of sodium hypochlorite; allow to stay in contact with well until spent.
11. Replace pump and column pipe; put well back into production.

The neutralized spent treatment solution from the chemical treatment would be released through a 4-inch rubber hose, allowing it to be directed away from vegetation monitoring sites and equipment.

Any chemicals used would be stored off site and picked up and transported in accordance with Federal and State laws. After wells have been chemically treated and pump tested, laboratory personnel would monitor water quality for routine parameters, such as metals, bacteria, and major anions.

Initially, Reclamation employees would conduct the chemical treatments. Once the necessary treatment intervals have been established for the new wells, a contractor may be hired to either assist in the process or perform all required chemical treatments.

All Reclamation and contractors' personnel conducting the chemical treatments, or on site during the process, would comply with existing Reclamation *Safety and Health Standards* and the *Job Hazard Analysis*.

Monitoring Groundwater Drawdown

A monitoring system will continue to ensure that the water table outside the project area will not be drawn down more than 2 feet, as provided in the authorizing legislation, Public Law 92-514, as amended. Monitoring would determine whether salvage well pumping rates need to be adjusted. Readings would continue to be furnished to the three-member Operating Committee, which is responsible for determining if the operation complies with the requirements of the Closed Basin Division Act.

Alternatives Considered but Eliminated

As noted previously, Reclamation has conducted extensive tests at existing wells since 1994 to increase production by reducing and controlling bacterial growths. All of these rehabilitation efforts have had limited success; well yields have not increased

significantly, and the wells have been subject to bacterial regrowth. These efforts have included varying the chemical solutions and the physical processes. Different methods attempted include introducing fluids into the well under pressure, down-hole jetting, re-circulating cleaning fluids in the well, surging, air pumping and air cleaning, using plungers and swabs, and heated chemicals treatments.

Several other options have been proposed and eliminated because, upon evaluation, they are not viable, are cost prohibitive, or both. These options include using a drain system to harvest water from the shallow aquifer, installing horizontal wells, or redeveloping existing wells by plugging off the first 20 or 30 feet of well screen, and pumping the well relatively slowly to prevent the water level from dropping below the exposed well screen. These options would eliminate the introduction of oxygen, a necessary ingredient to bacterial growth, to the well screen. French drains were considered during the design phase of the original project and eliminated as a viable alternative. Horizontal wells have been rejected because research has shown that groundwater doesn't move vertically because of the prevalence of clay seams throughout the aquifer. Plugging off the first 20 or 30 feet of the well screen has been eliminated because most water is in the upper two-thirds of the wells.

Based on the high costs of rehabilitating existing wells and the belief that repeated cleaning operations would be needed and, even then, would not be successful because of the design of the wells and the current levels of bacterial growth, Reclamation recommends the preferred alternative of re-drilling the wells, modifying their design, and implementing ongoing, regularly scheduled maintenance. Several consultants have also recommended this alternative.

Table 2-1.—Summary of Effects of Alternatives
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| Alternatives | Hydrology | Water Quality | Wetlands | Terrestrial Vegetation | Fisheries | Endangered, Threatened and Other Special Status Species | Cultural Resources | Indian Trust Assets | Environmental Justice |
|--------------|--|---|--|---|---|---|--|---------------------|-----------------------|
| No Action | No effect. | Water quality would decline. | No effect. | No effect. | No effect. | No effect. | No effect. | No effect. | No effect. |
| Preferred. | Effects on groundwater would be within legislated limits and have previously been mitigated. | All water conveyed into Rio Grande would continue to meet water quality terms of the Compact. | Ground-water draw-downs that could affect wetlands have previously been mitigated. | A total of up to 85 acres of terrestrial vegetation would be temporarily disturbed. These impacts have previously been mitigated. | Additional flows to Rio Grande would possibly benefit aquatic life downstream, particularly during dry periods. | Slightly beneficial effect on the Southwestern willow flycatcher; no effect on the yellow-billed cuckoo, whooping crane, or black-footed ferret. The project would not affect the bald eagle, with continued delivery of water to refuge wetlands. May affect, but is not likely to adversely affect, the mountain or snowy plover with implementation of proposed conservation measures. Additional groundwater pumping could possibly affect unknown stands of little beeplant (Bureau of Land Management sensitive species). Reclamation will consult with the Bureau of Land Management if the Bureau of Land Management finds potentially affected stands. | No effect on significant cultural resources. | No effect. | No effect. |

Chapter 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected resources and the effects of the proposed action on them. The conditions that currently exist establish the baseline for analysis. Only those affected resources whose condition differs significantly from the earlier analyses are discussed in detail. Similarly, only those impacts that would change or are new are evaluated extensively. The evaluated resources are water and water quality; wetlands; vegetation; fisheries; endangered, threatened and other special status species; cultural resources; Indian trust assets; and environmental justice.

Setting

The Closed Basin Division, San Luis Valley Project, is located in south-central Colorado in Alamosa and Saguache Counties. The division is named after a topographic basin in the northern portion of the San Luis Valley called the Closed Basin, so-named because none of the surface runoff entering the basin drains into the nearby Rio Grande. The Closed Basin has an internal drainage area of 2,940 square miles. The San Juan Mountains on the west and the Sangre de Cristo Mountains on the east merge to form the northern boundary of the basin. The San Luis Hills form the southern boundary. Several Rio Grande irrigation diversions and creeks drain into the Closed Basin. A number of small lakes occur in the basin, where the surface flows from these creeks collect. The largest of these is San Luis Lake, about 15 miles northeast of Alamosa, and located within the Closed Basin Division boundaries. This natural lake and nearby Head Lake are the lowest point of the Closed Basin.

Land Ownership

Of the 130,000 acres in the project area, about 6,600 acres are Federal land (primarily Bureau of Land Management [BLM]), about 60,000 acres are State land, and about 64,000 acres are privately owned. Most of the State and Federal land is leased for grazing.

Land Use

The primary land use within the project boundaries continues to be the grazing of domestic livestock. About 2,000 acres within the project boundaries are irrigated; the principal crops are potatoes, alfalfa, barley, and native hay.

Also included within the project boundary is San Luis Lake State Park. As part of the mitigation for the original construction of the well fields, Reclamation agreed to provide water to stabilize the lake level at about 890 surface acres and to develop recreational facilities there. A turnout at the north end of San Luis Lake takes water from the Franklin Eddy Conveyance Channel (conveyance channel) and delivers it into the lake. At the south end of the lake, a pumping plant conveys water back into the conveyance canal. Through a cooperative effort of Reclamation, Colorado Water Conservation Board, and Colorado Division of Wildlife, facilities constructed include roads, landscaping, fencing, picnic sites, campsites, boat ramps, fishing access areas, sanitary facilities, trails, and water systems. A portion of the BLM-managed Blanca WHA is within the project boundaries.

Outside the project boundaries in the San Luis Valley, the total amount of land used for farming and ranching in Alamosa County decreased from 226,000 acres in 1982 to 190,000 acres in 1997. In Saguache County, during that same period, the total decreased slightly from 485,000 to 482,000 acres. Conversely, the amount of *irrigated* farmland has increased slightly since 1982, particularly in Saguache County (increasing from 128,000 acres in 1982 to 207,000 acres in 1997). Some of this irrigation has occurred just outside the northwestern project boundary near Stages 4 and 5 where a number of center pivot sprinklers have been installed. Potatoes, alfalfa, barley, and native hay are the principal crops grown in the San Luis Valley.

Hydrology

Affected Environment

Groundwater in the Closed Basin is found in two aquifers—the confined and unconfined. A blanket of saturated sand, silt, and clay, up to 200 feet thick constitutes the unconfined aquifer. Groundwater in this aquifer is derived from surface runoff; applied irrigation; downward leakage from streams, canals, and ditches; seepage from the underlying confined or artesian aquifer; and precipitation. Below the unconfined aquifer, and generally separated from it by relatively

impermeable clayey strata and lenses, is the confined or artesian aquifer. The degree of confinement of the aquifer varies with the depth and location. Figure 3-1 shows a cross-section of the San Luis Valley.

The authorizing legislation for the Closed Basin Division requires that, “the Secretary shall operate project facilities in a manner that will not cause the water table available for any irrigation or domestic wells in existence *outside the project boundary* (emphasis added) prior to construction of the project to drop more than two feet and in a manner that will not cause reduction in artesian flows in existence prior to construction of the project.” *Inside the project boundaries*, it was anticipated that water levels in the unconfined aquifer would drop at least 8 feet when the project was in full operation. Near well and pump facilities, water levels were expected to drop 30 to 50 feet.

As described in chapter 1, Reclamation constructed a network of monitoring or elevation wells to monitor groundwater elevations in both the confined and unconfined aquifer in and around the project. Frequent measurements of the depth to groundwater were made at these wells before and during construction to establish baseline conditions. Reclamation continues to take measurements to ensure that pumping is not adversely affecting water levels outside and within the project area.

Three locations have been identified outside the project boundaries where water levels in the unconfined aquifer have dropped more than 2 feet since project construction.

The first location is at the southeast corner of the project (boundary wells EW01, EW02, EW27, and outside the project boundary EW07, EW08, EW09). This area was experiencing declining water levels even before project construction. The rate of decline has not changed since project construction, and the data does not show an impact from project pumping.

One elevation well along the east central project boundary, EW37, has revealed a drop in the water table. EW37 had a fairly constant water level for 5 years before project operation. When project pumping began in Stage 3 in this area in 1988, the water level began to decline steadily until 1992. In that time, the water level dropped about 6 feet. Since 1992, the water level has remained fairly constant.

