


Red River Valley Water Supply Project

Selection Process and Alternatives Review

March 7, 2008

Decision Making Process



Dave Koland
General Manager
Garrison Diversion Conservancy District

Decision Making Process

Collaboration Process

- 1994 - 2000
- *Red River Valley Water Needs Assessment Phase II; Appraisal of Alternatives to Meet Projected Shortages* – released January 2000
- Report concluded: "If no action is taken the Red River Valley would experience significant water shortages. Additional studies are needed before a preferred alternative can be selected."

Dakota Water Resource Act

Authorized two studies

- Needs & Options Report
 - To be completed by Reclamation
- Environmental Impact Statement (EIS)
 - To be completed jointly by Reclamation and the State of North Dakota

DWRA Section 8 (d)

15 (1) **IN GENERAL**- After reviewing the final report required by subsection (b)(1) [Needs & Options Report] and complying with subsection (c) [EIS], the Secretary, in consultation and coordination with the State of North Dakota in coordination with affected local communities, shall select 1 or more project features described in subsection (a) that will meet the comprehensive water quality and quantity needs of the Red River Valley. The Secretary's selection of an alternative shall be subject to judicial review.

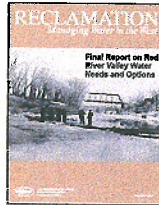
Decision Making Process

- 16 Governor appointed Garrison Diversion to represent North Dakota in the EIS Study
- 17 Reserved policy decisions to the State Engineer
 - 18 "The State Engineer will continue to be responsible for interstate, international, and general policy issues."

Federal Process

Needs & Options Report

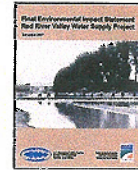
- Released November 2005
- Technical Team
 - 47 organizations on team
 - 15 formal meetings
 - March 2001 – July 2005



Federal Process

Environmental Impact Statement

- Final EIS released December 2007
- Cooperating Agency Team
 - 13 agencies on team
 - 10 formal meetings
 - Met from January 2003 – February 2007



Federal Process

Resource Meetings

- 52 individual meetings with one or more agencies
- 27 Agencies involved, such as:
 - Corps of Engineers
 - U.S. Fish & Wildlife Service
 - EPA
 - USGS
 - State Water Commission
 - Minnesota DNR

State Process

Included coordination and input from:

- Lake Agassiz Water Authority
- State Agencies
- State Legislators

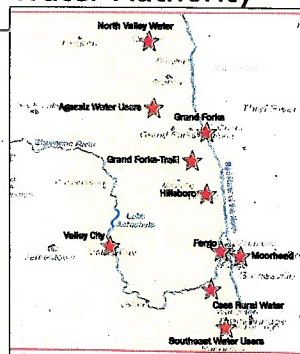


Lake Agassiz Water Authority

Board of Directors

- Created by state legislature
- Meeting almost monthly since February 2004
- 10 members
 - 5 – city members
 - 5 – rural water system members

★ Members of the LAWA Board of Directors

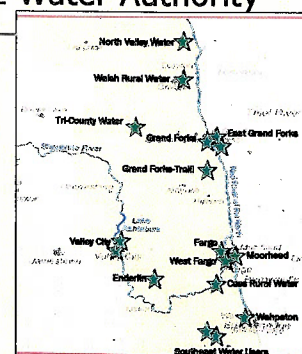


Lake Agassiz Water Authority

Technical Advisory Committee

- Formed to review details of the study and alternatives
- Met monthly from September 2004 – March 2007
- 17 water systems represented

★ Members of the LAWA TAC Committee

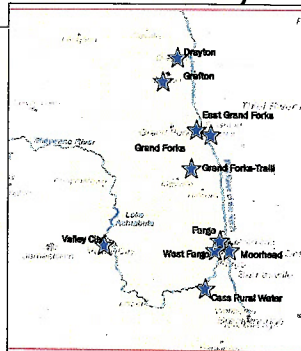


Lake Agassiz Water Authority

Ad Hoc Committee

- Formed to evaluate financial concerns
- Met monthly from December 2006 – April 2007
- 10 members

★ Members of the LAWA Ad Hoc Committee



State Process

State Agency Meetings

- 9 Meetings (May 2003 - February 2007)
- 47 monthly status reports on the Project (August 2004 – February 2008)
- Agencies:
 - Governor's Office
 - Department of Transportation
 - Department of Health
 - Department of Commerce
 - Department of Agriculture
 - Department of Tourism
 - State Parks & Recreation
 - ND Forest Service
 - State Water Commission
 - State Game & Fish Department
 - ND Geological Survey

