

RECLAMATION

Managing Water in the West

Municipal, Rural, and Industrial Water Supply System Feasibility Study Status Report

Santee Sioux Nation and
the Village of Niobrara,
Nebraska

May 2008

Status Report Summary

This status report summarizes activities to date on a feasibility study for a municipal, rural, and industrial (MR&I) water supply system for the Santee Sioux Nation and the Village of Niobrara, Nebraska. The final product will be a feasibility report and an environmental assessment (FR/EA). Partial funding for the study resulted in completion of only part of the work necessary to produce the FR/EA. As of this writing, all funds have been spent, so the study has been suspended until more funding is available.

The study tasks accomplished to date are described in the pages to follow, after some background information on the study. Attachments A-F can be found at the end of this report (and all attachments, along with the Status Report Summary, are on the enclosed CD).

Study Location

The Santee Sioux Reservation (Figure 1) lies in the north-central part of Knox County in northeastern Nebraska. The approximately 175-square mile reservation is bordered by Lewis and Clark Lake and the Missouri River to the north, and boundary lines to the east, west, and south. About 10 percent of reservation land is Tribally-owned or allotted to individual Indians. The resident population is centered in the Village of Santee in the northernmost part of the Reservation. The Village of Niobrara is about 4 miles to the west of the reservation at the confluence of the Niobrara and Missouri Rivers.

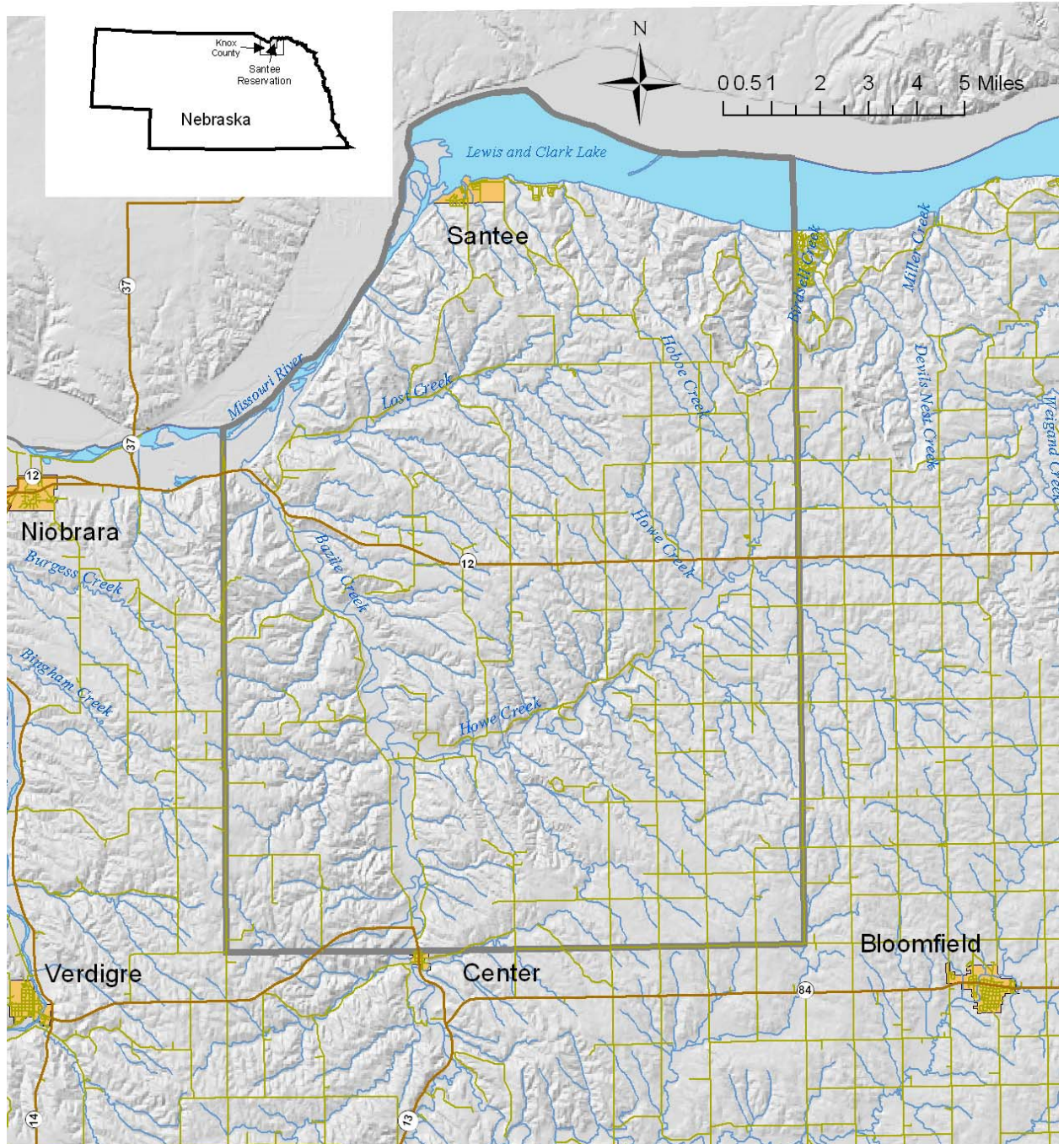
Based on 2006 population projections, there are 906 residents of the reservation, with 408 of in the Village and the nearby Lakeside community. Niobrara has another 380 residents.

