Chapter 5: *Potential Effects of the Alternatives*

Evaluation

Alternatives were evaluated against the Future-Without Project Condition according to planning objectives and constraints; the degree to which they would solve problems, meet needs and take advantage of opportunities in the project area; and according to their environmental and social acceptability. This evaluation is shown in Table 5.1.

The study partners developed specific standards of effectiveness, implementability, and costs to evaluate the alternatives, too. These standards are:

Effectiveness

Effectiveness measures how well an alternative meets the defined objectives. Factors considered include the alternative's technical effectiveness to meet the objectives, reliability, and Republican River Basin-wide distribution of benefits and effects, including fish, wildlife, and recreation. For this study, effectiveness considered:

- Reservoir yield in AF
- Likelihood the yield would benefit Frenchman Creek
- Ability to help sustain alluvial groundwater levels
- Ability to help sustain natural flows
- Ability to maintain irrigation benefits
- Ability to sustain flood flows within natural variability in terms of timing, frequency, magnitude
- The Unit's ability to reliably deliver project water in the future
- The Unit's ability to replace or reduce groundwater demand
- Potential for unintended environmental consequences.

Implementability

Implementability includes both the technical and administrative feasibility of the alternative. It considers characteristics of the proposed alternative. Implementability includes an alternative's political constraints, including the social equity of benefits and effects and public support or opposition. Implementability considered:

- Hydrologic constraints
- Environmental concerns, such as fish, wildlife, and recreation
- The state of technology, such as computer water models
- Legal and regulatory concerns at the local, state, and Federal levels
- Water rights

- Compatibility of the project with nearby uses
- Complexity of crossing jurisdictional boundaries
- Likely support or opposition.

Costs

O&M costs rather than detailed estimates were used to determine ratings. Costs considered:

- FVID's and H&RWID's O&M expenses
- Total annual cost (sum of capital cost amortized over the life of the project plus O&M)
- Availability of state or Federal funding
- Timing when the funding would be needed.

Comparison

Planning Objectives and Constraints

The Future-Without Condition would maintain the viability of the FVID and the H&RWID, although with continued reduced irrigation benefits because of lessened inflows into Enders Reservoir. The Future-Without Project Condition would also reduce recreation at the reservoir. For maintaining irrigation and recreation benefits, even though at a reduced level, the Future-Without could be said to protect the Federal investment in the Unit.

The Flow-through Alternative would be similar to the Future-Without Project Condition regarding irrigation benefits, but it would virtually eliminate flat-water recreation. It would also be similar to the Future-Without in protecting the Federal investment, although there might be a question of who would pay for those benefits.

The Recreation Alternative would maintain viability of the districts, but there would be less storage available to them because of the new minimum pool established for recreation. Recreation would be improved compared to the Future-Without and the Federal investment would be protected, although with greater recreational and fewer irrigation benefits.

The Groundwater Recharge Alternative would maintain viability of the districts. It would not change recreation in comparison to the Future-Without Project Condition. Thus, the Federal investment would be protected, with irrigation and recreational benefits maintained.

Problems and Needs

Neither the Future-Without Project Condition, nor any of the alternatives, would do anything to restore the declining water supply in the Frenchman River Basin. Water demands would continue to exceed supply. Irrigation, recreation, and the other needs would remain the same in the Future-Without Project Condition and the alternatives, with the exception that groundwater recharge in the project area would be improved as expected in the Groundwater Recharge Alternative.

Environmental and Social Acceptability

Recreation and fish and wildlife would continue in the Unit in the Future-Without Project Condition. Walleye, crappie, bass and crappie fishing would continue to attract anglers to the average 671 surface-acre reservoir, and big game, game birds, and waterfowl to the lands surrounding the reservoir. Threatened and Endangered species, cultural resources, and ITA's would be unaffected in the Future-Without and in all of the alternatives. The Unit would continue to provide irrigation benefits on a much reduced basis because of intensive groundwater pumping and soil and water conservation measures upstream. Only the FVID receives irrigation water at present: 4 inches/acre from natural flows below Enders Dam, and 3 inches/acre from Enders Reservoir every fifth year (assuming a 20 percent reduction in groundwater pumping upstream). H&RWID receives nothing.

