Summary

The Bureau of Reclamation's Frenchman Unit (Unit) in south-central Nebraska lacks the water supply to meet all authorized purposes. Enders Reservoir supplies project water to the Frenchman Valley Irrigation District (FVID) and the Hitchcock and Red Willow Irrigation District (H&RWID). Enders and the surrounding land provide fishing, flat-water recreation, hunting, and camping.

Reclamation studies in 1977 and 1997 showed that surface water inflows into the reservoir had dropped drastically due to intensive drilling of irrigation wells upstream in Frenchman Creek, and to soil and water conservation practices in the area. FVID and H&RWID have not received a full water supply since the early 1970's. The last time Enders Reservoir reached the top of conservation (TOC) pool at elevation 3112.3 feet was in 1968.

By existing Nebraska water right law, all inflows into Enders Reservoir, and natural flows to Frenchman Creek below the dam, belong to the Unit. These water rights are needed to meet irrigation obligations to the FVID and H&RWID.

Purpose and Scope

The purpose of this study is to determine whether the alternative plans analyzed in this report have sufficient potential to justify further Federal involvement, including a detailed feasibility report on the Unit.

Background

The Unit is one of four in Reclamation's Frenchman-Cambridge Division. It is located on Frenchman Creek, a tributary to the Republican River near the Kansas border. The study area encompasses Chase, Dundy, Hays, Hitchcock, Perkins, and Red Willow counties.

Water stored in Enders Reservoir—along with flows from the Frenchman and Stinking Water Creeks—supplies the Culbertson Canal and the Culbertson Extension Canal Systems (see map at front of the report).

In a 1998 lawsuit, Kansas charged Colorado and Nebraska had violated the Republican River Compact which divides the river's water supply among the three states. The states negotiated a settlement, called the *Final Settlement Stipulation* (FSS), approved by the Supreme Court in May 2003. The FSS mandated an accounting of stream depletions caused by groundwater pumping.

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CASE # Deposition

Under the water terms in the FSS, Nebraska exceeded its allocation from 2003-2006. To try to comply, Nebraska enacted legislation in 2004 by which the Nebraska Department of Natural Resources (DNR), the Upper Republican Natural Resource District, and the Middle Republican Natural Resource District (NRD's) developed integrated surface water/groundwater management plans. These *Integrated Water Management Plans* (IMP's) include limiting groundwater depletions by the NRD's. The IMP's predict that target stream flows could be met with a 20 percent reduction in groundwater pumping in the Republican River Basin from average pumping from 1998-2002.

The DNR and/or NRD's have tried to improve streamflows though other means as well: buying or leasing surface water from willing irrigation districts or taxing property in the basin to pay for surface water. Neither of these methods has resulted in reduced groundwater pumping in the basin.

Alternatives

Three alternative plans were developed by Reclamation with input from the study partners to meet planning objectives and avoid constraints.

- Flow-through Alternative
- Recreation Alternative, and
- Groundwater Recharge Alternative.

These alternatives were compared to the *Future-Without Project Condition*, which represents no change in present conditions of the Unit. Table S.1 describes the salient characteristics of the alternatives; summarizes irrigation, flat-water recreation, fish and wildlife, and flood benefits of each; and concludes whether or not the alternatives would meet the three planning objectives.

Conclusions

Nebraska's current IMP's project that reductions in groundwater pumping to meet the will result in only a small increase in streamflows in the basin. The surface water supply of the Unit will not return to levels necessary to sustain all project irrigation requirements.

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Chapter 7: *Conclusions and Concerns*

Conclusions

Because of the severe decline in streamflows in the Frenchman River Basin due to intensive groundwater pumping and soil and water conservation measures, the Unit no longer operates as authorized.

Nebraska's current IMP's project the Republican River Compact will result in only a small increase in streamflows in the basin. The surface water supply of the Unit will not return to levels necessary to sustain all project irrigation requirements.

Future Surface Water Supply

The future surface water supply will not provide enough water to support both the 9,292 project acres of the FVID and the 11,915 acres of the H&RWID.