Authorizing Legislation

The *Native American Technical Corrections Act of 2004* (Public Law 108-204, Sec. 125) authorized the U.S. Bureau of Reclamation to conduct a feasibility study to determine the most feasible method of developing a safe and adequate MR&I water system for the reservation and nearby communities. P.L. 108-204, Sec. 125 states:

(a) **STUDY.**—Pursuant to reclamation laws, the Secretary, acting through the Bureau of Reclamation and in consultation with the Santee Sioux Tribe of Nebraska (referred to in this subtitle as the “Tribe”), shall conduct a feasibility study to determine the most feasible method of developing a safe and adequate municipal, rural, and industrial water treatment and distribution system for the Santee Sioux Tribe of Nebraska that could serve the tribal community and adjacent communities and incorporate population growth and economic development activities for a period of 40 years.

Figure 1
Santee Sioux Water Supply Feasibility Study
Map of Study Area



(b) COOPERATIVE AGREEMENT.—At the request of the Tribe, the Secretary shall enter into a cooperative agreement with the Tribe for activities necessary to conduct the study required by subsection (a) regarding which the Tribe has unique expertise or knowledge.

(c) REPORT.—Not later than 1 year after funds are made available to carry out this subtitle, the Secretary shall submit to Congress a report containing the results of the study required by subsection (a).

(d) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out this section \$500,000, to remain available until expended.

Study Funding and Participant Collaboration

In fiscal year 2004, Congress appropriated \$300,000 for the study. Budget rescissions and under-financing reduced the appropriation to \$269,000. There have been no additional funds appropriated for this study.

Reclamation talked with the Santee Nation about pursuing the study under a P.L. 93-638 Sec. 108 Non-Construction Contract. After consideration, they preferred Reclamation to conduct the study with cooperation of the Nation. In June 2005, the Nation and Reclamation entered into a Memorandum of Agreement (MOA) defining roles and responsibilities for the study (*Attachment A*).

The authorizing legislation specifies that the study should address meeting future demands not only for the Nation, but also for adjacent communities. Reclamation determined that the villages of Niobrara and Center qualify as “adjacent communities”. The Village of Center (Figure 1) declined to participate in the study (*Attachment B*). In February 2006, Niobrara entered into a MOA (*Attachment C*) with Reclamation to participate in the study and share with part of the costs. Niobrara has contributed an additional \$6,400 as their share of the study funds.

A Plan of Study was developed for Reclamation to prepare the FR/EA, with cooperation of the study participants (*Attachment D*).

Background

Presently, the reservation draws water supplies almost entirely from the Bazile Creek well field near the western boundary of the reservation. Findings from the Environmental Protection Agency (EPA) Title 106 Water Quality Management Program indicate that pesticides don't appear to be a problem for the reservation's domestic groundwater supply. Nitrate-nitrogen and total coliform bacteria, however, appear to exceed EPA primary drinking water standards in a significant number of wells. Initial findings show that the contaminant source is related to septic-system effluent or onsite confined-animal feeding operations, rather than agricultural non-point source pollution. Niobrara's poor quality water, as well as cluster-housing projects and rural areas of the reservation, imposes potential health constraints and economic constraints.