State Process

State Water Commission

- Full day workshop held for commissioners regarding Project
 - October 18, 2005
- Briefed about Project at 20 SWC meetings
 - Aug 2002 – Dec 2006
- Received 47 Monthly Status Reports on the Project
 - August 2004 – February 2008
- SWC official recommendation of GDU Import to Sheyenne River as preferred alternative
 - November 1, 2005

State Process

State Legislature

- Natural Resources Committee
 - Received presentations at committee meetings in 2004, 2006 and 2007
- Red River Valley Legislators
 - March 3, 2005, Bismarck
 - December 12, 2005, Fargo
 - January 24, 2006, Fargo
 - December 12, 2006, Fargo
 - December 21, 2006, Grand Forks
 - February 11, 2008

Water Supply Problem

Red River has historically gone dry for months at a time (five months in 1934)
 Region's only backup water supply is the storage capacity in Lake Ashtabula

Capacity 69,000 acre-feet
 Current region's demand 66,000 acre-feet

In a multi-year drought there is not enough water to meet today's demands

As the region grows, the problem escalates

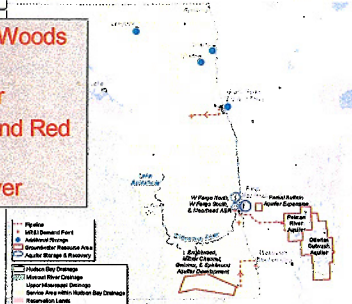
Red River Valley Studies



David Johnson, P.E.
 District Engineer
 Garrison Diversion Conservancy District

Water Sources Studied

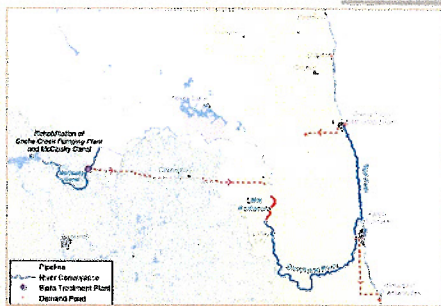
Lake of the Woods
Minnesota
groundwater
Red River and Red
Lake River
Missouri River



Missouri River Solutions

- **GDU Import to Sheyenne River Alternative**
- **Missouri River Import to Red River Valley**
 - Both alternatives solve the problem; however, they operate differently
 - One imports water to Lake Ashtabula for distribution
 - One imports water directly in a pipe to water systems in the valley
 - Both alternatives are only **supplemental water supplies** and rely on a **combination of in-basin and Missouri River water**
 - They are NOT a replacement water supply project like NAWs or Southwest Pipeline
(Replacement cost estimate \$2.2 billion)

GDU Import to Sheyenne River



GDU Import to Sheyenne River Operations

Triggers

- When the Red River at Fargo drops to 70 cfs, the systems around Fargo switch to the Sheyenne River
- When Sheyenne River flows are not adequate to meet MR&I needs + aquatic flow needs, systems call for water out of storage in Lake Ashtabula
- When Lake Ashtabula levels start dropping the import pipeline adds water to Lake Ashtabula

GDU Import to Sheyenne River Operations

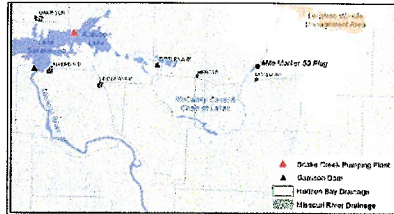
- **Aquatic Needs**
 - In addition to MR&I needs, Baldhill Dam is used to release flow to meet aquatic needs recommended by ND Game & Fish
 - 23 cfs minimum
 - Spring flush 215 cfs for 48-72 hours
 - In April minimum 69 cfs
- **Rural Water Systems**
 - The pipeline also has capacity to provide water for the northern rural water systems directly from the pipeline
 - Grand Forks Trail Rural Water District gets water from Grand Forks
 - Cass Rural Water Users District gets water from Fargo

GDU Import to Sheyenne River Operations

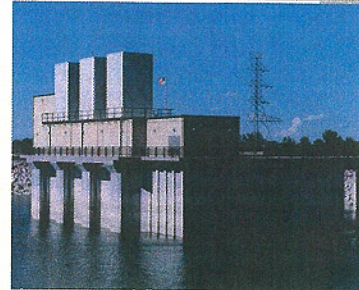
- **Downstream Users (downstream of Fargo)**
 - Return flows are essential to meeting downstream needs
 - Return flows would be protected as part of the project
- **Moorhead**
 - There is capacity in the project to serve Moorhead when the Red River drops below 70 cfs