Reclamation's Appraisal report, Unit (1977) stated:

> *. . . the severe depletion to stream flow expected to result from irrigation well development upstream from the Culbertson Diversion Dam would reduce the acreage that can be provided an adequate project water supply to 10,250 acres. This supply was estimated to average 1.34 feet/acre during the 8-year period* (p. IV-14).

Using the RRCA groundwater model to predict streamflows for the next 40 years, along with historic streamflows and delivery records, the future available surface water above Culbertson Diversion Dam could provide an adequate water supply for an estimated 3,300 acres (based on a 12 inches/acre supply). This estimate is based on an assumed four-month irrigation season and a delivery system efficiency estimate of 40 percent.

Without drastic reductions in groundwater pumping in the Frenchman Basin, there will not be enough streamflows to provide any sizeable deliveries to the H&RWID. The H&RWID's current contract with Reclamation allows them to continue to "wait and see" in case drastic measures cause future streamflows to increase. Also, the H&RWID can retain their water right for a period of 30 years due to the shortages (possibly extended by petition-see Appendix A).

Recreation Opportunities

Benefits

RRCA groundwater modeling shows that future streamflows in the Frenchman River Basin will increase slightly from present levels and will stabilize at these levels for a short period before the lag effect from upland groundwater wells causes streamflows to decline again. The modeling indicates that these slight improvements to streamflows above Enders Reservoir will provide enough water to maintain the higher minimum pool of elevation 3089.4 feet of the Recreation Alternative. This would result in increased recreational facility availability, visitation, and economic value compared to the Future-Without Project Condition. Reservoir operations show that the supply to project irrigators of sustaining the higher minimum pool would approximate 2 inches/acre every fifth year.

Recreational economic value for 2002-2006 was estimated using the average number of current visits by recreational activity. Using the full year visitation and percentage by activity estimates, recreation value averaged nearly $1.9 million yearly. Focusing on estimates of visits during the high recreational season (May-September) applied by recreational activity to an estimate of average visits by recreational activity provided an estimate of average yearly recreational economic value averaging $1.5 million yearly. The top three activities in terms of economic value proved to be camping, fishing, and boating.

Flat-water recreation and fishing would benefit from establishment of a minimum pool at the reservoir. A new minimum pool at elevation 3089.4 feet would maintain a surface area of 825 acres and 14,426 AF of water in the reservoir. Data show that the fishery in Enders would benefit from the higher minimum pool, especially panfish and open water species.

Concern

The NGPC has concerns about investing in future recreational facilities at the reservoir or maintaining existing facilities because of budgetary constraints.

Groundwater Recharge Opportunities

Benefits

Groundwater recharge benefits from operating the Unit's delivery system are well recognized by project irrigators. An estimated 90 percent of project lands irrigated by surface water are also irrigated with groundwater (see Appendix B). Without operating the delivery system, groundwater levels in the project area will continue to decline at a faster rate than if the system were operating.

The FVID has an 1890 senior water right and will continue to divert available natural flows. In order to provide groundwater recharge benefits with FVID natural flows to H&RWID project lands, an agreement would have to be made between the two districts.

Concerns

There are concerns connected to groundwater recharge, too. These are:

- The DNR would need to acknowledge groundwater recharge as a beneficial use
- If it would not change the priority date, the DNR might need to amend and/or change the FVID's natural flow right from an irrigation benefit to a groundwater recharge benefit
- If groundwater benefits were realized in the H&RWID project area, the DNR might need to amend and/or change the districts' natural flow rights and storage use rights
- If using available storage in Enders Reservoir for groundwater recharge, the DNR might need to amend and/or change the United States' storage use water right from supplemental irrigation to groundwater recharge
- Project boundaries might need to be adjusted to include non-project lands benefiting from project recharge
- It is the DNR's preliminary opinion that project operations could continue with the FVID using natural flows to prime the delivery system to prepare for delivering natural flows and storage water in Enders, with the acknowledgement that the benefits of groundwater recharge were an authorized project benefit
- Congressional legislation would be needed to change and/or add groundwater recharge as a project benefit
- If adding areas within the project, project boundaries would need to be adjusted
- If the project boundaries were expended, a study would be required to determine which lands would benefit from project recharge.