



Garrison Diversion Conservancy District

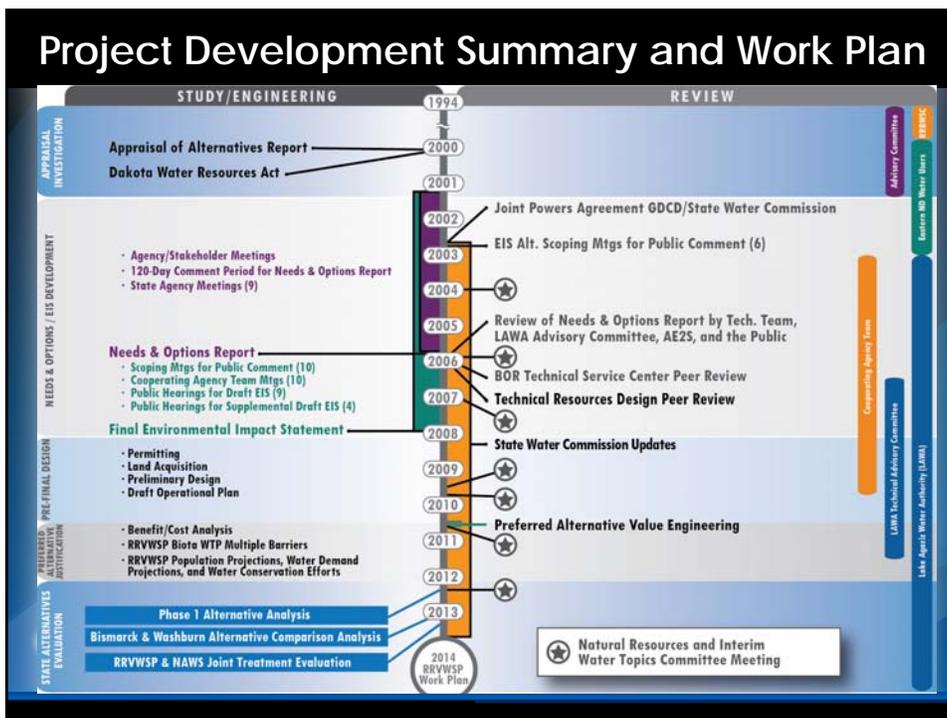
RRVWSP Alternatives Review

February 4, 2014

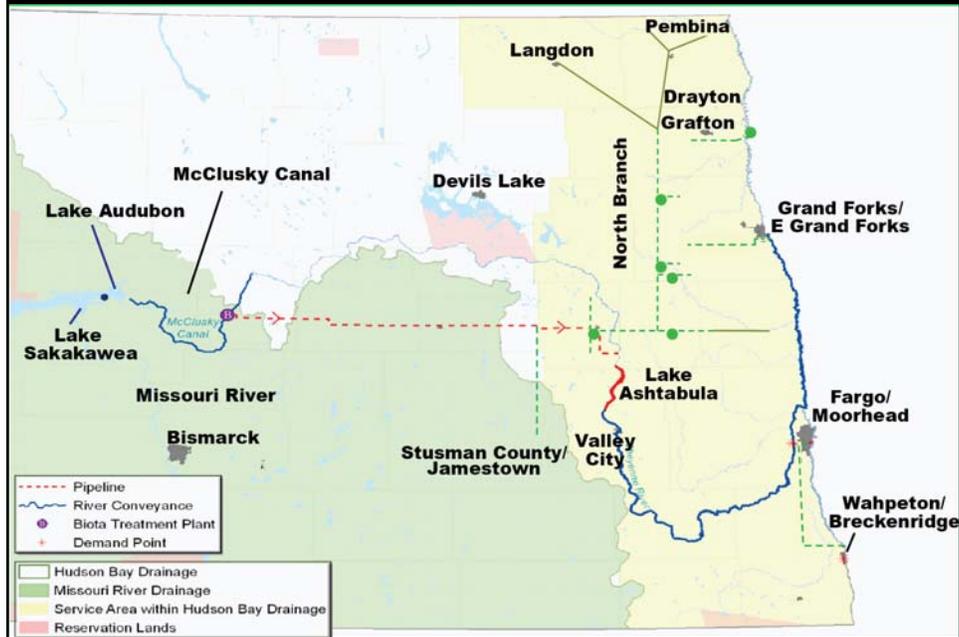
Ken Vein, Chairman





Preferred Alternative Overview



Plan B

OBJECTIVE

Determine "Plan B"

- Considered multiple potential alternatives from Missouri River
- One alternative emerged:
 - Washburn to Baldhill Creek

Background – “What did we need to determine?”