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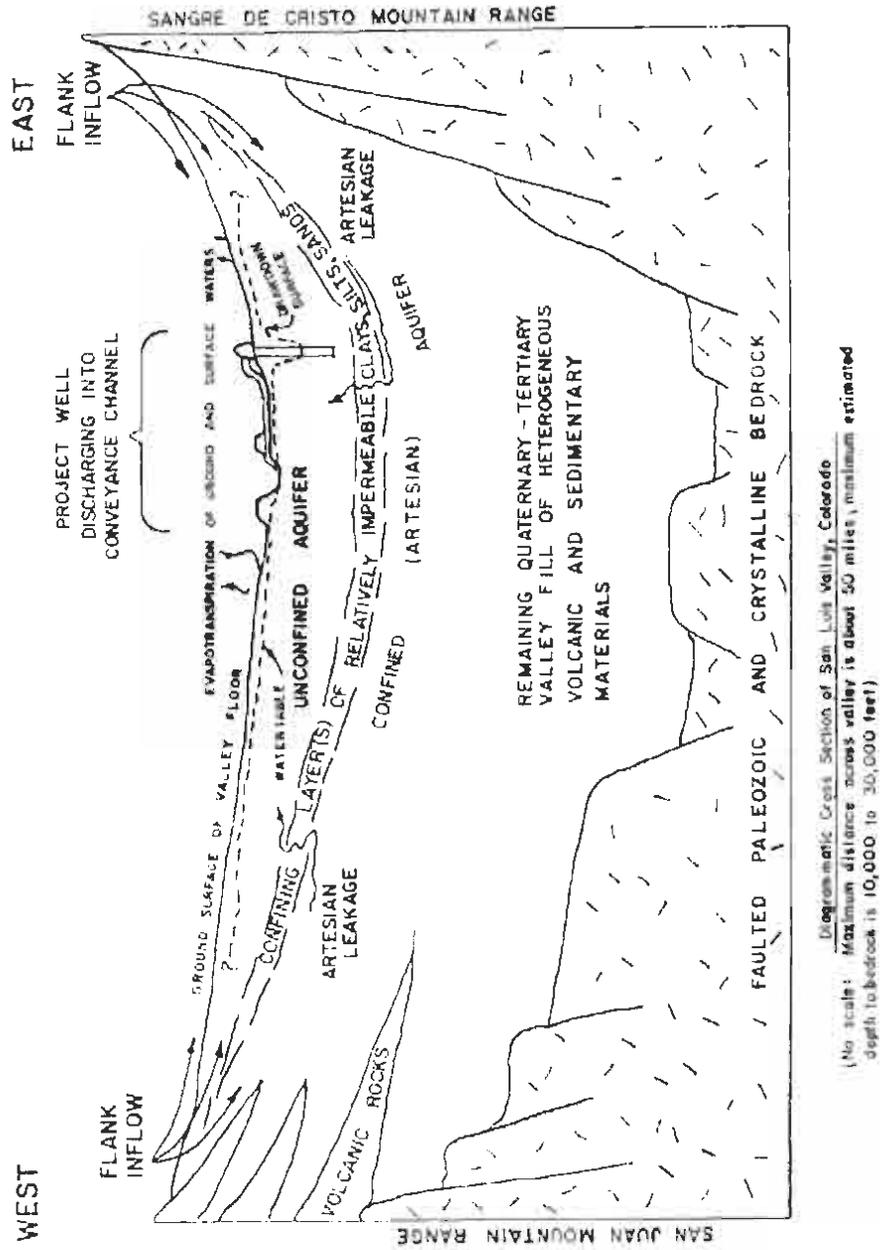


Figure 3-1. Cross-section of the San Luis Valley (from *San Luis Valley Project, Colorado, Closed Basin Division, Facts and Concepts, Reclamation*).

The third area outside the project boundaries showing water level declines is along the northwest project boundary (boundary wells EW33, 35, 39, 47, 50, 58, 60, and outside the project boundary wells EW34, 40, 41, 48, 49, 82). This area has experienced the greatest decline in water levels, with EWs 47, 48, 50, 80, and 82 declining more than 10 feet since 1984. Water levels were declining before project construction, but possibly a greater rate of decline has occurred since project pumping began in Stages 4 and 5 in 1992. Since project pumping began, however, more irrigated land has also been brought into production just outside the project boundary. Numerous center pivot sprinklers have been installed. The landowners of these sprinklers own no surface water rights to provide for recharge. In 1999, in response to this observed decline in water level, Reclamation reduced the pumping rate of 34 salvage wells by 50 percent. Because the fluctuations in the unconfined aquifer are seasonal and the significant drawdowns have been noted during irrigation season, monitoring of water levels has been ongoing and would continue to determine if there is a correlation. Reclamation is currently evaluating the effects of reduced project pumping.

Within the project boundaries, the greatest decline in the unconfined aquifer has occurred in Stages 4 and 5, with declines since 1984 ranging from 2 feet near the east boundary to nearly 15 feet near the west boundary. In Stage 3, the decline ranges from no decline in the area of San Luis Lake to nearly 5 feet along the boundary with Stage 4. In Stages 1 and 2, the only significant area of decline has been in the southeast corner, where the greatest decline has been nearly 10 feet.

The declines observed in the “confined” monitoring wells generally mirror those observed in the unconfined wells. At many of the monitoring well sites, there is no difference between the confined and unconfined water levels. At the seven sites where new confined monitoring wells were drilled deeper into the aquifer (175 feet to 260 feet), two of the wells penetrated artesian pressure areas within the aquifer and three of them still have the same water level as the unconfined well and old “confined” well, illustrating the great variability of the aquifer.

Most of the monitoring wells along the northwest corner of the project (inside and outside of the project boundary) show a seasonal change in gradient between the water levels in the confined and unconfined aquifers. During the spring, the water levels in the confined aquifer are slightly higher than the water levels in the unconfined aquifer (generally less than 1 foot). However, during the summer irrigation season, the gradient reverses, and the water levels in the confined aquifer drop as much as 30 feet below the levels in the unconfined aquifer. After the irrigation season, the water levels in the confined aquifer begin to rise until the next irrigation season begins.

Environmental Consequences

No Action Alternative.—Under the No Action Alternative, groundwater production would continue to decline, and the project would no longer have the ability to make water available in the following listed order of priority, as specified in the authorizing legislation:

(1) To assist in making the annual delivery of water at the gaging station on the Rio Grande near Lobatos, Colorado, as required by article III of the Rio Grande Compact: Provided, That the total amount of water delivered for this purpose shall not exceed an aggregate of six hundred thousand acre-feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of January next succeeding the year in which the Secretary determined that the project authorized by this Act is operational.

(2) To maintain the Alamosa National Wildlife Refuge and the Blanca Wildlife Habitat Area: Provided, That the amount of project salvaged water delivered to the Alamosa National Wildlife Refuge and the Blanca Habitat Area shall not exceed five thousand three hundred acre-feet annually. *The Secretary is authorized to negotiate and enter into an agreement with the Rio Grande Water Conservation District which provides for the temporary delivery of project salvaged water to the refuge and habitat area in those years in which there is not sufficient water to fully satisfy the purposes of both paragraphs (1) and (2) of this subsection.*

(3) To apply to the reduction and elimination of any accumulated deficit in deliveries by Colorado as is determined to exist by the Rio Grande Compact Commission under article VI of the Rio Grande compact at the end of the compact water years in which the Secretary first determines the project to be operational.

(4) For irrigation or other beneficial uses in Colorado: Provided, That no water shall be delivered until agreements between the United States and water users in Colorado, or the Rio Grande Water Conservation District acting for them, have been executed providing for the repayment of such *construction* costs as in the opinion of the Secretary are appropriate and within the ability of the users to pay, *and for the payment of all of the costs of operation and maintenance which are allocable to the production of this priority 4 water.*

Preferred Alternative.—Under the preferred alternative, the project would have the ability to sustain project production and make water available in the above priorities as described in the authorizing legislation. The project could sustain a yield that would not affect the drawdown in the unconfined aquifer more than originally anticipated. Monitoring of groundwater elevations in the confined and unconfined aquifers both in and around the project boundaries would continue. Adjustments to production well pumping rates would be made, as needed, so that the hydrologic balance of groundwaters within and outside of the project area would not be adversely affected. Reclamation would continue to ensure that the water table outside the project boundary is not drawn down more than 2 feet below pre-project depths, as stipulated in the project’s authorizing legislation, described under the No Action Alternative.

Water Quality

Affected Environment

Water quality terms of the Rio Grande Compact provide that the State of Colorado shall not be credited with delivered project water “unless the proportion of sodium ions shall be less than 45 percent of the total positive ions in that water when the TDS in such water exceeds 350 parts per million.”

On the basis of water samples taken by Reclamation before project construction, the TDS of the groundwater on the east edge of the project area was about 100 to 150 milligrams per liter (mg/L). The TDS of the groundwater on the west edge of the project area was about 250 to 300 mg/L. TDS values for the northern section of the project range from 200 to 1000 mg/L, with a median value of approximately 400 mg/L. TDS values for the southern area range from 50 to 200 mg/L, with a median value of approximately 100 mg/L.

Project production water, at the outlet, has not and currently does not exceed EPA National Primary Drinking Water Standards for the water quality variables tested. Outlet water has not and currently does not exceed the Secondary Drinking Water Standard of 500 mg/L TDS. Outlet water does regularly exceed the standards for iron, manganese, and sulfate, and this is expected to continue when new wells begin production.

Currently, all water conveyed into the Rio Grande meets the water quality terms of the Compact and is blended, as necessary, before delivery downstream.

Environmental Consequences

No Action Alternative.—As well production would decline under the No Action Alternative, the ability to meet the water quality standards specified in the Rio Grande Compact would diminish greatly because of the need to salvage high TDS water.

Decreases in project water production would leave the groundwater essentially unchanged. Water quality within the well bore would be expected to change (under non-pumping status) to reflect equilibrium conditions with atmospheric oxygen, iron bacteria and metal (stainless steel) well components. Levels of iron, nickel and chromium would be expected to increase in the well bore.

Preferred Alternative.— All water conveyed into the Rio Grande would continue to meet the water quality terms of the Compact and would be blended, as necessary, before delivery downstream.

Wetlands

Affected Environment

National Wetland Inventory (NWI) maps compiled in 1978 indicated that 43,122 acres of wetlands occurred in the Closed Basin Division project area, or about 33 percent of the project lands. Of these, 24,878 acres (57 percent) were determined to be ephemeral wetlands; 17,037 (40 percent) acres were seasonal wetlands; and 1,207 acres (3 percent) were permanent wetlands. The acreage, distribution, and classification of potentially affected wetlands are summarized in tables III-4 and III-5 in the final supplement to the FES (Reclamation, 1982a) and are incorporated by reference.

At the time the FES was written, estimated waterfowl production in these wetlands was 13,620 ducks per year. The wetland areas also support breeding populations of other wetland dependant birds, including eared grebe, western grebe, pied-billed grebe, American avocet, Wilson's phalarope, killdeer, common snipe, sora, black-crowned night heron, snowy egret and northern harrier. More detailed lists of birds in the project area are in table III-10 of the final supplement to the FES (Reclamation, 1982a) and are incorporated by reference.

