

RED RIVER VALLEY MUNICIPAL, RURAL, AND INDUSTRIAL WATER NEEDS

CHAPTER 1— INTRODUCTION AND BACKGROUND

PURPOSE AND OBJECTIVES

The purpose of this appraisal-level planning study is to objectively investigate and evaluate the existing and future use of municipal, rural, and industrial (MR&I) water resources in the Red River Valley of North Dakota. This study began in 1994, under direction of the Executive Steering Committee, North Dakota Water Management Collaborative Process. Although the Collaborative Process ended in 1995, the U.S. Bureau of Reclamation (Reclamation) agreed to complete this and a number of other reports.

The Executive Steering Committee met periodically early in the study and reached consensus on the need to gather more data in the following study areas:

- * Red River Valley MR&I Water Needs Assessment (this report)
- * Non-Indian MR&I — State Grant Program
- * Indian MR&I Construction and Studies
- * Turtle Lake Irrigation and Wildlife Development Area
- * Devils Lake Water Management — Draft Plan of Study

The intent of the Committee in calling for this particular study was to provide information about existing and future MR&I water needs, to serve as a basis for prudent water resources planning within the Red River Valley. Specific tasks necessary to achieve the purpose stated above are:

- * Pursue significant public involvement to obtain the data and viewpoints of those who best understand the situations at hand—the local interests.
- * Evaluate the availability and quality of surface and ground water resources.
- * Project future growth in population, economic activity, and water use patterns.
- * Use a hydrologic computer model to predict water supply conditions based upon future demand at locations of interest within the study area.

The Collaborative Process executive steering committee endorsed the use of Reclamation specialists from the Denver Technical Service Center to perform the analyses necessary for this report. This approach was adopted to secure a viewpoint from a resource outside of North Dakota. Reclamation personnel from Bismarck, North Dakota, coordinated the study and obtained vital input from a local Technical Steering Team to assure that local views and interests were considered.

SCOPE OF THE STUDY

As defined by the Collaborative Process, this study is conducted at an appraisal level of detail in the planning process, which means that the study draws upon available sources of existing information and data. Any efforts to develop new data sources would have been beyond the scope of this study.

Local municipalities and water systems were asked to provide pertinent information about water resources and water use. For those that did not respond, some estimated values had to be used, and these are noted as such in the report.

This report contains a greater level of detail for the North Dakota water resource inventory and evaluation than for Minnesota. This noted difference comes about at least partially because the study was performed by Reclamation, which is rarely involved in water resource planning east of the Dakotas, and partially because it is a continuation of the North Dakota Water Management Collaborative Process. However, information regarding water resources was gathered from the Minnesota side of the Red River Valley to understand the hydrologic setting along the main stem of the Red River for this appraisal-level study. Future studies should strive to incorporate more information from both Minnesota and Canada so that the Red River Basin can be better understood and managed as a whole rather than by separate geographic regions divided by jurisdictional boundaries.

Ten cities were identified as the principal municipal component of this study. These cities are all on or near the Red River or the Sheyenne River. They also have significant populations and have industrial components at the local level. So far as possible, detailed water-use information was obtained for these cities. The 10 cities used as a focus of this study are:

- Breckenridge, Minnesota
- Drayton, North Dakota
- East Grand Forks, Minnesota
- Fargo, North Dakota
- Grafton, North Dakota
- Grand Forks, North Dakota
- Moorhead, Minnesota
- Valley City, North Dakota
- Wahpeton, North Dakota
- West Fargo, North Dakota

STUDY AREA

The general location map and water needs assessment study area are shown on figure 1.1. The water needs study area consists of 13 counties within the Red River Basin in North Dakota and the municipalities of East Grand Forks, Moorhead, and Breckenridge in Minnesota. The study area is generally defined by county boundaries since the demographic data are provided on a

