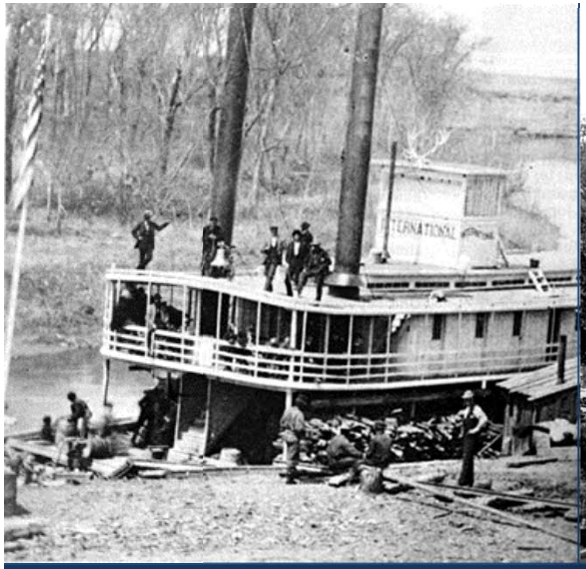
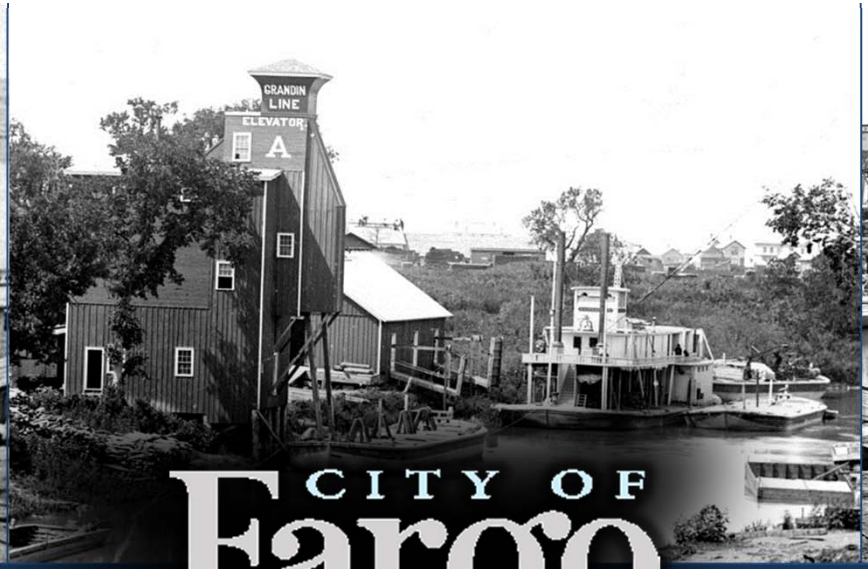
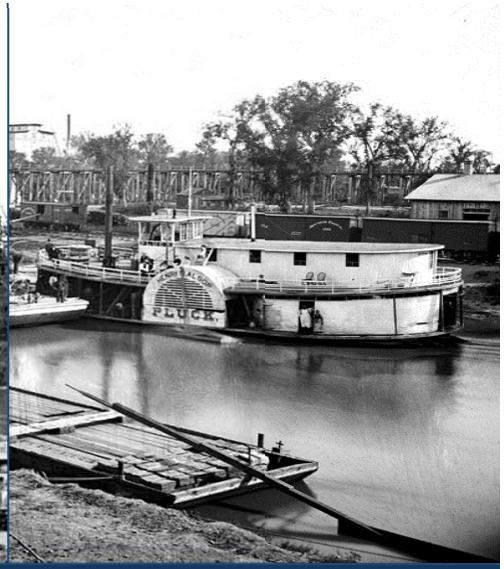