The final supplement to the FES predicted that construction of the conveyance channel, laterals, well fields, and access roads would directly affect 5,026 acres of wetlands. Under full design capacity, groundwater drawdowns were expected to affect an additional 3,434 acres where the groundwater table was less than 2.5 feet deep and where infiltration rates were greater than 0.25 feet per day (ft/day). A total of 8,460 acres of wetlands were expected to be affected. Water levels were not expected to decline more than 2 feet outside project lands, but were expected to decline at least 8 feet inside the project area. Waterfowl production was expected to decline by about 3,400 birds per year as a result of loss of wetlands.

Since the Closed Basin Project has been in operation, various Reclamation-funded projects in State and Federal wildlife areas have been implemented to mitigate all of the predicted effects of the full design capacity of the project. The mitigation plan is summarized in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982) and its two amendments (FWS, 1992 and FWS, 2001), which are incorporated by reference. Mitigation has compensated for both the direct construction impacts as well as for the original design pumping related groundwater impacts. In addition, vegetation and groundwater monitoring has been ongoing since project operation began in 1986.

The development, improvement, or maintenance of Alamosa NWR, Blanca WHA, Russell Lakes WMA, and San Luis Lake have mitigated for the 8,460 acres of wetlands predicted to be affected by project construction and operation. Reclamation has adhered to the goal of no net loss of wetland habitat value by salvaging water, obtaining water rights from willing sellers, and acquiring land. It is assumed that wetland mitigation has compensated for effects to wildlife, including waterfowl production.

Alamosa National Wildlife Refuge.—A total of 4,374 acres of wetlands has been improved and maintained by using up to 4,500 acre-feet of project water and 800 acre-feet of water rights transferred from Lillpop Ranch and the Chicago Ditch.¹

Blanca Wildlife Habitat Area.—A total of about 198 acres of wetlands has been improved and maintained with 891 acre-feet/year of project water to offset impacts from project operation. In addition, to compensate for a deficit of mitigation

¹ Originally, the source of this 800 acre-feet of water was a proposed transferred water right resulting from Reclamation's purchase of the Emperious Estate lands. However, since transferable water rights from this site were found to be limited, Reclamation acquired the Lillpop Ranch along with shares in Chicago Ditch water.

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wetlands from other project lands, 167 acres of additional wetland development will be credited to Reclamation upon completion of water rights transfer from the Emperious Estate tract to Blanca WHA, as described in the first and second amendments to Fish and Wildlife Coordination Act reports (FWS, 1992 and FWS, 2001). To promote flows that had ponded along the east side of the conveyance channel, the Blanca Siphon was installed in 2000. The siphon allows these flows to be delivered to 700 acres of wetlands in the Blanca WHA. BLM is currently negotiating water rights transfers for this project (Roy Smith, personal communication, 2002). After completion of wetland development on the North Tract of Blanca WHA, FWS considers that the mitigation requirements for the entire Closed Basin Division will be complete (FWS, 2001).

Russell Lakes Waterfowl Management Area.—Reclamation acquired 2,320 acres of private land and appurtenant water rights to develop wetlands. This purchase includes 800 acres of the White Ranch, with 400 acre-feet of water rights to use as wetlands mitigation. In addition, Reclamation provides the Colorado Division of Wildlife with annual funding to operate, maintain, and replace facilities at the Russell Lakes Waterfowl Management Area.

San Luis Lake.—Reclamation provided a flow-through water system, using about 4 cfs of water to help stabilize lake levels and to maintain 180 acres of high-value wetland habitat replace low-value wetland habitat.

Project construction directly affected up to 5,026 acres of wetlands, as described under “Wetlands.” In addition, Agro Engineering (2001) has used Normalized Difference Vegetation Index (NDVI) analysis to determine that 2,358 acres of project lands showed decreased vegetation in 2000 compared to baseline conditions.² Most of the decreased vegetation occurred in areas associated with Stages 1, 2, 3 and 4. A portion of this affected area is upland vegetation. Agro Engineering hypothesized that much of this decreased vegetation could be attributed to factors other than pumping, such as grazing and low precipitation or runoff. In summary, Reclamation assumes that less than 2,358 acres have been affected by groundwater drawdowns and that these impacts have been compensated (impacts to 3,434 acres associated with groundwater pumping were predicted and mitigated).

² As part of Reclamation’s environmental commitment program, Agro Engineering (2001) has been evaluating and monitoring vegetation changes in the project area. The monitoring reports are available at the Alamosa Field Division Office. The monitoring would continue with or without the proposed project.

Environmental Consequences

No Action Alternative.—Impacts are expected to remain at current levels documented by Agro Engineering (2000), but below levels described in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982). However, monitoring would continue as described by Agro Engineering (2000) to determine if any impacts are greater than those previously predicted. Reclamation would continue to provide project water to the refuges for wetlands mitigation.

Preferred Alternative.—Increasing pumping to full capacity could cause greater groundwater drawdowns that could negatively affect wetlands. The amount of wetlands affected could reach the 3,434 acres associated with groundwater pumping that were previously predicted (and mitigated for), but impacts greater than those described in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982) are not expected. Reclamation would continue to provide project water to the refuges for wetlands mitigation.

Vegetation and groundwater monitoring would continue as described by Reclamation (1982a), FWS (1982), and Agro Engineering (2001). If monitoring reveals that impacts are greater than those described in the final supplement to the FES (Reclamation, 1982a), then Reclamation, in coordination with FWS and the Colorado Division of Wildlife (CDOW), would determine any new mitigation required to offset additional impacts, as recommended in the second amendment to the Fish and Wildlife Coordination Act report (FWS, 2001).

Terrestrial Vegetation

Affected Environment

The native upland plant communities of the project area are arid shrubland and grassland adapted to saline or alkaline conditions. Dominant shrubs include greasewood (*Sarcobatus sp.*), rabbitbrush (*Chrysothamnus sp.*), and fourwing saltbrush (*Atriplex canescens*). Dominant grass species include inland saltgrass (*Distichlis stricta*) and blue grama (*Bouteloua gracilis*). Vegetation classifications are described in detail in the FES (Reclamation, 1979) and are incorporated by reference. More recently, for vegetation monitoring purposes, the project area has been classified into eight range

sites: (1) bare ground, (2) alkali overflow, (3) Chico land, (4) salt flats, (5) sand hummocks, (6) deep sand, (7) salt meadow, and (8) wet meadow (Agro Engineering, 2001).

The final supplement to the FES and the Fish and Wildlife Coordination Act report predicted that construction of the conveyance canal would affect 1,527 acres of terrestrial vegetation and that construction of the salvage wells would affect 180 acres. The reports predicted that groundwater drawdowns would reduce plant vigor and density. The effect on vegetation would be most severe in the immediate vicinity of individual wells but could also occur in areas of very shallow water tables. At that time, it was determined that within the affected environment, 2,154 acres of vegetation were in areas where depth to groundwater was 5 to 10 feet, and 8,944 acres were in areas where depth to groundwater was less than 5 feet. Thus, impacts to a maximum of 11,098 acres of terrestrial vegetation were predicted from groundwater drawdowns in areas where depth to groundwater was less than 10 feet.

Reclamation committed to replace 11,098 acres of terrestrial vegetation with potentially reduced habitat value by improving the value of about 6,417 acres of habitat adjacent to the wetlands or ponded areas. Tree planting has created shelterbelt habitat at several locations within the project boundaries. On the Alamosa NWR, the delivery of 2,300 acre-feet of water per year is improving and maintaining the value of 4,485 acres of habitat adjacent to wetlands. About 410 acres of habitat adjacent to Blanca WHA have been improved with the delivery of 103 acre-feet of water per year. At San Luis Lake, about 880 acres of terrestrial vegetation adjacent to the lake's shoreline have been improved by stabilizing the Lake. At Russell Lakes WMA, various wildlife management activities have improved the habitat value of 1,642 acres.

Reseeding and regenerating existing vegetation has restored much of the native vegetation within the 1-acre well sites to pre-existing conditions. In addition, a 50-foot-wide strip on each side of the construction right-of-way of the conveyance channel has been revegetated with native grasses.

Construction of the wells and conveyance channel disturbed about 180 and 1,527 acres of terrestrial vegetation, respectively. Agro Engineering (2001) determined that in 2000, up to 2,358 acres of project lands in the area potentially affected by pumping drawdowns showed decreased vegetation. A portion of these affected lands is upland vegetation. Agro Engineering (2001) hypothesized that some effects may be attributed to factors other than pumping, such as grazing and low

precipitation or runoff. In summary, Reclamation assumes that no more than 2,358 acres of terrestrial vegetation has been affected, which is less than the predicted 11,098 acres.

Environmental Consequences

No Action Alternative.—Impacts are expected to remain at current levels documented by Agro Engineering (2000), but below levels predicted in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982). Monitoring would continue, as described by Agro Engineering (2000), to determine if any impacts exceed those previously predicted.

Preferred Alternative.—During well relocation, drilling, pipeline excavation, and placement of mineral spoils from the drill hole could affect temporarily affect up to ½ acre of terrestrial vegetation within each 1-acre well site, resulting in an incremental total of about 85 acres of disturbed vegetation, which has been previously mitigated.

Reclamation does not anticipate any effects in addition to those described in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act Report (FWS, 1982). However, monitoring would continue as described by Agro Engineering (2000) to determine if any impacts exceed those previously predicted.

Mitigation for the Preferred Alternative

Following construction, the 1-acre well sites will be monitored and (if necessary) treated to prevent the invasion of noxious weeds. If native vegetation does not become established, revegetation will be accomplished by seeding with native grasses to prevent the invasion of noxious weeds.

Fisheries

Affected Environment

A cold-water fishery exists in the 108-mile segment of the Rio Grande extending downstream of the conveyance channel outfall to the confluence of the Rio Chama. A list of fish species known to occur in this reach of the Rio Grande is included the final supplement to the FES (Reclamation, 1982a) and is incorporated by reference.

San Luis Lake, Head Lake, and the Blanca Ponds support a sport fishery and receive mitigation waters. The various ponds and pools in the project area are too shallow to support fish populations. To control the aquatic weeds, Reclamation introduced sterile triploid grass carp (*Ctenopharyngodon idella*) into the conveyance channel and provided screens and nets to control their distribution. This program has been successful.