GDU Principal Supply Works

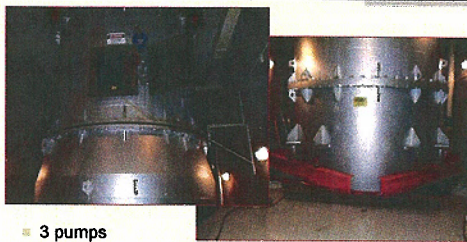
- Snake Creek Pumping Plant
- Lake Audubon
- McClusky Canal



Snake Creek Pumping Plant



Snake Creek Pumping Plant



- 3 pumps
- NAWS is planning to use the space of one of the pumps
- Leaves two redundant pumps (700 cfs each)

Snake Creek Pumping Plant

Current Uses

- Maintains water level in Lake Audubon
- Provides water for fish & wildlife mitigation features
- Provides water for the McClusky Canal
- Provides water for the freshening program

Snake Creek Pumping Plant

Potential Uses

- Provide water for the Red River Valley Water Supply Project
- Provide water for authorized irrigation
 - 13,700 acres in Turtle Lake area
 - 10,000 acres in McClusky Canal area
- Provide intake facility for NAWS

Lake Audubon



- Recreation
- Wildlife Refuge
- Reservoir Capacity
 - 340,000 acre-feet
 - Surface area of 18,000 acres

McClusky Canal Headworks



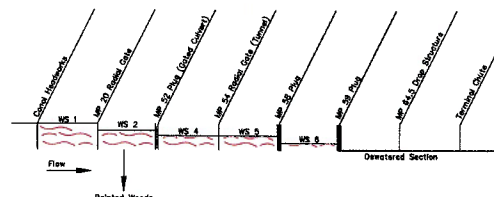
McClusky Canal Headworks



McClusky Canal



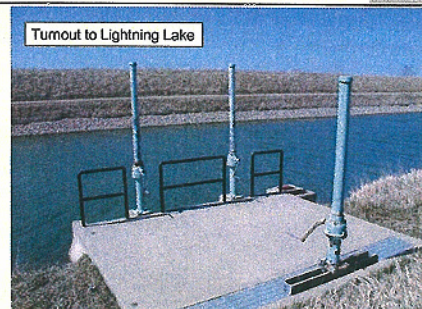
McClusky Canal



Recreation at Chain of Lakes



Mitigation Features



Repayment-Section 1(f)

- (2) **REPAYMENT CONTRACT**- An appropriate repayment contract shall be negotiated that provides for the making of a payment for each payment period in an amount that is commensurate with the percentage of the total capacity of the project that is in actual use during the payment period.

O&M Costs-Section 1(f)(3)

- (B) The State of North Dakota shall be responsible for costs of operation and maintenance of the proportionate share of existing unit facilities that are used and shall be responsible for the full costs of operation and maintenance of any facility constructed after the date of enactment of the Dakota Water Resources Act of 2000;

Principal Supply Works

Repayment and O&M costs

- Costs based on capacity used
 - 122 cfs/1860 cfs
 - 6.56% of allocated costs = \$11,030,461
- O&M costs based on capacity used
 - 6.56% of \$1.367 million = \$89,707
- Estimated cost for 42 miles of pipe and intake to avoid using Principal Supply Works roughly \$150 million

Biota Treatment Plant

- Prevents spread of invasive species
- Located in Missouri River basin
- Meets the recommended treatment goals submitted by Canada
- Provides first lift out of canal to continental divide
 - Hydraulic head 346 feet

Buried Pipeline

- **McClusky Canal to Sheyenne River**
- Approximately 125 miles
- Operates by gravity

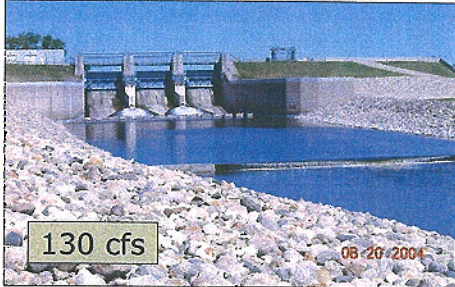


Lake Ashtabula

- Reservoir for storage
 - Capacity 69,000 acre-feet (22.4 billion gallons)
 - 5,300 surface acres
- Existing storage currently allocated to MR&I uses
- Existing water permits would not be changed
- Benefits to recreation
- Aquatic environment - 28,000 acre-feet