As part of the planning process, Reclamation and the Nation completed a *Needs Assessment: MR&I Water System, Santee Indian Reservation, Nebraska* (Needs Assessment) in March 2004

under authority of the Reclamation Act of 1902 (32 Stat. 388, as amended). This report identified six reasonable alternatives which could meet future water needs of the Nation. These alternatives, which included drawing water either from surface and/or groundwater resources or tying into the existing rural water systems next to the reservation, will be further refined in the feasibility study. The alternatives are briefly described below:

Well Field in the Southeast Corner of the Reservation – Wells would be installed in an aquifer in the southeast corner of the reservation. Following chlorination and fluoridation, water would be pumped via a main pipeline to the existing Tribal water treatment building or a new water treatment facility. From this point, booster pumps would lift the water to Niobrara. Distribution lines would branch off the main pipeline to convey water to rural residences on the reservation

Tribal Surface Water Treatment Plant at Bazile Creek – Surface water would be directly diverted from Bazile Creek south of the existing Tribal water treatment building. Water would be treated by chemical and/or physical means. It would then be delivered to Niobrara using an existing pipeline. A distribution system would convey water to rural residences on the reservation

Tribal Surface Water Treatment Plant at the Missouri River – Water would be diverted directly from the Missouri River in the vicinity of Niobrara’s boat docks. A new treatment plant would be constructed to treat the water which would then be distributed to the village and rural residences on the reservation

Tribal Groundwater Treatment Plant in the Vicinity of the Existing Bazile Creek Well Field – The existing well field would be expanded by installation of additional wells. A new treatment plant would be constructed to treat the water which would then be conveyed to Niobrara through an existing pipeline, with a distribution system constructed to convey water to rural residences on the reservation

Connection to the Cedar-Knox Rural Water System – A distribution system would be developed that would connect to the existing Cedar-Knox Rural Water Authority delivery network. Water use at the existing treatment facility for Cedar-Knox is near capacity, and it’s believed that Cedar-Knox would have to construct a new facility to meet the added demands of the reservation

Connection to the West Knox Rural Water System – A distribution system would be developed for the reservation that connects to the existing West Knox Rural Water System. The well supply and storage capacity of the West Knox System would need to be expanded to meet demands of the reservation.

Public Scoping Process

The National Environmental Policy Act (NEPA) requires that the public be consulted to ensure their concerns about potential environmental impacts of a Federal action are considered, while

the National Historic Preservation Act requires that the public's concerns about potential impacts to cultural resources are considered. Concerns are often collected at public scoping meetings. Reclamation and the Santee Nation conducted both a technical meeting and a public scoping meeting on August 25, 2005. The purpose of the meetings was to present information about the feasibility study and the six alternatives of the Needs Assessment. The public was asked to help identify environmental concerns about the alternatives, or help determine if any other alternatives could be developed as a result of public input. Comments from the technical and public meetings will be used in the preparation of the NEPA compliance document (see *Attachment E*, "NEPA Process" for specific comments). At this time, Reclamation anticipates preparing an environmental assessment and Finding of No Significant Impact (FONSI).

Endangered Species Act

In accordance with the Endangered Species Act (ESA) of 1973 (as amended), Reclamation sent the U.S. Fish and Wildlife Service (Service) on September 14, 2005, a memorandum requesting information on any listed species, species proposed for listing, or candidate species that might be present in the Niobrara River Basin and within the proposed feasibility study area.

The Service provided Reclamation with a list of Federally-listed species and designated critical habitat within the proposed project area on January 23, 2006. Species that might occur in the proposed project area or be affected by the project are: (1) whooping crane, (2) piping plover, (3) interior least tern, (4) pallid sturgeon, (5) American burying beetle, and (6) western prairie fringed orchid. This information will be used to prepare the biological assessment to meet ESA Section 7 consultation requirements.

Alternatives Screening Process

A process to screen the Needs Assessment alternatives and five additional alternatives was initiated in October 2005 (*Attachment F*). The primary goal of the screening process was to jointly identify among Reclamation, the Santee Nation, and the Village of Niobrara the most reasonable alternative(s) to advance in the feasibility study for detailed engineering design, cost estimation, and evaluation. This process was required since the funding level wouldn't allow detailed evaluation of more than one or two alternatives.

The screening process ended with a meeting of the study participants, resulting in a consensus decision to proceed with a more detailed evaluation of a raw water supply from Lewis and Clark Lake (Missouri River) near the Village of Santee (Figure 1). Obtaining a water supply from this source is problematic due to significant sedimentation in the lake, with the resultant uncertainty of future channel locations. Because of this uncertainty, the study participants decided the study would concentrate on obtaining a water supply through Missouri River alluvium via wells or infiltration galleries.