At full design capacity, the project was expected to deliver an average minimum of 80 cfs to a reach of the Rio Grande in Colorado where zero flows are often recorded. These additional flows would be beneficial for aquatic life, including a Rio Grande trout fishery extending downstream to at least the State line.

The final supplement to the FES proposed establishing a trout fishery in the conveyance channel, contingent on economic feasibility and participation of a cost-sharing non-Federal partner in the management. However, because of high water temperatures, high nitrogen and dissolved oxygen concentrations, and aquatic weed infestation³, the conveyance channel is currently unsuitable for a trout fishery. To control the aquatic weeds, Reclamation introduced sterile triploid grass carp (*Ctenopharyngodon idella*) into the conveyance channel and provided screens and nets to control their distribution. This program has been successful.

To date, the project has delivered an average of 20,500 acre-feet of water to the Rio Grande per year, which has been beneficial for aquatic life downstream, especially during low flow periods.

³ Sago pondweed (*Potamogeton pectinatus*), American pondweed (*Potamogeton pectinatus*), waterweed (*Elodea canadensis*), northern watermilfoil (*Myriophyllum exabescens*), and white buttercup (*Ranunculus sp.*) are the target pest plants in the canal which would impede flows without control.

Environmental Consequences

No Action Alternative.—No impacts and no change from existing conditions are anticipated.

Preferred Alternative.—The proposed project could result in pumping at full capacity. As a result, impacts could reach the levels predicted (and mitigated for) in the final supplement to the FES (Reclamation, 1982a). Depending on Compact requirements, project flows into the Rio Grande could benefit aquatic life downstream in the Rio Grande, especially during low flow periods. The triploid grass carp in the conveyance channel may continue to be maintained for aquatic weed control.

Mitigation for the Preferred Alternative

No additional mitigation is anticipated.

Endangered, Threatened, and Other Special Status Species

Section 7 of the Endangered Species Act prohibits Federal agencies from authorizing, funding, or carrying out activities that are likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its critical habitat. By consulting with FWS before initiating projects, agencies review their actions to determine if they could adversely affect listed species or their habitat. Reclamation initiated consultation with FWS by requesting a list of threatened and endangered species that could occur in the project area (attachment A). Reclamation biologists also consulted with FWS biologists during preparation of this EA. This document also serves as the biological assessment for informal consultation requirements.

The following sections describe federally listed, threatened, and endangered species known to exist in the project area and provide an assessment of the potential effects of the alternatives on these species. This assessment also addresses Federal candidate species, proposed species, State of Colorado listed species, and other species of concern.

Bald Eagle

Affected Environment

The bald eagle (*Haliaeetus leucocephalus*) is listed both as a Federal and a State of Colorado threatened species. It recently has been proposed for delisting under the Endangered Species Act because recovery goals may have been met, its population has increased, and its range has expanded. This bird requires wetland and aquatic ecosystems for foraging and large trees and cliffs near water for roosting. Wetland and riverine habitats in the San Luis Valley area attract a large population of both migrating and wintering bald eagles. They have been observed foraging in the Closed Basin Division conveyance channel and in wetlands adjacent to the project area. There are no breeding records for the San Luis Valley, although future nesting is possible with an expanding population.

Impacts to bald eagles correlate to impacts to wetlands, open water, and prairie dog colonies in the project area where they forage. The final supplement to the FES predicted that the project would affect 8,460 acres of wetlands; these effects would be offset by 8,460 acres of wetland mitigation, as summarized under "Wetlands." As an environmental commitment, no impacts to identified prairie dog colonies were anticipated.

Project construction affected 5,026 acres of wetlands. Project operations affected fewer than 2,358 acres of wetlands, and these impacts have been mitigated. The wetlands in the project area that have been improved by mitigation measures have provided foraging habitat for bald eagles. Reclamation avoided direct impacts to identified prairie dog colonies during the construction phase of the project. Electric transmission lines for the project have been modified to minimize electrocution of raptors. Increasing flows to the Rio Grande may have improved bald eagle foraging habitat downstream of the conveyance canal.

Environmental Consequences

No Action Alternative.—Impacts to wetlands and bald eagle foraging habitat are expected to remain at current levels documented by Agro Engineering (2000), but below levels described in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982). Reclamation would continue to provide project water to refuges where bald eagles are known to forage.

Preferred Alternative.—No impacts to wetlands and bald eagle foraging habitat are anticipated in addition to those predicted in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982a). Reclamation would continue to provide project water to refuges where bald eagles are known to forage.

Southwestern Willow Flycatcher

Affected Environment

The southwestern willow flycatcher (*Empidonax trailli extimus*) is listed both as a Federal and as a State of Colorado endangered species. This neotropical migratory songbird nests exclusively in dense riparian woody vegetation (especially willow thickets) with standing water or saturated soils. The breeding status of the endangered subspecies in Colorado is unclear because its northern distribution limit may be south of the San Luis Valley. However, breeding willow flycatchers occur at Alamosa NWR, McIntire Springs, Beaver Creek, and Clear Creek. These populations may represent the southwestern subspecies, or at least be intergrades, but additional research is ongoing to confirm this. No stands of willow and other woody riparian vegetation suitable for breeding and migrating willow flycatchers are known to occur in the Closed Basin Division area. Suitable habitat does occur along the Rio Grande River downstream of the confluence of the conveyance canal.

The southwestern willow flycatcher was not listed as endangered until 1995 and was not addressed in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982). Nevertheless, no impacts to woody riparian vegetation were predicted because this vegetation type does not occur in the project area.

The project has not adversely affected the southwestern willow flycatcher. To date, the project has delivered an average of 20,500 acre-feet of water per year (water years 1986-2001) to the Rio Grande, which may be slightly beneficial for the maintenance of woody riparian vegetation downstream of the conveyance channel, especially during low flow periods.

Environmental Consequences

No Action Alternative.—No impacts and no change from existing conditions would occur.

Preferred Alternative.—No adverse impacts would occur. Additional flows to the Rio Grande could be beneficial for the maintenance of woody riparian vegetation, especially during low flow periods.

Yellow-Billed Cuckoo

The yellow-billed cuckoo (*Coccyzus americanus*) is a Federal candidate for listing as endangered. This neotropical migratory bird nests exclusively in large stands of mature riparian forests and woodlands with at least some patches of dense understory vegetation. Minimum habitat patch size appears to be about 25 acres; riparian stands less than 300 feet wide are probably unsuitable habitat. A sizeable breeding population is known to occur from the middle Rio Grande near San Marcial, New Mexico, and a few breeding pairs are known to occur from the Arkansas River floodplain near Pueblo, Colorado. There have been only two sightings of this bird in the San Luis Valley and no nesting records. No suitable habitat occurs in the Closed Basin, and habitat patches of mature riparian forests on the Rio Grande in Colorado downstream of the conveyance canal are too small to support yellow-billed cuckoos. Because of the lack of suitable habitat and non-occurrence of this species in the San Luis Valley, additional assessment is not warranted.

Whooping Crane

Affected Environment

The whooping crane (*Grus americana*) is listed both as a Federal and as a State of Colorado endangered species. Individuals of the “wild” population historically migrated on the eastern plains of Colorado. Since the early 1970s, a few individuals of a transplanted “experimental” population migrated through the San Luis Valley with large flocks of sandhill cranes. These birds use wetlands adjacent to agricultural fields.

The FES concluded that the project would not affect whooping cranes because of their small population size and a paucity of the required interspersion of wetlands adjacent to agricultural grain field.

The Closed Basin Project has not affected the whooping crane. Mitigation has increased the habitat value of wetlands for cranes within Closed Basin wildlife areas by providing their preferred habitat of irrigated food plots interspersed with wetlands.

Environmental Consequences

No Action Alternative.—Impacts to wetlands are expected to remain at current levels, but below levels previously predicted and mitigated. However, monitoring would continue to determine the level of impacts.

Preferred Alternative.—If wetland impacts increase to above predicted levels and whooping crane populations increase in the project area, Reclamation would re-initiate informal consultation with FWS.

Black-Footed Ferret

Affected Environment

The black-footed ferret (*Mustela nigripes*) is listed both as a Federal and as a State of Colorado endangered species. It is exclusively associated with prairie dog colonies in shortgrass prairie and semidesert shrubland. No ferrets have been documented in Colorado since 1942, except for the recently reintroduced population in northwestern Colorado. The San Luis Valley is within the historic range of the species. Records exist for Saguache County (15 miles northwest of Del Norte) and Costilla County (northwest of Fort Garland near Buck Mountain). A colony of Gunnison prairie dogs exists in the southern portion of the Closed Basin Division, but there are no records of black-footed ferrets at this site. There are currently no ferret reintroduction plans for the San Luis Valley, probably because of the low density of prairie dogs.

The FES concluded that the project would not affect black-footed ferrets because they did not occur in the area, and Reclamation planned project features so they would not affect any prairie dog colonies.

The project has not resulted in any known impacts to black-footed ferrets, and no populations have been documented in the project area during project construction and operation. The project has not affected the colony of prairie dogs in the southern portion of the project area.

Environmental Consequences

No Action Alternative.—No impacts and no change from existing conditions are anticipated. Project operations would not affect existing prairie dog colonies.

Preferred Alternative.—The project would not affect the black-footed ferret. Black-footed ferrets are very unlikely to be recruited into the project area or to be reintroduced into the San Luis Valley. No additional impacts to prairie dog colonies are expected. However, if ferrets are reintroduced into the area, or are otherwise found to occur in the project area, Reclamation would initiate consultation with FWS if prairie dog colonies spread into areas affected by well relocation.

Mountain Plover

Affected Environment

The mountain plover (*Charadrius montanus*) is proposed for Federal listing as a threatened species and is a State of Colorado species of special concern. In Colorado, populations are concentrated near Pawnee and Comanche National Grasslands and in South Park. A small remnant breeding population exists in isolated areas along the western edge of the San Luis Valley outside the project area. Migrating mountain plovers use the Closed Basin in the spring, when they are occasionally observed on dry alkaline flats or dry reservoir shorelines. Mountain plovers breed in flat shortgrass prairies with very short, sparse vegetation. They are often found where livestock or prairie dog grazing have reduced vegetation height and density. Mountain plover are often associated with prairie dog colonies.