Baldhill Dam



Sheyenne River Flows

Below Baldhill Dam - 130 cfs

- Dominant flows - approx. 1,000 cfs
- MR&I needs peak flow at Fargo – approx. 200 cfs in July
- Gaining reach of Sheyenne River



Red River

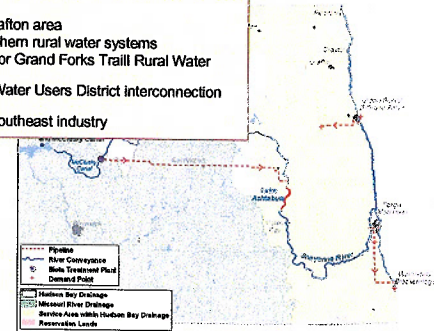


- Fargo area taken off river at flow of 70 cfs
- Conveyance to
 - Grand Forks – Grafton – Drayton - East Grand Forks
- Return flows are essential to meeting the needs down stream of the Fargo area

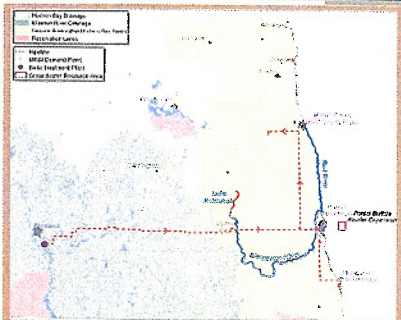
GDU Import to Sheyenne River

Phase II

1. Intake for Grafton area
2. Connect northern rural water systems
3. Connection for Grand Forks Traill Rural Water District
4. Cass Rural Water Users District interconnection with Fargo
5. Pipeline to Southeast industry



Missouri River Import to Red River Valley Alternative



Missouri River Import to Red River Valley Alternative Operations

Triggers

- When the Red River drops below the capacity to serve the Fargo area
 - Switch to a combination of the Red and Sheyenne Rivers
- When natural flows are not sufficient
 - Switch to a combination of natural flows and the pipeline
- When the combination of natural flows and the pipeline are not sufficient
 - Call on Lake Ashtabula water for the balance

Missouri River Import to Red River Valley Alternative Operations

■ Aquatic needs

- Baldhill Dam provides 13 cfs minimum flow for the Sheyenne River

■ Rural water systems

- There is no capacity for the northern rural water systems
- Cass Rural Water Users District gets water from Fargo
- Grand Forks Traill Water District gets water from Grand Forks

Missouri River Import to Red River Valley Alternative Operations

■ Downstream users

- Grand Forks – 20 cfs is supplied directly in a pipeline (Missouri River water)

■ When the pipeline is not sufficient

- Use natural flows in the Red and Red Lake Rivers

■ When the combination of pipeline and natural flows is not sufficient

- Call on water from Lake Ashtabula

■ Return flows are essential in this alternative

■ Moorhead

- Uses water out of the Red River and Buffalo Aquifer

Missouri River Import to Red River Valley Alternative

■ Intake & pump station in Missouri River to biota treatment plant

- Collector wells - geology study needed

■ Biota treatment plant & pump station near Bismarck (same general description as GDU Import to Sheyenne River)

- Provides 282 ft hydraulic head first lift

■ Pump station near Sterling

- Provides 334 ft of hydraulic head

Missouri River Import to Red River Valley Alternative

■ Buried pipeline 198 miles from Bismarck to Fargo

- 86 miles of pressurized buried pipe to Cleveland (elevation 1873 msl)
- Then 112 miles of gravity flow pipe

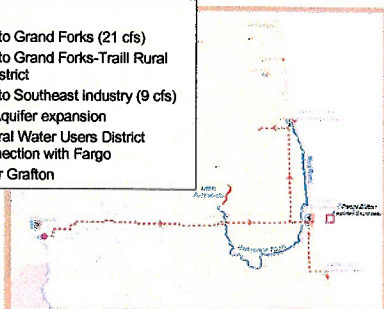
(Bismarck elevation 1725 msl)

(Fargo elevation 899 msl)

Missouri River Import to Red River Valley Alternative

Phase II

- Pipeline to Grand Forks (21 cfs)
- Pipeline to Grand Forks-Traill Rural Water District
- Pipeline to Southeast Industry (9 cfs)
- Buffalo Aquifer expansion
- Cass Rural Water Users District interconnection with Fargo
- Intake for Grafton



Comparison of the Two Alternatives

Steve Burian, P.E.

