CHAPTER 10—
FINDINGS AND CONCLUSIONS

GENERAL

If no action is taken to develop additional water supplies, the Red River Valley will experience significant water shortages in the future during drought periods. There are alternatives, both using in-basin water and importing Missouri River water, which could meet Reclamation's year-2050 projected shortages. Costs and impacts associated with these alternatives vary considerably. Additional studies are needed before a preferred alternative can be selected.

FINDINGS

The major findings and conclusions resulting from this study follow:

- Significant shortages exist under either Reclamation's or the Participants' year-2050 projections, even without consideration of instream flow requirements.

- The alternatives presented herein were sized only to meet the municipal, rural, and industrial shortages. Potential benefits for instream flow (e.g., water quality, aquatic habitat, fish and wildlife, recreation) and irrigation could be achieved if operational plans are developed in recognition of these purposes.

- There are both in-basin and out-of-basin (Missouri River water import) alternatives that can meet Reclamation's projected 2050 MR&I shortages.

- Only the out-of-basin alternatives can meet the Participants' projected 2050 MR&I shortages.

- Most of the alternatives evaluated herein appear to be financially viable.

- Feasibility-level studies are required prior to the selection a preferred alternative.

- The Technical Steering Team identified many issues and instances of insufficient data that will require consideration in future studies, and these are summarized below.

CONSIDERATIONS FOR FUTURE STUDIES

This report presents a wide range of alternatives to meet the water shortages of the Red River Valley through the year 2050, though it does not identify a preferred alternative. The study was a joint effort between Reclamation and the North Dakota Technical Steering Team. It should be understood that many of the features or alternatives presented herein are highly controversial and were not agreed to by consensus. The team agrees that many items and sections within this report require further study before completion of a feasibility level study and the identification of a preferred alternative. The following is a list of items, identified by the team, that need to be considered in scoping future studies.

- The costs associated with not utilizing portions of the existing Garrison Diversion Unit facilities were briefly studied and, in particular, costs were estimated for minimal maintenance and for full abandonment. A partial abandonment was not analyzed and could have the potential for long term savings.

- The model used for this report is limited in its dynamic ability to incorporate operational details of the systems. This model relies on monthly flow data and does not account for daily demand variations. As a design parameter, the greatest monthly shortage was used to determine facility sizing. An effective operational plan will have to be developed in order to optimize the systems. This has to the potential to lead to cost savings in construction, operations, and maintenance.

- The period of record used in the model should be updated. Currently, it does not account for the drought period of 1988–92 nor for the wet period that began in 1993. The period of record should be extended to include these period. Also, it may be useful to simulate variable rate demands for wet years and dry years.

- Demand projections should be reassessed, in light of the significant difference between the participant city projections and the projections developed by Reclamation.

- A basin-wide analysis approach was not used to complete this report. The state of Minnesota was involved only through the city of Moorhead. Hydrologic contribution to the study area from the Minnesota side was simulated using historic river flows. No attempts have been made to include future projections of population or industry, or changes in water uses on the Minnesota side.

- Tributary flows for the North Dakota side were not fully researched, and depleted flows were used. The model for any future study should include more detail on major tributaries and on Lake Traverse, Lake Orwell, and the Red Lakes.

- Losses within the Sheyenne River channel, which were estimated for this study, should be determined by field measurements.

- The impacts of water quality on local cost of treatment are still subjective and will require further analysis.

- This appraisal-level analysis has relied on TDS as a water quality indicator. The next level of study should include a detailed assessment of the whole suite of water quality parameters that are typically addressed in municipal treatment of raw water. Also, water quality issues relative to environmental concerns and compliance with the 1909 Boundary Waters Treaty will need to be addressed.

- The level of biota treatment required, as well as the number and location of treatment plants needed to comply with the 1909 Boundary Waters Treaty, are subject to changes based on discussions between the United States and Canada.

- The wide range of impacts related to interbasin transfer of water has not been fully studied at this time. Social, financial, and political impacts will require additional assessment at a more detailed level in future studies.

- Projections for the future "new industries" have been included in this study. However, specific locations of major new water users could be optimized for better use of the water resources in the study area. Site-specific impacts on flows, including additional consideration for how return flows affect overall water quality, need to be addressed in more detail. Also, a cross section of large and small industries of various types might yield a more realistic picture of future use patterns than the five identical corn-milling plants modeled here.