The mountain plover was not proposed for Federal listing as a threatened species until 1999 and, thus, was not addressed in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982). As an environmental commitment, impacts to prairie dog colonies were to be avoided during construction of project features.

The project has not resulted in any known impacts to mountain plover breeding sites, because these sites are outside the project boundaries. It is unlikely that well field, pipeline, or canal construction or groundwater drawdowns resulting from project operation have directly affected dry alkaline flats or reservoir shoreline migration stopover habitat.

Environmental Consequences

No Action Alternative.—No change from existing conditions is anticipated. Project operations would not affect dry alkaline flats, dry reservoir shorelines, or other areas with sparse vegetation used by migrating mountain plovers.

Preferred Alternative.—If dry alkaline flats or reservoir shoreline habitat are within 100 meters of construction activities, noise and human activities in these areas could possibly displace mountain plovers. Mountain plovers are expected to be uncommon to rare migrants in the project area, and they would use the habitat for only very short periods. A slight possibility exists that mountain plovers could breed in the project area, although no breeding has been documented to date.

Mitigation for the Preferred Alternative

During advanced planning, Reclamation will identify potential mountain plover habitat within 100 meters of the 1-acre well sites. For all sites where such habitat is found, area searches for mountain plovers will be conducted a few days before any scheduled construction activities (from mid-March to mid-August, if landowner permission is granted). If mountain plovers are found, Reclamation will re-initiate consultation with FWS, and construction at that site will be postponed until the plovers leave the area or mid-August (whichever occurs first).

Impact Determination for Federally Listed Species and Species Proposed for Listing

The project would have slightly beneficial effects on the southwestern willow flycatcher. It would have no effect on the yellow-billed cuckoo, whooping crane, or black-footed ferret. The project would not affect the bald eagle, with continued delivery of project water to refuges. The project may affect, but is not likely to adversely affect, the mountain plover, with implementation of the proposed conservation measures.

Other Special Status Species

The following sections describe other special status species known to exist in the project area and provide an assessment of the potential effects of the alternatives on these species.

American Peregrine Falcon

Affected Environment

The American peregrine falcon (*Falco peregrinus anatum*) is a former federally listed endangered species and a Colorado State species of special concern. It was removed from the Federal list of threatened and endangered species in August 1999.

Peregrine falcon populations have increased significantly throughout much of the western United States. In Colorado, the population increased from four breeding pairs in 1979 to 119 in 2001. The falcons are most numerous along the Dolores and Colorado River canyons in Mesa and Montrose Counties and in Dinosaur National Monument. Peregrine falcons nest on cliffs and rock outcrops up to 9,000 feet in elevation, and nesting pairs forage over wetlands, meadows, forests, lakes, and streams up to 20 miles from the nest. Most peregrine falcons in the San Luis Valley are migrants during the spring and fall and forage over wetland areas. East of the San Luis Valley, breeding territories may occur on the western escarpment of the Sangre de Cristo Mountains.

Impacts to American peregrine falcons correlate to impacts to the wetlands where they forage. The final supplement to the FES predicted that the original project

would affect 8,460 acres of wetlands, which would be offset by 8,460 acres of wetland mitigation, as summarized under “Wetlands.” However, minimal direct impacts to peregrine falcons were expected because of the large extent of wetland foraging areas in the San Luis Valley and the small number of peregrine falcons in the area.

Impacts to the wetland foraging habitat of peregrine falcons have been similar to those described for the bald eagle.

Environmental Consequences

No Action Alternative.—Impacts to wetlands and peregrine falcon foraging habitat are expected to remain at current levels, well below levels previously predicted and mitigated. Monitoring would continue to determine the level of impacts.

Preferred Alternative.—No impacts to wetlands and peregrine falcon foraging habitat in addition to those already predicted are expected. However, monitoring would continue to determine if any wetland impacts exceed those previously predicted. If additional impacts occur, Reclamation would initiate informal consultation with FWS.

Greater Sandhill Crane

Affected Environment

The greater sandhill crane (*Grus canadensis tabida*) is a State of Colorado endangered species (breeding population). The *Rocky Mountain* population migrates through the San Luis Valley from late-January to early-May; the migration peaks by mid-March. Fall migration extends from late-August to early November, peaking in mid-October. Greater sandhill cranes concentrate with lesser sandhill cranes, Canadian sandhill cranes, and a few individuals of the “experimental” whooping cranes on the Monte Vista National Wildlife Refuge. Small numbers are occasionally found in the project area. They often roost in shallow water areas during the night and feed in adjacent agricultural fields or meadows during the day. Historically, they nested in the San Luis Valley, but there are no recent breeding records. Breeding does occur

in northwestern Colorado, but lack of large marshes adjacent to agricultural fields may limit the sandhill crane's breeding and distribution in the San Luis Valley.

The FES predicted that the project would not affect the greater sandhill crane because of its small population size and a paucity of the required interspersed wetlands adjacent to agricultural grain fields.

Because of the greater sandhill crane's limited use of the project area, its concentrations outside the project area, and its lack of breeding in the area, the project has not affected this species. Mitigation has increased the habitat value of wetlands within wildlife areas in the Closed Basin vicinity by creating their preferred habitat of irrigated food plots interspersed with wetlands.

Environmental Consequences

No Action Alternative.—Impacts to wetlands are expected to remain at current levels, and below levels previously predicted and mitigated. Monitoring would continue to determine the level of impacts.

Preferred Alternative.—If additional unpredicted impacts occur to the wetlands in the project area or if the use of project lands by cranes increases, Reclamation would initiate informal consultation with CDOW.

Western Snowy Plover

Affected Environment

The interior population of the western snowy plover (*Charadrius alexandrinus nivosus*) is a former Federal candidate and a State of Colorado species of special concern. In Colorado, a breeding population exists on the plains of southeastern Colorado. Historically, snowy plovers nested on the exposed shoreline of San Luis Lake, but no nesting has been observed since 1984. Snowy plovers nest on open shorelines where alkaline soils camouflage birds and eggs. Nests are located within 500 feet of water. In Colorado, breeding occurs from mid-April through July. Migrating snowy plovers are uncommon in the Closed Basin in the spring when they stop, feed, and rest on dry alkaline flats or dry reservoir shorelines.

The final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982) did not address the snowy plover because it had no special status at that time.

Stabilization of San Luis Lake as a project mitigation measure has resulted in less lake fluctuations, and less exposed shoreline has resulted in less nesting habitat for the snowy plover.

Environmental Consequences

No Action Alternative.—No change from existing conditions is anticipated. Project operations would not adversely affect dry alkaline flats, dry reservoir shorelines, or other areas with sparse vegetation used by migrating mountain plovers.

Preferred Alternative.—If construction activities occur within 300 meters of alkaline flats or reservoir shoreline habitat, noise and human activities possibly could displace snowy plovers using these areas. Snowy plovers in the project area are expected to be uncommon to rare migrants, and they would use the habitat for only very short periods. A slight possibility exists that snowy plovers could breed in the project area, although no breeding has been documented since 1984.

Mitigation for the Preferred Alternative

During advanced planning, Reclamation will identify potential plover habitat within 100 meters of the 1-acre well sites. For all sites where such habitat is found, area searches for snowy plovers will be conducted a few days before any scheduled construction activities (from mid-March to mid-August, if landowner permission is granted). If snowy plovers are found, Reclamation will re-initiate consultation with FWS.

Gunnison Sage Grouse

The Gunnison sage grouse (*Centrocercus minimus*) is a Federal candidate for listing and a State of Colorado species of special concern. The Gunnison sage grouse occurs in sagebrush habitats in Gunnison County, but it also occurs in Dolores, San Miguel, Montrose and northwestern Saguache Counties. It occurs only in large expanses of

sagebrush habitat dissected with wet meadows and riparian areas at elevations between 7,000 and 9,500 feet. The bird depends on big sagebrush for food, breeding habitat, and roosting. Because sagebrush habitat or sage grouse do not occur in the affected environment of the Closed Basin Division, impacts would not occur and further assessment is not warranted.

Little Beeplant

Affected Environment

Little beeplant (also known as slender spiderflower) (*Cleome multicaulis*) is a former Federal candidate (category 2) species and a BLM "sensitive species." This rare annual plant occurs in moist saline and alkaline soils along edges of seasonal wetlands, wet meadows, and alkaline flats, often extending into the greasewood plant community. According to estimates, little beeplant has disappeared from about 90 percent of its former range, and the only remaining known populations in Colorado are in the San Luis Valley. Stands of this plant are known from the Blanca WMA, Russell Lakes State Wildlife Area (SWA), and Mishak Lakes area. The species' distribution in the Closed Basin Division outside the above areas is unknown. Populations in the San Luis Valley appear to have developed in wet soils in waterfowl management areas in the San Luis Valley. The population size apparently fluctuates from year to year. A "bank" of dormant seeds helps protect this annual plant against drought and extremes in environmental variation.

The final supplement to the FES and the Fish and Wildlife Coordination Act reports did not address little beeplant because it was not a special status species at that time.

The direct effects of project construction and operation on little beeplant are unknown, but could be correlated with effects on wetlands discussed previously. Wetland mitigation associated with this project, as well as other wetland programs, has created habitat for this plant, especially in Blanca WMA and Russell Lakes SWA.

Environmental Consequences

No Action Alternative.—Impacts to wetland areas potentially occupied by the little beeplant are expected to remain at current levels documented by Agro Engineering (2000), but below levels described in the final supplement to the

FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982). However, monitoring would continue as described by Agro Engineering (2000) to determine if any impacts are greater than those previously predicted.

Preferred Alternative.—Additional groundwater pumping could possibly affect unknown stands of little beeplant if they occur in wetlands affected by additional groundwater drawdowns. Known stands within Blanca WMA and Russell Lakes SWA would not be affected because these areas receive mitigation waters.

Mitigation for the Preferred Alternative

If BLM determines that there are any newly discovered populations of little beeplant in the 1-acre well sites, Reclamation will consult with BLM to assess impacts and develop conservation measures.

Rio Grande Sucker

Affected Environment

The Rio Grande sucker (*Catostomus plebeius*) is a Colorado State endangered species. Currently, it occurs in the mainstem and tributaries of the Rio Grande River north of Albuquerque, New Mexico. The suckers' distribution in the San Luis Valley of Colorado includes the Rio Grande and Hot Creek, and populations have recently been introduced in Medano Creek (upstream of Great Sand Dunes National Monument) and San Francisco Creek. CDOW introduced a few Rio Grande suckers into the conveyance channel in 1993, where their current status is unknown.