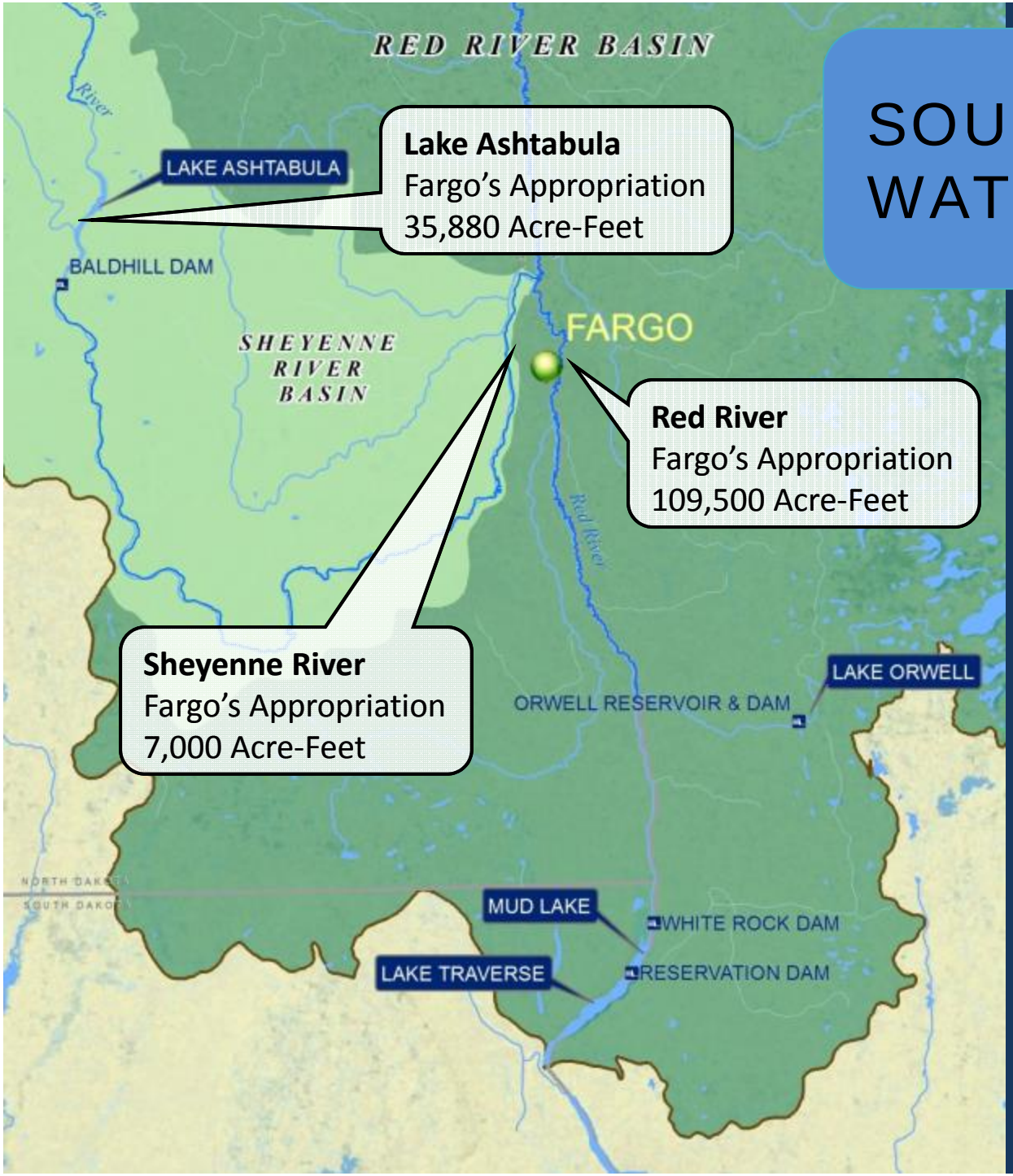
CITY OF Fargo

Drought and Water Service Management Plan

GDCD 2015 District Water Conference

October 1, 2015

SOURCES OF WATER FOR FARGO



Lake Ashtabula
Fargo's Appropriation