Advanced Engineering & Environmental Services
Consultant, Lake Agassiz Water Authority

Comparison of Alternatives: Environmental Impacts

Environmental Impacts

- GDU Import to Sheyenne River provides benefits to the following resources that the Missouri River Import to Red River Valley does not:
 - Sheyenne Delta Aquifer
 - Sheyenne River fish
 - Sheyenne River mussels
 - Red River fish
 - Protected areas
- Missouri River Import to Red River Valley has adverse impacts to Sheyenne River mussels

Comparison of Alternatives: Missouri River Depletions

GDU Import to Sheyenne River

- Minimum - 1,192 ac-ft
- Maximum - 86,469 ac-ft
- Average - 31,686 ac-ft

Missouri River Import to Red River Valley

- Minimum - 21,382 ac-ft
- Maximum - 68,769 ac-ft
- Average - 28,111 ac-ft

Comparison of Alternatives: Life Expectancy

Both alternatives used similar design criteria

- 2050 projected MR&I demand
- Pipeline materials
- Intake designs
- Pump station designs

Both alternatives are expected to operate a minimum of 100 years

Comparison of Alternatives: Life Expectancy

Canal life expectancy is essentially into perpetuity with proper maintenance

The embankment between Lake Sakakawea and Lake Audubon is expected to be stable with proper maintenance of the relief wells

Snake Creek Pumping Plant has been properly maintained and is expected to operate at least another 100 years

Comparison of Alternatives: Construction Costs

GDU Import to Sheyenne River:

\$ 659.8 million

Missouri River Import to Red River Valley:

\$ 1.065 billion

Comparison of Alternatives: Annual OM&R Costs

(Excluding Biota Treatment, Local Treatment & Water Conservation)

GDU Import to Sheyenne River (31,700 acre-feet)

■ Facility Costs	\$96,000
■ Equipment & Labor	\$942,000
■ Power Costs	\$78,000
Total OM&R	\$1,116,000

Missouri River Import to Red River (28,200 acre-feet)

■ Facility Costs	\$257,000
■ Equipment & Labor	\$1,158,000
■ Power Costs	\$1,564,000
Total OM&R	\$2,979,000

Financing Drought Protection

- **Supplemental Water Supply**
 - Users purchase pipeline capacity
 - 122 cfs or 119 cfs
- **Financed**
 - By a revenue bond
 - Secured by water service contract
 - Payments begin at the start of construction
 - Payments include OM&R
 - Repayment over 80-year period
 - Or \$200 million Bureau of Reclamation loan at 3.25%
 - 40 year contracts until repaid

Engineering Review

- **Houston Engineering/Montgomery Watson Harza**
 - Performed engineering and prepared cost estimates
 - Reviewed by:
 - Advanced Engineering & Environmental Services
 - Technical Team
 - Technical Advisory Committee (local systems)
 - Reclamation Dakotas Area Office
 - Peer reviewed by Reclamation's Technical Services Center
 - Review of Design and Cost Estimates in Draft Needs and Options Report
 - Design, Estimating and Construction Review of Red River Valley Water Supply Project (DEC)

Summary

The Preferred Alternative Provides:

- More Flexibility
- More Reliability
- Additional Environmental Benefits
- Lower Capital Costs
- Lower O&M Costs

Questions?

Memos:

- Documentation of the Engineering Review Processes
- Documentation of the Decision Making Process
- Comparison of Alternatives

Water Permit-1416

- **Priority Date - February 9, 1967**
- **US Bureau of Reclamation**
- **Quantity: 3,145,000 acre-feet**
- **Construction completed by 12/31/2018**
- **Includes return flows**

Water Permit-1416A

- Priority Date - February 9, 1967
- ND State Water Commission
- Assigned: 1,932,652 acre-feet from 1416
- Same conditions as Permit 1416

DWRA Section 8

(e) SHEYENNE RIVER WATER SUPPLY AND RELEASE OR ALTERNATE FEATURES-

The Secretary shall construct, operate, and maintain a Sheyenne River water supply and release feature (including a water treatment plant) capable of delivering 100 cubic feet per second of water or any other amount determined in the reports under this section, for the cities of Fargo and Grand Forks and surrounding communities, or such other feature or features as may be selected under subsection (d).

DWRA Section 5 (a) (5)

- (5) PRINCIPAL SUPPLY WORKS- The Secretary shall maintain the Snake Creek Pumping Plant, New Rockford Canal, and McClusky Canal features of the principal supply works. Subject to the provisions of section (8) of this Act, the Secretary shall select a preferred alternative to implement the Dakota Water Resources Act of 2000. In making this selection, one of the alternatives the Secretary shall consider is whether to connect the principal supply works in existence on the date of enactment.