The Rio Grande sucker was not a special status species and, thus, was not addressed in the final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982).

Because the project does not affect flows in Medano Creek, San Francisco Creek, Hot Creek, and other tributary streams occupied by the species, project operations have not affected the Rio Grande sucker. Project waters delivered to the Rio Grande may have been slightly beneficial for Rio Grande suckers in the river downstream of the conveyance channel, especially during low flow periods.

Environmental Consequences

No Action Alternative.—No impacts and no change from existing conditions are anticipated.

Preferred Alternative.—Aquatic habitat occupied by the Rio Grande sucker would not be adversely affected. Additional flows to the Rio Grande River downstream of the conveyance channel could be beneficial for fish in the river, especially during low flow periods.

Rio Grande Cutthroat Trout

Affected Environment

The Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*) is a Colorado State species of concern and FWS is reviewing it for candidate status. This species occupies clear, coldwater tributaries with gravel substrate of the Rio Grande in Colorado.

Currently, 65 known populations of Rio Grande cutthroat trout occur in Colorado in the Rio Grande headwaters. Of these, 22 are secure or expanding, 16 are stable but at risk; 21 are at risk of declining; and 6 populations have unknown status. CDOW classifies these populations as “core” (pure with no hybridization), “conservation” (some hybridization), and “recreation” (hybrids stocked for anglers). The closest “core” population to the Closed Basin is in the upper reaches of Medano Creek above Great Sand Dunes National Monument. “Recreation” populations have been stocked into San Luis Lake and Blanca Ponds. Currently, no remaining Rio Grande cutthroats exist in San Luis Lake, and the status of the “recreation” population in Blanca Ponds is unknown.

The final supplement to the FES (Reclamation, 1982a) and the Fish and Wildlife Coordination Act report (FWS, 1982) did not address the Rio Grande cutthroat trout because it was not a special status species at that time.

Because the project does not affect flows in Medano Creek and other tributary streams occupied by the species, project operations have not affected the

Rio Grande cutthroat trout. The project has not adversely impacted habitat for the “recreation” populations in San Luis Lakes and Blanca Ponds.

Environmental Consequences

No Action Alternative.—No impacts and no change from existing conditions are anticipated.

Preferred Alternative.—Aquatic habitat occupied by the “core” and “recreation” populations near and in the project area, respectively, would not be adversely affected.

Cultural Resources

Affected Environment

Before project construction, virtually none of the project area had been formally surveyed, although the abundance of archaeological sites in the area was well known to local collectors. Between 1976 and 1986, Reclamation conducted extensive cultural resources investigations in the project area. Although it was estimated that about 3,000 acres of ground would be disturbed, an area of some 20,000 acres was subjected to intensive archaeological survey. Reclamation conducted this intensive survey so that the proposed location of project features could be shifted, if necessary, to avoid affecting significant sites during construction. Ultimately, project planners were able to select a final canal alignment and 1-acre well sites that avoided any *significant* sites. *All* deposits of archaeological materials were avoided whenever feasible. The program of systematic planned avoidance was so successful that no large-scale archaeological testing was found to be needed, and no mitigative excavation was required (Reclamation, 1987a).

Nearly 350 sites were recorded during the investigations. Typical Closed Basin archaeological deposits were thin surface lithic scatters extending over a large area. The lead project archaeologist, Van Button, interpreted these to be the result of seasonal subsistence-related activities of prehistoric hunter-gatherer bands repeated over the course of 12,000 years.

Relocation of Salvage Wells
Closed Basin Division, San Luis Basin Project

A number of the sites were test excavated, and numerous back hoe trenches were dug. The testing program was limited to those few locations where buried archaeological materials were a remote possibility within the zone of future construction disturbance. The subsurface testing yielded only negative data.

Ultimately, project construction affected a total of 91 prehistoric sites in some way, which was considered quite low given the nearly 200 miles of linear impact area in the project boundaries. All of the disturbed sites were surface scatters, and, in more than half of the cases, less than 10 percent of the site area was affected. No large, complex sites were completely destroyed, and no interpretable buried deposits were found in the impact areas.

The potential of the project to affect significant historic sites was also fully evaluated. The most abundant historic period sites of the Closed Basin related to two waves of attempted homesteading in the area (in the 1890s and 1930s). These were widely scattered, and none were affected by construction. The project did not affect any other historic sites.

During the same time period that Reclamation conducted its investigations, Adams State College students identified hundreds of sites at the Blanca Wildlife Refuge (now Blanca WMA) for FWS; the Colorado Archaeological Society did volunteer work in the sand fields south of the Great Sand Dunes National Monument; and the University of Denver's San Luis Valley Archaeological Project surveyed portions of the Baca Grant. The Smithsonian Institution began investigations in the San Luis Valley in 1974 at the Linger Folsom Site within the Closed Basin project area (northeastern part of Stage 2). Subsequent investigations were undertaken in 1977 and 1979.

Since the time of Van Button's work, numerous small compliance surveys have been undertaken in the San Luis Valley. Most of the surveys have been conducted by BLM, Colorado Department of Transportation, the National Park Service at Great Sand Dunes National Monument, and on Colorado Division of Wildlife lands. In addition, the Smithsonian Institution has continued its investigations in the San Luis Valley, conducting research on a number of PaleoIndian and Archaic sites, some of which are in the Closed Basin Division in the vicinity of San Luis Lake (not on any salvage well sites). Their studies have added greatly to the knowledge regarding early occupation of the San Luis Valley.

Reclamation conducted a file search at the Colorado State Historic Preservation Office (SHPO) in the winter of 2002 to obtain information on sites recorded in the

Closed Basin Division and surrounding area. An ArcView shape file containing site locations, with estimated acreage, for all sites recorded in the Closed Basin Division and surrounding area was obtained from the Colorado SHPO.

Environmental Consequences

No Action Alternative.—The continued operation and maintenance of the existing wells is not expected to affect any significant cultural resources in the area of potential effect because of the absence of any identified significant sites in the area of potential impact.

Preferred Alternative.—The preferred alternative is not expected to affect any significant cultural resources. Only minimal new ground would be disturbed (well drilling and pipeline trench excavation), and it would occur in areas previously surveyed and found devoid of significant cultural resources. Gravel to be used in the packing for the new wells would be obtained from an existing gravel pit. A Class III inventory of the gravel quarry would be performed.

The process of drilling the original 170 wells disturbed the ground surface more or less severely within the 1-acre sites, so it is very unlikely that any surface context remains for the cultural resources that were recorded during the 1980s inventories within those sites. It is possible, however, that *subsurface* cultural materials may be found within the 1-acre well sites. To take this possibility into account, Reclamation proposes to monitor well drilling activities at well sites in areas with the highest probability of yielding archaeological information. Such well sites are located on archaeological sites recommended not significant when they were recorded during the 1980s. As discussed previously, no well sites were located on significant archaeological sites. Twenty-four wells are located within 210 feet (approximately 70 meters) of previously recorded archaeological sites, and Reclamation will monitor drilling activities at 17 of those (10 percent of the total wells in the project.)

Reclamation has initiated consultation with the Colorado SHPO to discuss potential effects to cultural resources and the proposed monitoring measures described above. The Colorado SHPO has concurred in writing with Reclamation's proposed monitoring plan. Reclamation has also consulted with the Jicarilla Apache Tribe, the Southern Ute Tribe, and the Ute Mountain Ute Tribe regarding the proposed project. The Southern Ute Tribe responded in writing that it has no cultural resources concerns regarding the project. The Jicarilla Apache and Ute Mountain

Ute indicated verbally that they have no cultural resources concerns other than a request to be notified in the event of inadvertent discoveries of Native American sites or human remains.

Mitigation for the Preferred Alternative

Before construction, a Class III cultural resources inventory of the commercial gravel source for well re-drilling will be conducted. The gravel source will be restricted to areas containing no significant cultural resources, based on the results of the inventory.

If cultural resources are discovered during construction, work in the immediate area will cease until a qualified archaeologist evaluates the site and takes appropriate measures. If contractors or others inadvertently discover human remains during construction, work in the immediate vicinity of the discovery will cease, except to secure and protect the remains. A Reclamation archaeologist and appropriate law enforcement authorities will be contacted to help determine antiquity and manner of death. In cases where human remains are clearly from an archaeological context, procedures will be initiated in accordance with the Native American Graves Protection and Repatriation Act.

Reclamation will ensure that any project-specific agreements regarding cultural resources are included as specifications in construction contracts.

Indian Trust Assets

Indian trust assets (ITAs) are legal interests in property held in trust by the United States for the benefit of Indian tribes or individuals. The United States has a trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or Indian individuals by treaties, statutes, and Executive orders. No Indian reservations or public domain allotments exist in the Closed Basin Division. No Indian trust assets are known to exist in the project area.

Reclamation consulted with the Jicarilla Apache Tribe, the Southern Ute Tribe, and the Ute Mountain Ute Tribe to identify possible concerns regarding Indian trust assets in the project area. The tribes responded that they had no Indian trust asset concerns. Reclamation also contacted the appropriate Bureau of Indian Affairs

(BIA) offices regarding Indian trust assets. Reclamation received no written responses but through verbal communication with the BIA, Southern Ute Agency, determined that they have no concerns.

Environmental Justice

Executive Order 12898, dated February 11, 1994, requires agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities as well as the equity of the distribution of the benefits and risks of their decisions. To comply with the environmental justice policy established by the Secretary, Reclamation is to identify and evaluate any anticipated effects, direct or indirect, from the proposed project, action, or decision on minority and low-income populations and communities, including the equity of the distribution of benefits and risks.

This project would not affect minority and low-income populations and communities, including the equity of the distribution of benefits and risks.

Chapter 4

Consultation and Coordination

This chapter includes information on consultation and coordination activities that occurred during planning and preparation of this EA. This chapter also serves as the public involvement and scoping summary report.