- Previous evaluation considered multiple potential State Alternatives
- Two lead alternatives emerged:
 - Washburn to Baldhill Creek
 - Bismarck to Lake Ashtabula
- **Objective:**
 - **Minimize Federal Involvement**

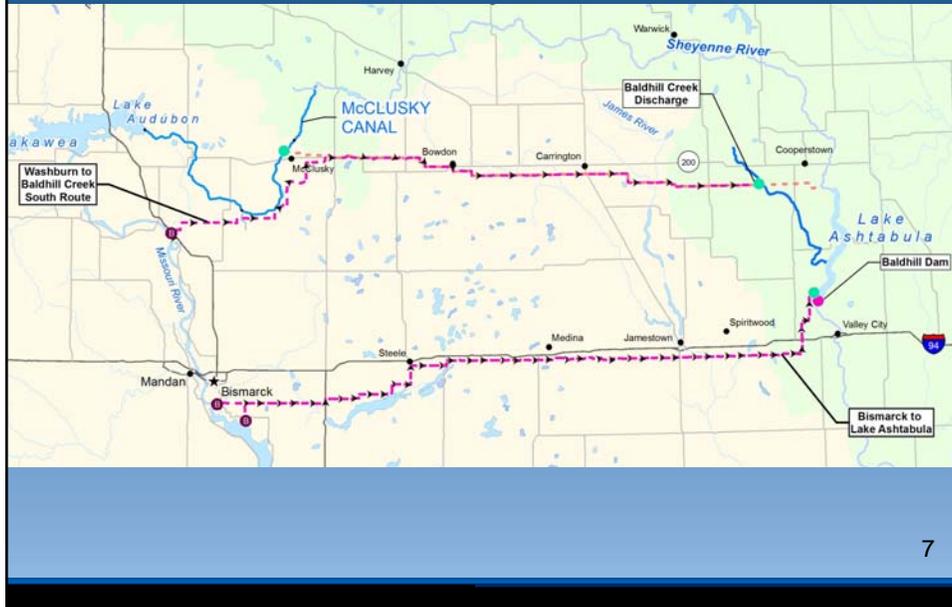
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Plan B Alternatives