35,880 Acre-Feet

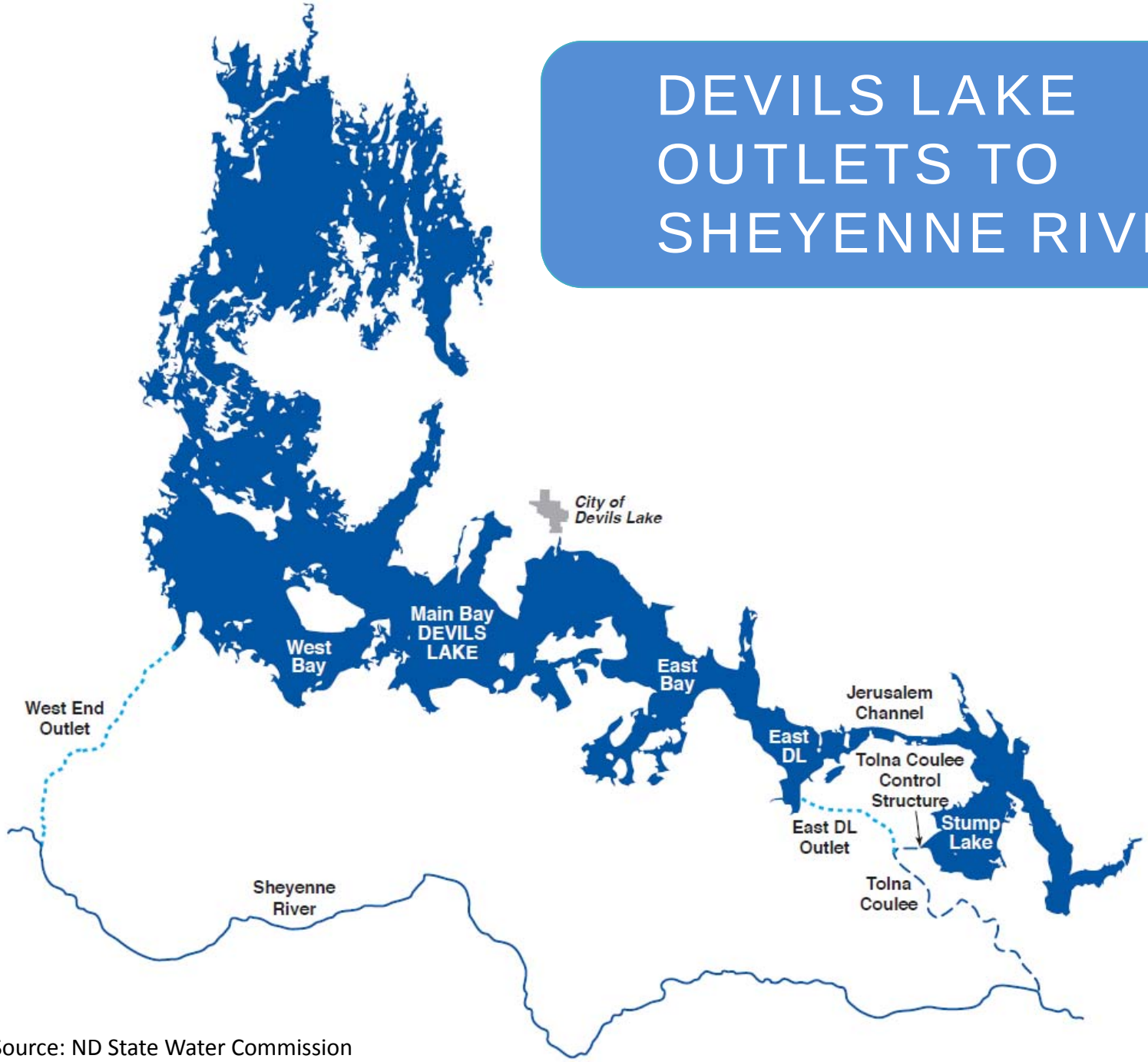
Red River
Fargo's Appropriation
109,500 Acre-Feet

Sheyenne River
Fargo's Appropriation
7,000 Acre-Feet

Why does Fargo utilizes multiple water sources?