Public Involvement and Scoping Summary

Through the public involvement process, residents of the San Luis Valley had the opportunity to learn about the scope of this study and voice their concerns and suggestions. One of the primary vehicles for informing the public was the RGWCD board meetings, which were announced in the local papers and open to the public. Reclamation staff made presentations at these meetings and responded to questions raised by local irrigators and ranchers about the well design, among other things. Representatives of the Nature Conservancy, an adjacent landowner, also attended the board meetings. Some representatives expressed concern about the potential effect of the preferred alternative due to a misunderstanding; the concerns were alleviated when it was understood that the new wells would replace existing *producing* wells and not be in addition to them. As a result of questions raised about the well design, Reclamation held several meetings with local drillers to obtain their input. Reclamation also briefed representatives of the San Luis Valley Rural Electric Association. The three-member Operating Committee endorsed Reclamation's preferred alternative.

In December 2002, Reclamation distributed the draft EA/BA to those on the distribution list for review and comment. Reclamation received only one letter from the Southern Ute Indian tribe that stated, "at this time, there are no known impacts to areas of Native American Cultural sites that are sensitive to this tribe in regards to the draft environmental/biological assessment of the salvage wells." (See attachment B.)

Consultation

Fish and Wildlife Consultation

Reclamation initiated consultation with FWS by requesting a list of threatened and endangered species that could occur in the project area (attachment A). Reclamation

biologists consulted with FWS biologists during preparation of this document, which serves as the Biological Assessment for informal consultation requirements.

The following specialists from FWS, CDOW, and BLM) were contacted to obtain their concerns and respond to any issues (chapter 3):

Andrew Archuleta, Fish and Wildlife Service (Fish and Wildlife Coordination Act Biologist)

Kelly Stone, Fish and Wildlife Service (Alamosa NWR)

Roy Smith, Bureau of Land Management, Colorado State Office (Water Rights Specialist)

Jill Lucero, Bureau of Land Management, La Jara Field Office (Wildlife Biologist)

Jerry Craig, Colorado Division of Wildlife (State Raptor Biologist)

Kurt Navo, Colorado Division of Wildlife (Habitat Biologist - Monte Vista)

Grady McNeal, Colorado Division of Wildlife (Water Resource Engineer)

Cultural Resources Consultation

Reclamation consulted with the Colorado SHPO to discuss potential effects to cultural resources and the proposed monitoring measures (attachment C). The Colorado SHPO concurred in writing with Reclamation's proposed monitoring plan. Reclamation also consulted with the Jicarilla Apache Tribe, the Southern Ute Tribe, and the Ute Mountain Ute Tribe regarding the proposed project. Reclamation received one written response, from the Southern Ute Tribe, that stated that the tribe has no cultural resources concerns. Reclamation received similar verbal responses from the Jicarilla Apache Tribe and Ute Mountain Ute Tribe.

Reclamation also held a meeting with Pegi Jodry, Smithsonian Institution archaeologist, who is conducting investigations in the Closed Basin. She provided valuable information on the results of her research and discoveries in the area since Reclamation completed cultural resource compliance activities for the Closed Basin Division in the mid-1980s.

Indian Trust Assets Consultation

Reclamation sent letters to the Jicarilla Apache Tribe, the Southern Ute Tribe, and the Ute Mountain Ute Tribe requesting government-to-government consultation to identify possible concerns regarding Indian trust assets in the project area. The tribes responded that they had no Indian trust asset concerns. Reclamation also contacted the appropriate BIA offices regarding Indian trust assets. Reclamation received no written responses, but through verbal communication with the BIA, Southern Ute Agency, determined that BIA has no concerns.

Environmental Commitments

Reclamation will continue the project's existing environmental commitment program to ensure that measures to avoid, minimize, and mitigate impacts continue to be carried out. The monitoring program for the project's operation will continue to ensure that impacts do not exceed predicted levels and that mitigation goals are achieved. Monitoring potential impacts to vegetation as a result of increased groundwater drawdowns will continue, as described in the FES and final supplement to the FES. Annual reports will continue document the status of mitigation and monitoring. Most of the new environmental commitments for this well relocation project involve mitigating short-term disturbance within the 1-acre well sites.

Reclamation will honor the following new environmental commitments in association with the well relocation project:

- • A dust and noise abatement program will be implemented (p. 13).
- • Storage and transportation of hazardous material at any one location will be limited (p. 13).
- • A spill prevention control and countermeasure plan will be implemented; accidental spills would be cleaned up immediately (p. 13).
- • Neutralized spent treatment solution from the chemical treatment of the wells will be released through a 4-inch rubber hose, allowing it to be directed away from vegetation monitoring sites and equipment (p. 17).
- • Any chemicals used to treat the wells will be stored off site and picked up and transported in accordance with Federal and State laws (p. 17).
- • After wells have been chemically treated and pump tested, laboratory personnel will monitor water quality for routine parameters, such as metals, bacteria, and major anions (p. 17).
- • Following construction, the 1-acre well sites will be monitored and (if necessary) treated to prevent the invasion of noxious weeds. If native vegetation does not become established, revegetation will be accomplished by seeding with native grasses to prevent the invasion of noxious weeds (p. 33).

- • During advanced planning, Reclamation will identify potential mountain plover habitat within 100 meters of the 1-acre well sites. For all sites where such habitat is found, area searches for mountain plovers will be conducted a few days before any scheduled construction activities (from mid-March to mid-August, if landowner permission is granted). If mountain plovers are found, Reclamation will re-initiate consultation with FWS, and construction at that site will be postponed until the plovers leave the area or mid-August (whichever occurs first) (p. 41).
- • During advanced planning, Reclamation will identify potential snowy plover habitat within 100 meters of the 1-acre well sites. For all sites where such habitat is found, area searches for snowy plovers will be conducted a few days before any scheduled construction activities (from mid-March to mid-August, if landowner permission is granted). If snowy plovers are found, Reclamation will re-initiate consultation with FWS (p. 45).
- • If BLM determines that there are any newly discovered populations of little beeplant in the 1-acre well sites, Reclamation will consult with BLM to assess impacts and develop conservation measures (p. 47).
- • Before construction, a Class III cultural resources inventory of the commercial gravel source for well re-drilling will be conducted. The gravel source will be restricted to areas containing no significant cultural resources, based on the results of the inventory (p. 52).
- • Reclamation will conduct archeological monitoring of 10 percent of the wells (17) to be drilled; the wells to be monitored are within 210 feet of archeological sites (p. 52). The State Historic Preservation Office consultation letter (attachment C) includes the list of wells to be monitored.

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Relocation of Salvage Wells
Closed Basin Division, San Luis Basin Project

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Also personal communications with Terry Knight Sr., Ute Mountain Ute Tribe; Adelaide Paiz, Jicarilla Apache Tribe; Superintendent Mike Stancampiano, Bureau of Indian Affairs, Southern Ute Agency.

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| Ralph Curtis | Manager | Rio Grande Water Conservation District | Land use assessment |
| Michelle Gilley | Agronomist | Agro Engineering | Vegetation monitoring assessment |
| Ella Mae Herrera | Chief, Operations | Bureau of Reclamation, Alamosa Field Division Office | Operational and administrative review |
| Signa Larralde | Archeologist | Bureau of Reclamation, Albuquerque Area Office | Cultural resources and Indian trust assets assessments |
| Christine Pfaff | Historian | Bureau of Reclamation, Office of Policy | Study management; cultural resources assessment |
| Richard Roberts | Hydrologist | Bureau of Reclamation, Alamosa Field Division Office | Hydrology assessment |
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La Jara, CO 81140

* Commented on draft.

Relocation of Salvage Wells
Closed Basin Division, San Luis Basin Project

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Attachment A



IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF RECLAMATION
Albuquerque Area Office
505 Marquette N.W. Suite 1313
Albuquerque, New Mexico 87102-2162

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MEMORANDUM

To: Mr. Leroy Carlson, US Fish and Wildlife Service, Colorado Field Office, Ecological Services, 755 Parfet Street, Suite 361, Lakewood, CO 80215

From: Mr. Kenneth G. Maxey
Area Manager

Subject: Request for Threatened, Endangered, Proposed, and/or Candidate Species List and Initiation of Informal Consultation for the Closed Basin Salvage Well Relocation Project; Saguache and Alamosa Counties, Colorado

In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended, the Bureau of Reclamation (Reclamation) is requesting information for threatened, endangered, proposed, and/or candidate species which may occur in the Closed Basin Salvage Well Relocation Project (Project) area. By this memorandum, Reclamation is requesting a species list and the initiation of informal consultation for the proposed Project.

To assist you in providing the requested species list and subsequent informal consultation discussions, two maps defining the Project study/impact area are attached including a reference guide to USGS maps representing the Project area. The following background information is also provided.

The Closed Basin Division operates 170 wells that collect water from the Closed Basin, situated between the Sangre De Cristo and San Juan Mountains in the San Luis Valley, Colorado. This water is delivered to the Rio Grande to partially fulfill Colorado's water delivery obligations under the Rio Grande Compact and meet the United States' commitments to Mexico under the Rio Grande Convention of 1906.

Public Law 92-514, dated October 20, 1972, authorized the Project for construction. A final Environmental Impact Statement (EIS) was filed in 1979. A final supplement to the Environmental Impact Statement (FSEIS) was signed in 1982, which presented project changes that had occurred since 1979. The FSEIS also contained updated information on the relationship of groundwater level changes and associated wetlands and terrestrial vegetation, and presented the US Fish and Wildlife Service's (Service) revised recommended mitigation measures. In 1982, the Service submitted a Fish and Wildlife Coordination Act Report, which was recently amended by a Memorandum from your office dated March 6, 2001.

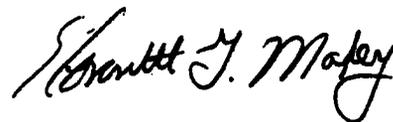
Development of the wells began in the early 1980s; over time they have degraded and have not sustained their design yield. Salvage well design and construction methods, when coupled with geochemical history of the Closed Basin, appear to have been the major contributing factors to well degradation. A large number of the wells, particularly in the northern portion of the basin

referred to as Stages 3, 4, and 5, have experienced significant performance declines since the mid-1990's.

This situation is triggering the proposed action to re-drill new wells in close proximity to the existing wells (within the one-acre tract originally established for each well) using a modified well design which would increase production and allow the wells to be chemically treated periodically, prolonging the sustainable yield of each well. Due to the extreme decline in well production, it is foreseen that up to 170 wells would be re-drilled over an approximate ten-year time frame. An underground 6-inch pipeline will be installed between the new well and existing underground well vaults to take full advantage of existing control systems for the well and plumbing features present in the existing well vault which deliver water to the conveyance channel. No other construction or changes are proposed. The amount of pumping, once the wells are operational, will be within the agreed-upon values found in the FSEIS of 66,000 to 104,000 acre-feet (AF) per year with 100,600 AF being a reasonable objective.