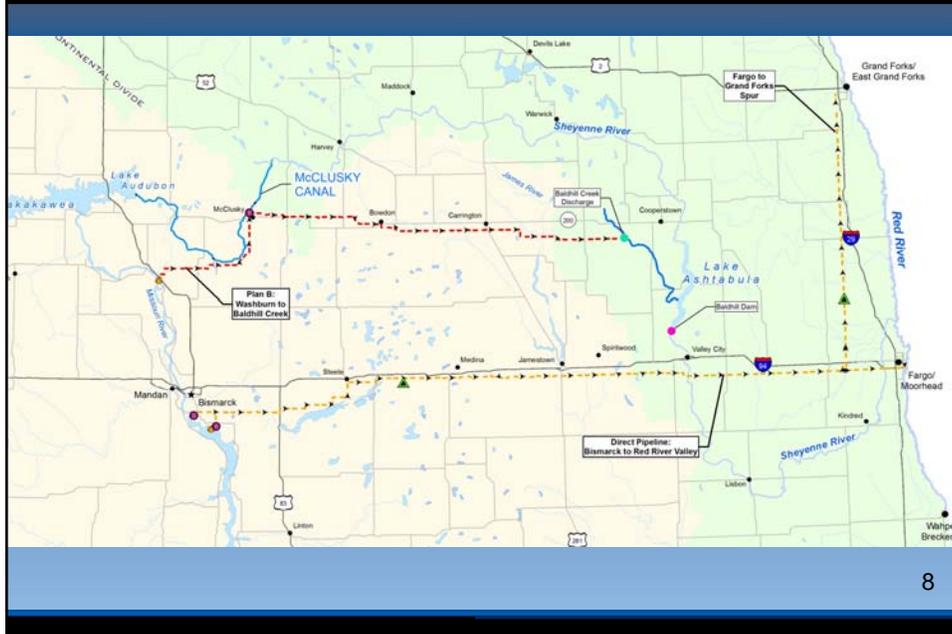


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Plan B Compared to I-94



Plan B Compared to Direct Pipeline



Primary Considerations

- Horizontal Collector Wells & Conventional Intakes
- Treatment Implications
- Baldhill Creek Discharge & Conveyance
- Lake Ashtabula Discharge
- Environmental or Cultural Resources Concerns
- Pipeline Route & Trenchless Crossing Refinements
- Cost Estimates

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What did we find out?

Washburn and Bismarck Alternatives - Project Cost Comparisons (2012\$)				
Alternatives	Intake Costs	Biota WTP Cost	Main Pipeline Cost	Total Project Cost
Washburn to Baldhill Creek (Conv. Intake)	\$51,200,000	\$128,400,000	\$611,000,000	\$790,600,000
Bismarck to Lake Ashtabula (Conv. Intake)	\$51,200,000	\$128,400,000	\$623,000,000	\$802,600,000
Bismarck to Fargo (Conv. Intake)	\$50,500,000	\$126,500,000	\$977,000,000	\$1,154,000,000

- ✓ Conceptual costs are expected to be within 30% (within margin of estimate accuracy)
- ✓ Considered conventional intake based on screening of available hydrogeologic data
- ✓ Conventional intake requires pretreatment at WTP

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Main Project Conclusions

- There is no significant advantage between the two routes based on costs alone
- Potential yield of HCWs is very site specific and would require field testing to determine more accurately
- HCWs may be difficult to implement based on the total capacity needed
- Use of Baldhill Creek requires flowage easements

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Direct Pipeline User Considerations

- Direct Pipeline Users – the Project could potentially provide water to users using spur lines connected to the main Project pipeline
- Who can be served from each route?
- What are the cost implications?

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Potential Direct Pipeline Users



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What did we find out?

Direct Pipeline User Cost Summary		
Alternative	Population	User Service Cost
Washburn to Baldhill Creek Main Pipeline:		
Potential Direct Pipeline Users:		
Steele	1,986	\$5,412,000
Bowdon	131	\$174,000
Medina	308	\$3,102,000
Carrington	2,065	\$867,000
Spiritwood-Jamestown	14,687	\$33,456,000
Cooperstown - Baldhill Creek	45,069	\$38,606,000
Totals	64,246	\$81,617,000
Cost Per User Served (\$/Person)		\$1,270
Bismarck to Lake Ashtabula Main Pipeline:		
Potential Direct Pipeline Users:		
Steele	1,986	\$200,000
Bowdon	131	\$3,825,000
Medina	308	\$282,000
Carrington	2,065	\$9,671,000
Spiritwood-Jamestown	14,687	\$4,461,000
Cooperstown - Baldhill Dam	45,069	\$68,944,000
Totals	64,246	\$87,383,000
Cost Per User Served (\$/Person)		\$1,360

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Washburn Alternative Advantages

- Equal or slightly lower capital cost (comparing least cost alternatives)
- Less congested corridor
- FEIS completed for majority of route
- ROW options secured for majority of route
- Preliminary design completed for majority of route
- Required permits identified
- Access to McClusky Canal in the future