RED RIVER VALLEY

Water Needs Assessment Study Area

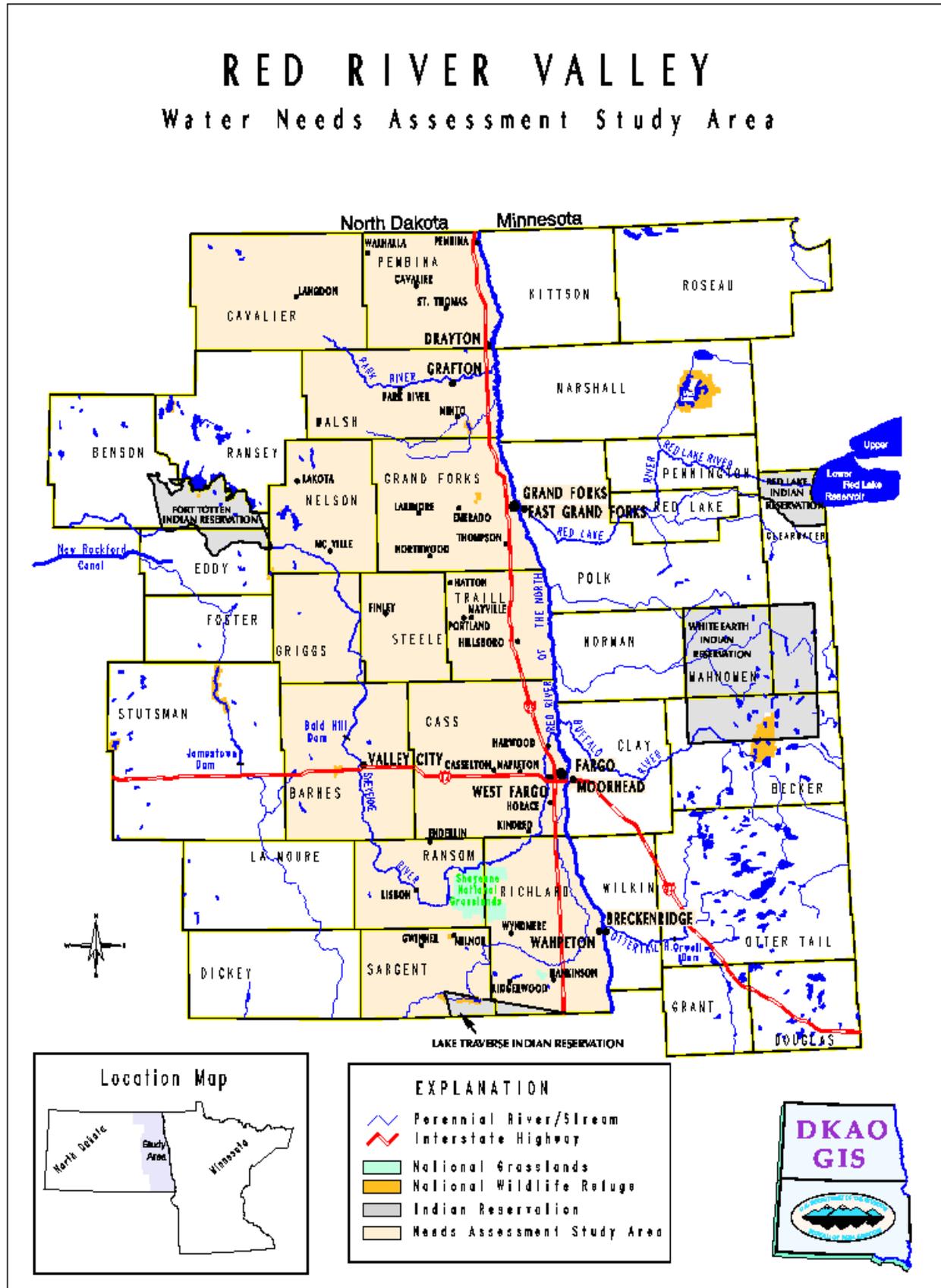


Figure 1.1. General Location Map

county-by-county basis. For the water resource inventories and evaluations, areas east and west of the water needs study area shown on figure 1.1 were also considered.

BACKGROUND ON GARRISON DIVERSION UNIT

The Garrison Diversion Unit (GDU) was authorized in 1965 and construction began in 1967. Most of the principal supply works have been constructed, except for a 20-mile reach between the end of the McClusky Canal and the beginning of the New Rockford Canal. The major project features are in the central and eastern parts of North Dakota. The project was reformulated in 1986 to put less emphasis on irrigation and more emphasis on meeting the municipal, rural, and industrial water needs in the entire state. Some major features of the 1986 reformulated project are:

- ! Jamestown Dam and Reservoir,
- ! Snake Creek Pumping Plant,
- ! McClusky Canal, and
- ! New Rockford Canal.

The GDU Reformulation Act of 1986 authorized 115,740 acres of irrigation. However, only the 5,000-acre Oakes Test Area has been developed to date. GDU is also authorized to provide municipal, rural, and industrial (MR&I) water service to as many as 130 towns and service areas throughout North Dakota and to three Indian Reservations. In addition, the Reformulation Act authorizes the delivery of 100 cubic feet per second of water to eastern North Dakota (Fargo, Grand Forks, and surrounding areas). Water to be delivered into the Hudson Bay drainage (which includes the Red River Valley) would have to be treated to avoid biota transfer. Recreation facilities are planned in 11 counties throughout North Dakota. The Act also provides for a wildlife mitigation and enhancement plan, a wetland trust, mitigation of project environmental impacts (acre-for-acre ecological equivalency basis, to be done concurrent with project construction), and flood-control facilities.

In 1990, a Department of the Interior task group reevaluated the project and recommended completion of Indian irrigation and MR&I facilities while recommending no future funding for non-Indian project irrigation features and related principal supply works. Since that time, the state has been attempting to find a way to move the project forward, particularly as it relates to meeting the MR&I needs in eastern North Dakota.

In 1998, the state's congressional delegation introduced the Dakota Water Resources Act (DWRA) to reauthorize the GDU. After working with Reclamation and other concerned entities, the delegation reintroduced the Act in September 1999. The DWRA would deauthorize nearly all of the irrigation originally included in the project and would increase construction ceilings for Indian and non-Indian municipal, rural, and industrial water supplies by about \$600 million. The DWRA of 1999 requires a feasibility-level environmental impact study as the decision making process for selecting the preferred plan for meeting water needs in eastern North Dakota. As of January 2000, the legislation (H.R. 2918 and S. 623) is still pending.