In summary, Reclamation does not consider the proposal to represent a major new Federal action. Reclamation is currently in the process of preparing an Environmental Assessment (EA), which will also serve as the Biological Assessment (BA) for the purpose of informal consultation with your office.

We hope that the information we have provided is sufficient for preparing the requested species list and initiating informal consultation discussions. We look forward to receiving the requested species list as soon as possible. If you have any questions regarding our request, need additional information, or wish to clarify anything, please contact Nancy Umbreit of my staff at (505) 248-5331.



Attachments

cc: Commissioner's Office, Denver CO ✓
Attention: Larry White (D-8210)
(w/att)

ORIGINAL

Larry White



United States Department of the Interior ALBUQUERQUE AREA OFFICE

FISH AND WILDLIFE SERVICE
Ecological Services
764 Horizon Drive, Building B
Grand Junction, Colorado 81506-3946

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| RECEIVED FOR OFFICIAL FILE COPY | |
| APR 5 2002 | |
| Classification: | EW-1.10 |
| Project: | GF |
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IN REPLY REFER TO:
ES/CO:BR
MS 65412 GJ

April 2, 2002

Memorandum

To: Area Manager, Bureau of Reclamation, Albuquerque Area Office, Albuquerque, New Mexico

From: Assistant Field Supervisor, Fish and Wildlife Service, Ecological Services, Grand Junction, Colorado

Subject: Species List Request for Closed Basin Salvage Well Relocation Project; Saguache and Alamosa Counties, Colorado

We have received your February 1, 2002, correspondence requesting a list of threatened (FT) endangered (FE), proposed (FP), and candidate (FC) species potentially effected by the proposed Closed Basin Salvage Well Project in Saguache and Alamosa Counties, Colorado. While candidate species have no legal protection under the Endangered Species Act, it is within the spirit of the Act to consider project impacts to potentially sensitive species. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed. If a candidate species does become listed as endangered, threatened, or proposed you will need to consult with the Service. Currently the Service is under court order to evaluate the status of the Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*). Based on the duration of your project, it would be advisable to now take into consideration your projects potential impacts to the Rio Grande cutthroat trout. Please be aware that endangered and threatened species lists should be updated every 90 days by telephone or in writing. The following species are of potential concern for your project.

Federally Listed Species of Saguache and Alamosa Counties, Colorado

- | | |
|-------------------------------------|-----------------------------------|
| Bald eagle (FT) | <i>Haliaeetus leucocephalus</i> |
| Mountain plover (FP) | <i>Charadrius montanus</i> |
| Gunnison sage-grouse (FC) | <i>Centrocercus minimus</i> |
| Southwestern willow flycatcher (FE) | <i>Empidonax traillii extimus</i> |
| Yellow-billed cuckoo (FC) | <i>Coccyzus americanus</i> |
| Whooping crane (FE) | <i>Grus americana</i> |
| Black-footed ferret (FE) | <i>Mustela nigripes</i> |

If the Service can be of further assistance, please contact John Kleopfer at the letterhead address or (970) 245-3920, extension 39.

pc: FWS/ES, Lakewood
JKleopfer:SalvageWellMem.wpd:040202

Attachment B



ORIGINAL

SOUTHERN UTE INDIAN TRIBE

ALBUQUERQUE AREA OFFICE

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April 24, 2002

Attn: Ms. Signa Larralde
Bureau of Reclamation
505 Marquette N. W. Suite 1313
Albuquerque, NM 87102-2162

Subject: Request for Consultation Regarding Proposed Closed Basin
Salvage Well Drilling Project

Dear Ms Benz:

The Southern Ute Indian Tribe believes, at this time, there are no known impacts to areas of Native American cultural sites that are sensitive to this Tribe in regards to the proposed re-drilling of up to 170 new salvage wells, within the one acre tracts encompassing the existing wells. In the event of inadvertent discoveries of Native American sites, artifacts, or human remains, this Tribe would appreciate immediate notification of such findings.

Should you require additional comments or have any questions, feel free to contact Mr. Neil Cloud, NAGPRA Coordinator, at the number listed below, extension 2209. Mr. Neil Cloud is available for a consultation if you set a date and time.

Sincerely,

Edna Frost, Director
Department of Tribal Information Services

Cc: Neil Cloud, NAGPRA Coordinator

Attachment C



United States Department of the Interior

BUREAU OF RECLAMATION
Albuquerque Area Office
505 Marquette N.W. Suite 1313
Albuquerque, New Mexico 87102-2162

IN REPLY REFER TO:

ALB-158
ENV-3.00

JUN 21 2002

*Concurrence
rec'd 6/18/02
SH*

EXPRESS MAIL

Ms. Georgianna Contiguglia
Colorado State Historic Preservation Officer
1300 Broadway
Denver Colorado 80203
Attention: Mr. Jim Green
Colorado Office of Archaeology and Historic Preservation

Subject: Closed Basin Water Well Re-Drilling Project

Dear Ms. Contiguglia:

In order to comply with Section 106 of the National Historic Preservation Act of 1966, the Bureau of Reclamation's (Reclamation) Albuquerque Area Office (AAO) requests your views on our efforts to identify and determine effects on historic properties for the above project (as specified in 36 CFR 800.4). The proposed project is to re-drill up to 170 new salvage wells to replace existing wells as a part of our Closed Basin Division in the San Luis Valley, Alamosa and Saguache Counties, Colorado.

Reclamation currently operates 170 salvage wells in the Closed Basin that pump water from the unconfined aquifer and deliver it through a canal to the Rio Grande River to partially fulfill Colorado's water delivery obligations downstream. Development of the wells began in the early 1980s and was completed in the mid-1990s. Over time, the wells have degraded due to severe chemical and biological biofouling, and have not sustained their design yield.

The proposed action involves re-drilling up to 170 new salvage wells within the one-acre tracts encompassing the existing wells. Pipelines will be installed to connect the new wells to the existing ones. The latter will be maintained as monitoring wells. In association with the new wells, a chemical treatment maintenance plan is being proposed to help prevent the wells from degrading so rapidly again. A map of the Closed Basin project is enclosed.

A thorough assessment of environmental impacts was undertaken in association with the original well drilling. Between 1976 and 1986, Reclamation conducted extensive cultural resources investigations in the project area. Although it was estimated that about 3,000 acres of ground would be disturbed, an area of some 20,000 acres was subjected to intensive archaeological survey. This was done so that the proposed location of project features could be shifted, if

necessary, to avoid impacting significant sites during construction. Ultimately, project planners were able to select a final canal alignment and one-acre well sites that avoided any *significant* sites. *All* deposits of archaeological materials were avoided whenever feasible. The program of systematic planned avoidance was so successful that no large-scale archaeological testing was found to be needed, and no mitigative excavation was required

Nearly 350 sites were recorded during the investigations. A number of the sites were test excavated, and numerous back hoe trenches were dug. The testing program was limited to those few locations where buried archaeological materials were a remote possibility within the zone of future construction disturbance. The subsurface testing yielded no archaeological data. Ultimately, a total of 91 prehistoric sites were affected in some way by project construction. This was considered quite low given the nearly 200 miles of linear impact area in the project boundaries. All of the disturbed sites were surface scatters, and in over half of the instances, less than ten-percent of the site area was impacted.

The proposed action is not expected to impact any significant cultural resources. There will be minimal new ground disturbance (well drilling within one acre tracts), and it will all take place in areas previously surveyed and found devoid of significant cultural resources. Gravel to be used in the packing for the new wells will be obtained from an existing quarry pit. A Class III inventory of the gravel quarry will be performed.

The process of drilling the original 170 wells disturbed the ground surface more or less severely within the one acre tracts, so it is very unlikely that any surface context remains for the cultural resources that were recorded during the 1980s inventories within those tracts. It is possible, however, that subsurface cultural materials may be found within the one acre tracts. In order to take this possibility into account, we propose to monitor well drilling activities at well sites in areas with the highest probability of yielding archaeological information. The well sites with the highest probability of yielding archaeological information are those located on archaeological sites recommended not significant when they were recorded during the 1980s, or near archaeological sites that may or may not have been recommended significant when they were initially recorded. As described above, no well sites were located on significant archaeological sites. A list of wells located within 210 feet (approximately 70m) of archaeological sites is enclosed. At least 17 of these wells, or a 10% sample of the project wells, will be monitored. On the enclosed map, the wells are marked with site numbers.

If cultural resources are discovered during construction, work in the immediate area would cease until a qualified archaeologist evaluates the site and takes appropriate measures. If contractors or others inadvertently discover human remains during construction, work in the immediate vicinity of the discovery would cease, except to secure and protect the remains, and a Reclamation archaeologist would be contacted to initiate procedures in accordance with the Native American Graves Protection and Repatriation Act.

If the above measures are implemented, we recommend that no historic properties will be

affected by this project. Please provide your views on this "no historic properties affected" recommendation. If we do not hear from your office within 30 days, we will assume your concurrence and proceed.

We have consulted with the Southern Ute Tribe, the Jicarilla Apache Tribe, and the Ute Mountain Ute Tribe regarding the proposed project. Neil Cloud of the Southern Ute Tribe, Terry Knight of the Ute Mountain Ute Tribe, and Adelaide Pais of the Jicarilla Apache Tribe have responded that their respective tribes have no cultural resources concerns regarding the project, unless there are discoveries during construction.

It is anticipated that the Environmental Assessment (EA) for re-drilling the wells will be released in mid-summer. A copy will be sent to you for your review and comment. In the meantime, if you have any concerns or questions relating to cultural resources and the proposed action, please feel free to contact Ms. Christine Pfaff, author of the EA, at (303) 445-2712 or Dr. Signa Larralde, Reclamation's AAO archaeologist, at (505) 248-5363.

Sincerely,

Marc D. Rucker
 Marc D. Rucker, Manager
 Environment and Lands Division

Enclosures

Concur:

Mark Wolfe DSHPO

Date: 7/3/02

No Historic Properties Affected:

for Colorado State Historic Preservation Officer