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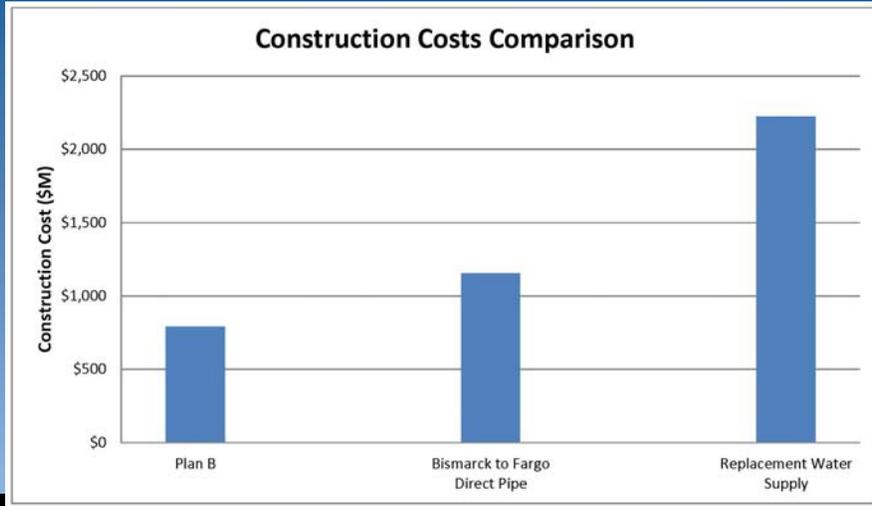
Bismarck Alternative Advantages

- Slightly lower operating cost due to reduced treatment and less pumping expected (much higher than Preferred Alternative)
- "Higher profile" corridor

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GDU Import to Lake Ashtabula Alternative Facts

Least Cost Missouri River Alternative



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Plan B Washburn to Lake Ashtabula



Selected Plan B Alternative Advantages



- Lowest cost
- Less congested corridor
- FEIS completed for majority of route
- ROW options 76% secured
- Preliminary design 83% completed
- Required permits identified
- Access to McClusky Canal in the future

Memoranda

- Technical Memos
 - Plan B Alternative Analysis (TM 1.14)
 - Bismarck to Lake Ashtabula and Washburn to Baldhill Creek Alternative Comparison (TM 1.15)
 - Washburn to Baldhill Creek (Plan B) and Bismarck to Fargo/Grand Forks (Direct Pipeline) Alternative Comparison (TM 1.19)

Memoranda

- Informational Memos
 - Memo Comparing RRVWSP Alternatives
 - Memo Documenting the Decision-Making Process for the RRVWSP
 - Document Compilation for the RRVWSP

Alternative Cost Comparison

Project Cost Comparisons (2012\$)

Alternatives	Intake Costs	Biota WTP Cost	Main Pipeline Cost	Total Project Cost
Washburn to Baldhill Creek (Plan B)	\$51,200,000	\$128,400,000	\$611,000,000	\$790,600,000
Bismarck to Lake Ashtabula	\$51,200,000	\$128,400,000	\$623,000,000	\$802,600,000
Bismarck to Fargo Direct Pipeline	\$50,500,000	\$126,500,000	\$977,000,000	\$1,154,000,000

- **Conceptual costs are expected to be within 30% (within margin of estimate accuracy)**
- **Direct Pipeline does not provide peak day demand**

Conclusion

- A Red River Valley drought is inevitable
- Red River Valley experienced a dry period in 2012 – river flows diminished rapidly
- Existing available water supplies inadequate
- Local options ~ expensive and don't meet water supply needs
- Missouri River transfer meets water supply needs and provides most value



Questions?

