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

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Lon Roberts — 1/28/03

Manager, Environment and Lands Division — Date

for Lon Roberts — 1/28/03

Area Manager, Albuquerque Area Office — Date

FONSI Number: AAO-03-05

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

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 in1982 (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.

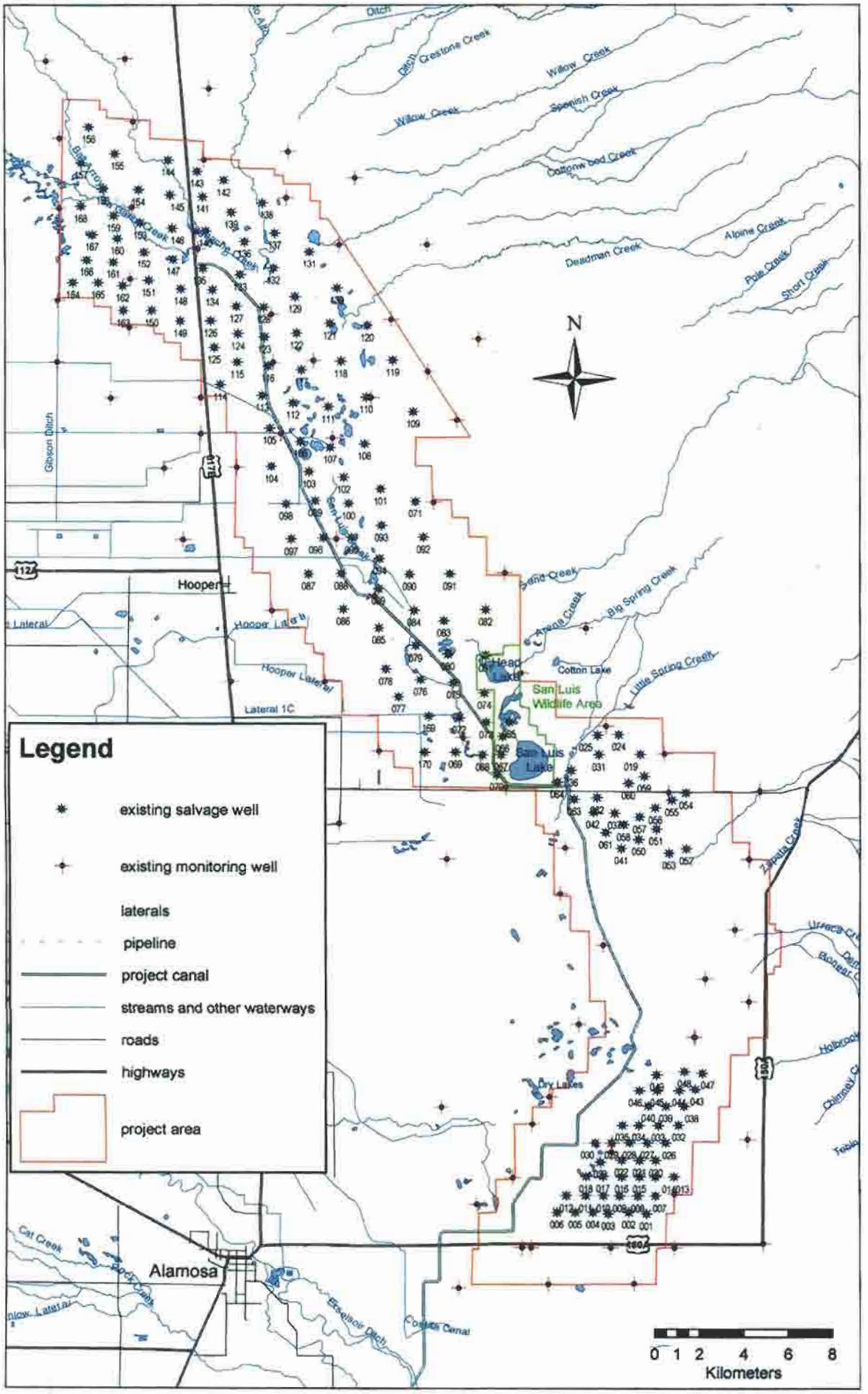

Figure 1-2. Salvage and monitoring well location map

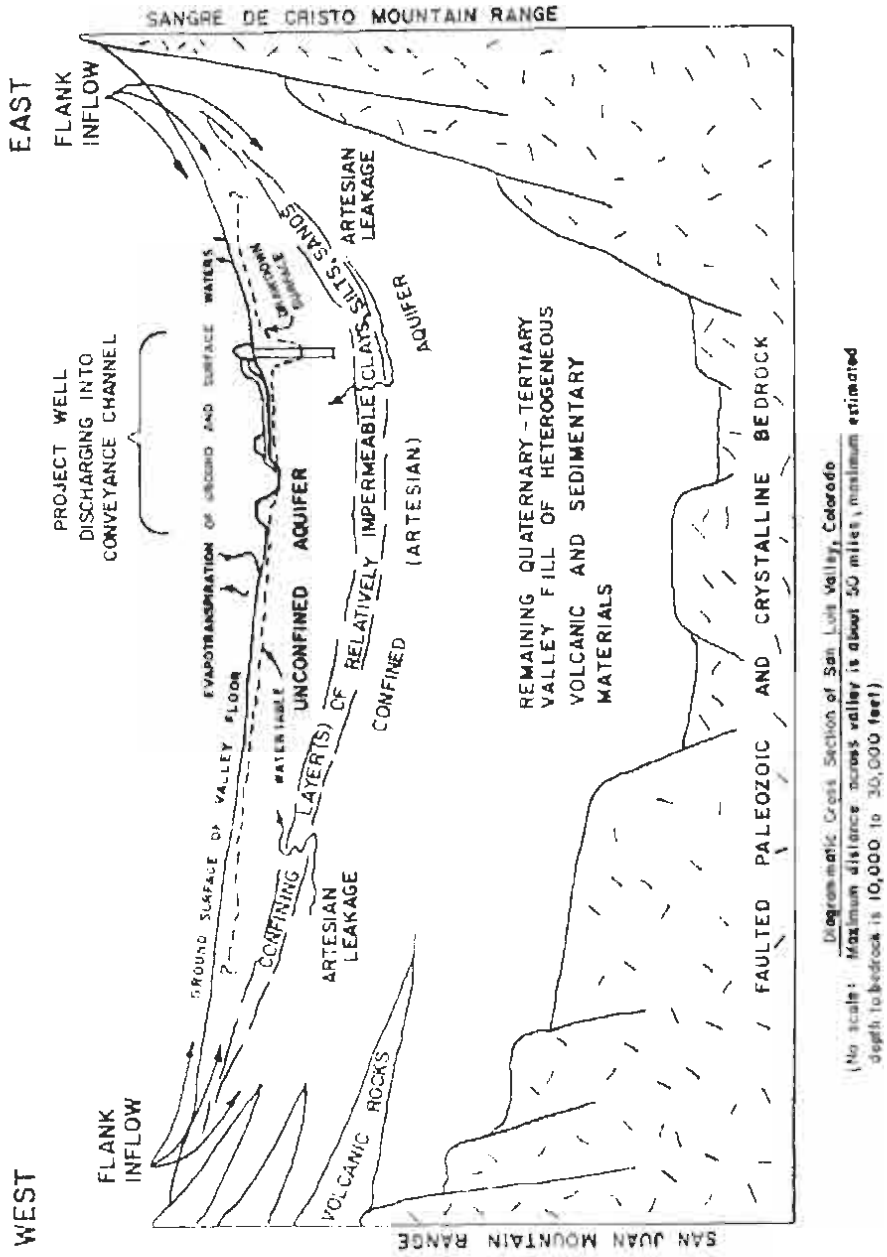

Figure 3-1. Cross-section of the San Luis Valley (from *San Luis Valley Project, Colorado, Closed Basin Division, Facts and Concepts*, Reclamation).