In the Flow-through Alternative, flat-water recreation and fishing would almost be eliminated because of the smaller reservoir area (567 surface acres at elevation 3080.0 feet). Wildlife might increase due to the exposed lands in the reservoir's upper end. The Unit would provide more irrigation benefits per year, 4.5 inches/acre from natural flows below the dam to FVID. If FVID and H&RWID shared natural flows, benefits would be slightly less than 2 inches/acre.

Flat-water recreation, fishing, and wildlife would be better in the Recreation Alternative than in the Future-Without Project Condition, with the reservoir of 825 surface acres at elevation 3089.4 feet. The Unit would provide less irrigation benefit per year in comparison to the Future-Without, 1.5 inches/acre from natural flows below the dam every fifth year to FVID only.

In the Groundwater Recharge Alternative, flat-water recreation and fishing would almost be eliminated.

Table 5.1: Evaluation of the Alternatives

Alternative	Objectives/Constraints	Problems/Needs	Environmental/Social Acceptability
Future-without- the Project Condition	This alternative would maintain viability of the FVID and H&RWID, although irrigation benefits would continue to be limited because of reduced inflows into the reservoir. Recreation would also continue but lessened for the same reason. Thus, this alternative would protect the Federal investment though it would offer reduced benefits. This alternative would meet the U.S.'s contracts with the districts, would meet Nebraska state water laws and regulations, and would fit within the Republican River Compact.	The Future-without Condition would do nothing about the declining water supply in the Frenchman River Basin, so water demands would continue to exceed water supply. At a reduced level, this alternative would meet irrigation; recreation and fish and wildlife; and other needs.	Recreation and fish and wildlife would continue as at present in this alternative; T&E species, cultural resources, and ITA's would be unaffected.
Flow through Alternative	The Flow through Alternative would also maintain viability of the FVID and H&RWID, although irrigation water would come solely from natural flows below the dam. Recreation would continue at a much reduced level because flows would pass through the reservoir. This alternative would protect the Federal investment though it would offer reduced benefits. This alternative would not meet contracts with the districts but would comply with state water laws and the Compact.	This alternative would do nothing about the declining water supply in the basin, so water demands would continue to exceed water supply. It would, at a reduced level, meet irrigation; wildlife; and some recreational needs, but flat-water recreation and fishing would all but disappear.	Some recreation and wildlife would continue at a reduced level, but flat-water recreation and fishing would all but disappear; T&E species, cultural resources, and ITA's would be unaffected.

Recreation Alternative	The Recreation Alternative would maintain viability of the FVID and H&RWID but there would be less reservoir storage available to them because of the new minimum pool. Recreation would improve for the same reason. This alternative would protect the Federal investment though it would offer reduced benefits. This alternative would meet contracts with the districts, would meet state water laws, and would comply with the Compact.	This alternative would do nothing about the declining water supply in the basin, so water demands would continue to exceed water supply. It would, at a reduced level, meet irrigation; recreation and fish and wildlife; and other needs.	Recreation and fish and wildlife would improve in this alternative; T&E species, cultural resources, and ITA's would be unaffected.
Groundwater Recharge Alternative	This alternative would maintain viability of the FVID and H&RWID as it would recharge groundwater in the project area. It would not maintain recreation at the reservoir. It would protect the Federal investment but at the expense of recreational benefits. This alternative would not meet contracts with the districts but would meet state water laws and would comply with the Compact.	The Groundwater Recharge Alternative would do nothing about the declining water supply in the basin, so water demands would continue to exceed water supply. It would meet irrigation and other needs, but not those of recreation and fish and wildlife.	Recreation and fish and wildlife would decline in this alternative; T&E species, cultural resources, and ITA's would be unaffected.