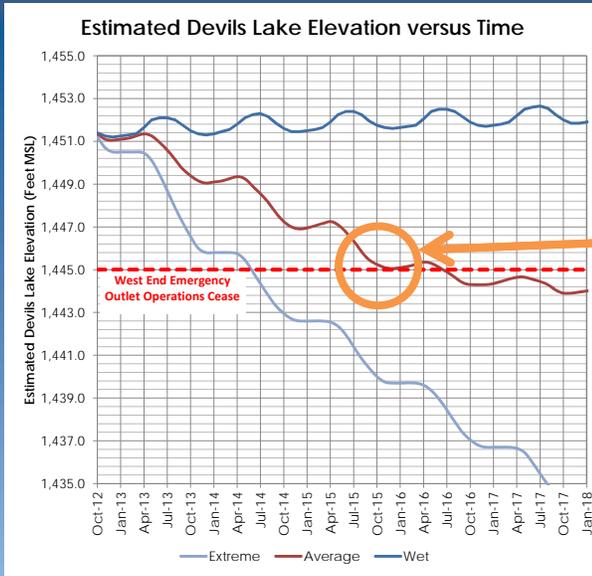


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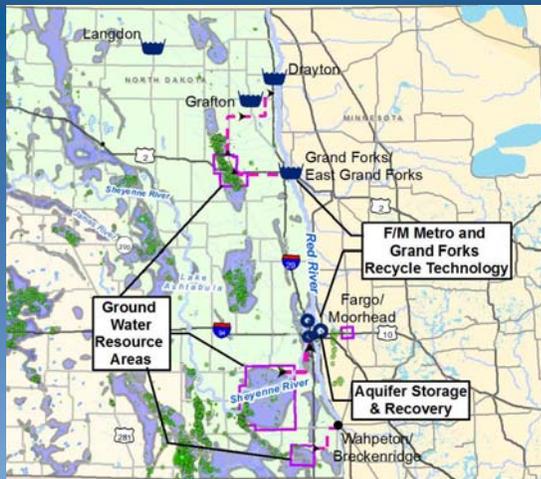
Devils Lake and Outlet Operations



Devils Lake discharges will provide 2-3 years of water during drought.

Lake Ashtabula will provide an additional 1 year.

Metro Recycle



Total Cost (2013 Dollars)

\$931,304,000

Volume (acre-ft/year)

36,507

Cost Per Volume (\$/acre-ft/year)

\$25,500

Time Until Operational (years)

6

Obstacles to Implementation

- Does Not Provide Emergency Water to Rest of Red River Valley
- Discouraged by ND Century Code
- Requires Extensive Public Education and Acceptance
- Use of ASR not proven
- Funding

Supplies 44% of the Project Need

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RRVWSP 'Plan B' Alternative



Meets ND Water Supply Objectives

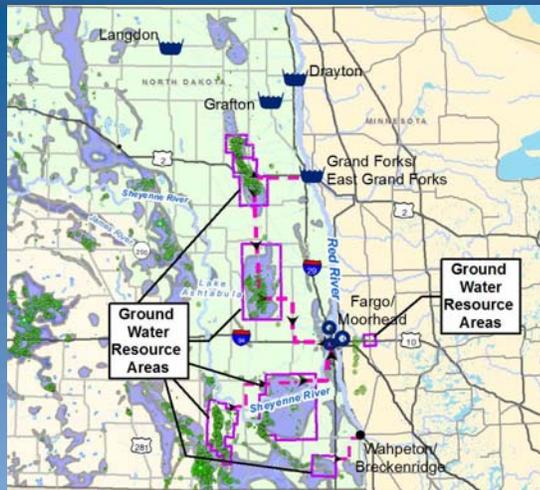
Total Cost (2012 Dollars)	\$790,600,000
Volume (acre-ft/year)	82,351
Cost Per Volume (\$/acre-ft/year)	\$9,600
Time Until Operational (years)	6

Obstacles to Implementation

- Larger Local Cost Share than Preferred Alternative
- Funding

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Irrigation Conversion



Provides Current Replacement Water Supply

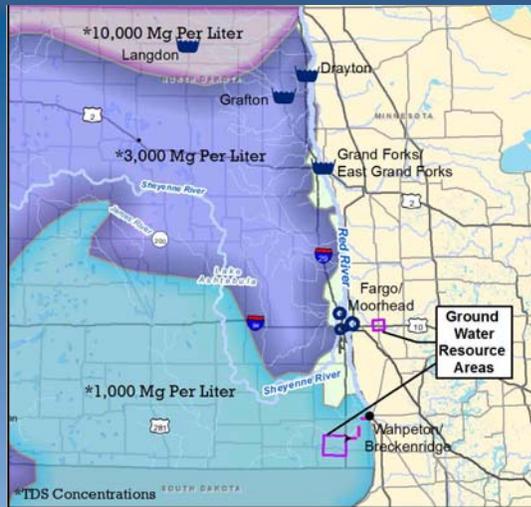
Total Cost (2013 Dollars)	\$1,703,918,000
Volume (acre-ft/year)	65,664
Cost Per Volume (\$/acre-ft/year)	\$25,900
Time Until Operational (years)	8