Economics and Water Demand Analyses

The authorizing legislation states the feasibility study will address water needs for the Nation and nearby communities, incorporating population growth and economic development 40 years into the future. Year 2050 was thus selected as the planning horizon for projecting water needs. The demographics of the Santee Nation and the Village of Niobrara were analyzed to project the probable population to 2050. Future economic growth was analyzed in consultation with study participants. For the total service area, the preliminary estimated 2050 average daily water demand is estimated to be 337,725 gallons per day (235 gallons per minute), and peak month daily demand of 675,451 gallons per day (470 gallons per minute) (*Attachment G*).

A preliminary analysis of the economic feasibility of the proposed water supply system was also done (*Attachment H*). This information will be used to project benefits of the proposed water system. This is a requirement of the U.S. Water Resource Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* for Federal water resource planning.

Preliminary Water Distribution System Pressure Zones

A preliminary analysis of pressure zones for a water distribution system was done (*Attachment I*). Study engineers reviewed the topography of the proposed service area and identified potential pressure zone areas. A preliminary determination of required fire flows for communities within the proposed service area was also done.

Missouri River Alluvium Geo-hydrologic Investigation

After the decision to pursue evaluation of a raw water supply from Missouri River alluvium, further data on hydrologic parameters of the alluvium were needed to assess capability and to design a water supply system. A literature search was made but little geo-hydrologic data were available for the proposed project area. Additional data were acquired by aquifer test holes and pumping tests for the feasibility study.

A site was located for a test pumping well to obtain aquifer parameters using a phased approach. Phase I of the investigation was initiated in 2006 by having a contractor drill five test holes near the Village of Santee to obtain aquifer lithology (*Attachment J*). This information supplemented data on two existing test holes in the area. Assessment of both infiltration galleries and vertical wells at the test-hole sites was made (*Attachment K*). Based on that assessment, Phase II of the investigation identified the most promising site for an aquifer test.

The aquifer performance test was done in October 2007 at Drill Hole 7(DH-7) near the eastern edge of the Village of Santee (*Attachment K*). The purpose was to determine aquifer parameters for feasibility-level extraction and treatment design costs. A pumping well, along with four observation wells, was installed during the test.

Pumping tests showed that the aquifer near DH-7 has the capacity to meet water demands for the system. Water quality analysis showed high total dissolved solids, which would require a more rigorous water treatment system (such as reverse osmosis) than originally anticipated to meet drinking water standards.

Study Termination

At the end of Phase II of the geo-hydrologic investigation, all appropriated and cost-sharing funds for the feasibility study had been exhausted. Thus, the study will be terminated until further funding is available to finish the study. About half of the feasibility study tasks have been undertaken at this point. Tasks that still need to be accomplished are listed below. Other tasks may develop during completion of the feasibility study.

- Engineering
 - Alternative development and selection.
 - Feasibility design of raw water supply extraction process and facility, treatment process and facility, and distribution system.
 - Cost estimates for system design, construction, and operations and maintenance.

- Economics
 - Ability to pay.
 - Alternatives benefits.

- NEPA
 - Cultural resources.
 - Coordination with the Service, Nebraska Game and Parks Commission, and U.S. Army Corps of Engineers.

- Report
 - Preparation of FR/EA.

References

- Bureau of Reclamation, 2004. *Needs Assessment, MR&I Water System, Santee Indian Reservation, Nebraska*. Nebraska-Kansas Area Office, Grand Island, Nebraska.
- Bureau of Reclamation, 2006. *Preliminary Engineering Report, Santee Sioux Tribe of Nebraska, Water Treatment Plant Assessment, Draft Report*". Technical Service Center, Denver, Colorado.
- Santee Sioux Tribe of Nebraska, 2001. *Assessment of Water Quality on the Santee Sioux Reservation, May 1998-March 1999 and Tribal Water Quality Management Plan*. Santee Sioux Tribe of Nebraska Open File Report WR070101, Village of Santee, Nebraska.

Attachments

Attachment A

Santee Sioux Nation and Reclamation MOA

Attachment B

Village of Center's Declaration of Non-Participation in the Study

Attachment C

Village of Niobrara and Reclamation MOA

Attachment D

Plan of Study

Attachment E

Environmental Summary

Attachment F

Alternatives Screening Process

Attachment G

Economics and Water Demand Analyses

Attachment H

Project Benefits

Attachment I

Potential Water Distribution System Pressure Zone Layout and Preliminary Review of Fireflow Requirements

Attachment J

Exploratory Drilling, Phase 1 Stage 1

Attachment K

Water Supply Evaluation: Santee Indian Reservation, Santee, Nebraska