STUDY ORGANIZATION

Study and Steering Teams

This Phase II study was conducted by the U.S. Bureau of Reclamation. A team consisting of personnel from Reclamation's Denver, Billings, and Bismarck offices administered the study process and performed the technical analyses. In addition, a local Technical Steering Team was formed to assure that the views and interests of local participants were considered as the study progressed.

The North Dakota Technical Steering Team (NDTST) consists of representatives (one each) from Reclamation; the State Water Commission; the State Health Department; the National Wildlife Federation; the Garrison Diversion Conservancy District; and the Cities of Moorhead, Minnesota, and Fargo and Grand Forks, North Dakota, as well as a consultant to rural water systems and municipalities in northeastern North Dakota. Meetings were held about every 6 weeks, and the NDTST was kept apprised of the study's progress. The NDTST actively participated in critical aspects of the study and was used as the sounding board for local constituents.

Study Phases/Reports

This water-needs assessment study is structured into two phases. The first phase (Phase I) is subdivided into Parts A and B. Phase IA examined the current and future MR&I water needs in the study area, and the Phase IA final report was published in April 1998. A summary of findings for Phase IA is presented in Chapter 2 of this report.

The Phase IB report (Instream Flow Needs Assessment) provides an evaluation of seasonal instream flow needs for water quality and maintenance of aquatic life in the Sheyenne and Red Rivers. This report was finalized in August 1999 and its findings are summarized in Chapter 3.

Phase II of the study (this report) presents a range of alternatives to meet the needs (unmet demands) that were defined in Phase IA. Alternatives include both in-basin and out-of-basin infrastructure features, water conservation, and a variety of management and operational techniques.

The formulation and evaluation of alternatives is the focus of this report. A range of reasonably viable alternatives is presented, but no preferred alternative is identified. Not all of the alternatives presented will meet all the needs identified; however, all were developed at the same level of detail in order to allow meaningful comparisons of quantity, quality, cost, environmental consequences, and other significant factors.

PUBLIC INVOLVEMENT

Phase I, Part A. *MR&I Appraisal Report*

The public involvement activities for the Phase I, Part A study included several public meetings in Grand Forks and Fargo, Technical Steering Team meetings, and a public review and comment process. Refer to the Phase I, Part A report for more details. The mailing list for the various Red River Valley Needs Assessment Reports has grown to more than 300 recipients.

Phase I, Part B. *Instream Flow Needs Assessment*

The public involvement activities for the Phase I, Part B study consisted of communicating study methodologies and preliminary findings through the Technical Steering Team and other interested agencies. Comments on the final appraisal-level instream flow report were accepted from the public and redistributed to all report recipients.

Phase II. *Alternatives to Meet Projected Shortages. (This Report)*

Thus far, the Reclamation study team has relied upon the members of the Technical Steering Team to distribute Phase II information to other interested parties with whom they are affiliated. The two teams have met with each other every 6–8 weeks near the study area. Comments on this report will be accepted from the public and redistributed to all report recipients.

PREVIOUS AND RELATED STUDIES

Data used in this report were compiled from published reports and other existing data sources, many of which provided specialized local viewpoints of water resources in the basin. The study team endeavored to view these reports objectively; however, the verification or testing of data reported by others was outside the scope of this study. An effort has been made to integrate individual studies of ground water supplies available in various county areas, surface water supply reports for municipal and industrial uses, and water quality assessments for various aquifers and surface water sources.

Several engineering planning studies for municipal water supply expansions, as well as rural water system expansions, have been completed or are in the process of being completed by others.

The following reports provided most of the data or background in the development of this report:

1. May 1985, "Fargo-Moorhead Urban Study." U.S. Army Corps of Engineers, St. Paul District, St. Paul, Minnesota.

2. October 1991, “Sheyenne River Release Facilities Water Treatment Feasibility Study.”
Prepared by James M. Montgomery Consulting Engineers, Inc., for U.S. Bureau of Reclamation, Bismarck, North Dakota.
3. 1991/1992, U.S. Geological Survey — Red River Data Base and Modeling Reports.
4. June 1994, “North Dakota Water Management Collaborative Process, Draft Data Sheets and Summary Matrix.”
5. March 1994, “Sykeston Canal Alternatives Study—Garrison Diversion Unit, North Dakota.” U.S. Bureau of Reclamation.
6. December 1995, “Northwest Area Water Supply Project Chloramine Challenge Study, Final Report.” North Dakota State Water Commission and Garrison Diversion Conservatory District.
7. March 1997, “Cost Comparison, Garrison Diversion Unit.” U.S. Bureau of Reclamation, Dakotas Area Office, Bismarck, North Dakota
8. March 1999, “Estimated Annual OM&R Associated with the Used and Unused Capacity of Existing Garrison Diversion Unit Principal Supply Works Features—Draft Report.” U.S. Bureau of Reclamation.