Obstacles to Implementation

- Limited Water at Canadian Border during Severe Drought
- Discouraged by ND Century Code
- Does Not Provide Aquatic Needs Flows
- Degraded Water Quality
- Funding

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Dakota Aquifer



Provides Current Replacement Water Supply

Total Cost (2013 Dollars)

\$1,790,314,000

Volume (acre-ft/year)

65,664

Cost Per Volume (\$/acre-ft/year)

\$27,300

Time Until Operational (years)

8

Obstacles to Implementation

- Limited Water at Canadian Border during Severe Drought
- Does Not Provide Aquatic Needs Flows
- Degraded Water Quality
- Funding

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Red River Recycle



Supplies 50% of the Project Need

Total Cost (2013 Dollars)

\$579,566,000

Volume (acre-ft/year)

41,189

Cost Per Volume (\$/acre-ft/year)

\$14,100

Time Until Operational (years)

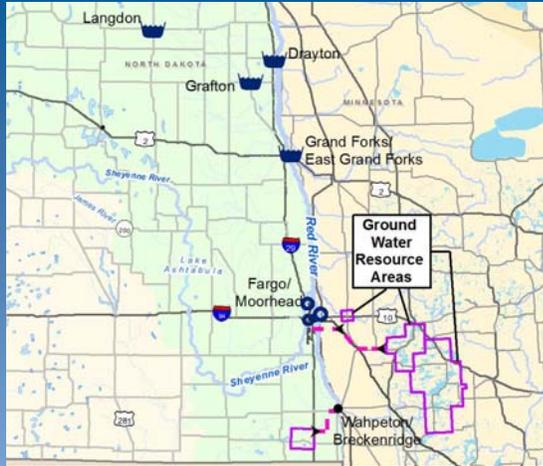
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Obstacles to Implementation

- Limited Water at Canadian Border during Severe Drought
- Does Not Provide Aquatic Needs Flows
- Degraded Water Quality
- Use of ASR not proven
- Funding

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MN Groundwater



Provides Current Replacement Water Supply

Total Cost (2013 Dollars)	\$845,554,000
Volume (acre-ft/year)	65,664
Cost Per Volume (\$/acre-ft/year)	\$12,900
Time Until Operational (years)	7

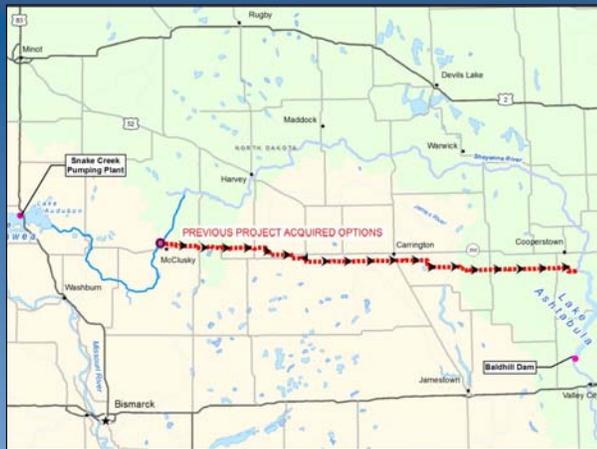
Obstacles to Implementation

- Uncertainty of Minnesota Groundwater Permit
- MN groundwater permit not likely used for industrial supply
- Does Not Provide Aquatic Needs Flows
- Degraded Water Quality of Off-Channel Storage
- Funding

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RRVWSP Preferred Alternative



Meets ND Water Supply Needs

Total Cost (2013 Dollars)	\$733,179,000
Volume (acre-ft/year)	82,351
Cost Per Volume (\$/acre-ft/year)	\$8,900
Time Until Operational (years)	8

Obstacles to Implementation

- Federal Record of Decision (ROD) and Congressional Authorization Required
- Six Years to Construct
- Funding

Preferred Alternative Overview

GDU Import to Lake Ashtabula