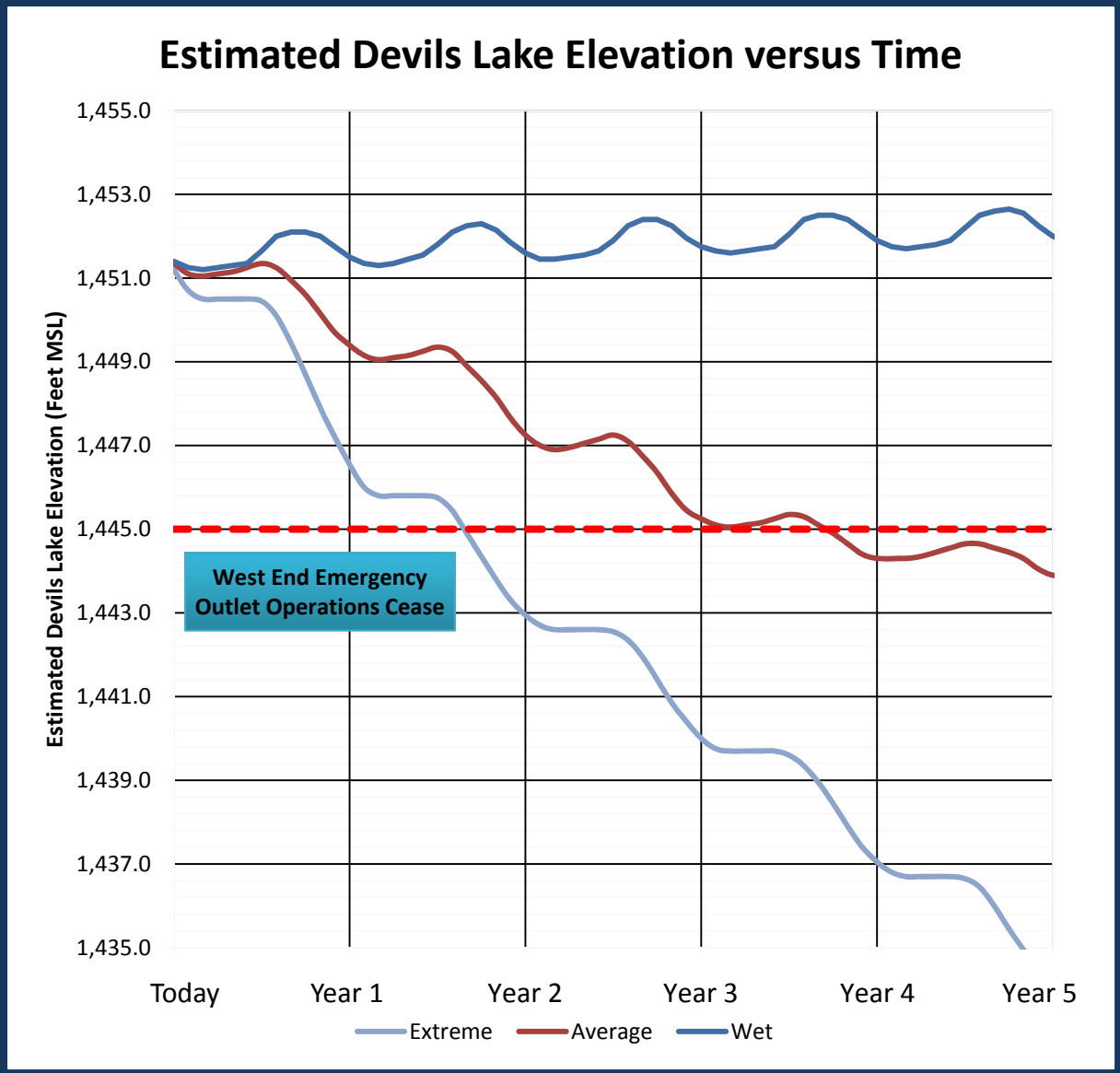
- Drought and water shortage preparedness
- Redundancy for water quality variations
- Manage treatment operations
- Minimize chemical use and cost
- Control taste and odor events
- Recommended by Professional Organizations

DEVILS LAKE OUTLETS TO SHEYENNE RIVER



Source: ND State Water Commission

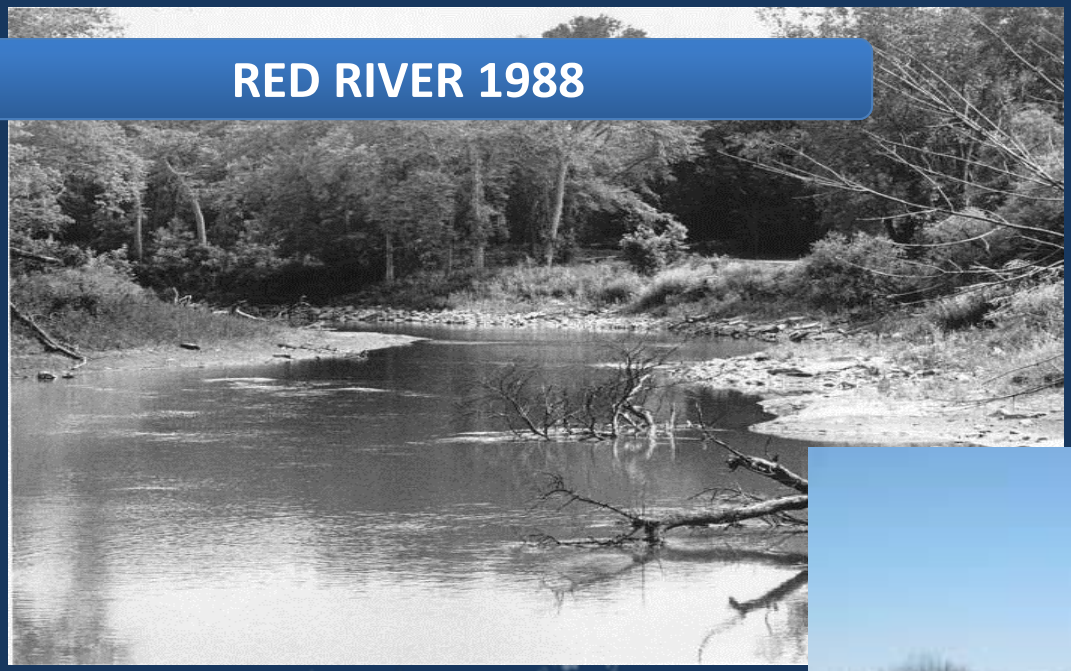
DEVILS LAKE OUTLET & OPERATIONS



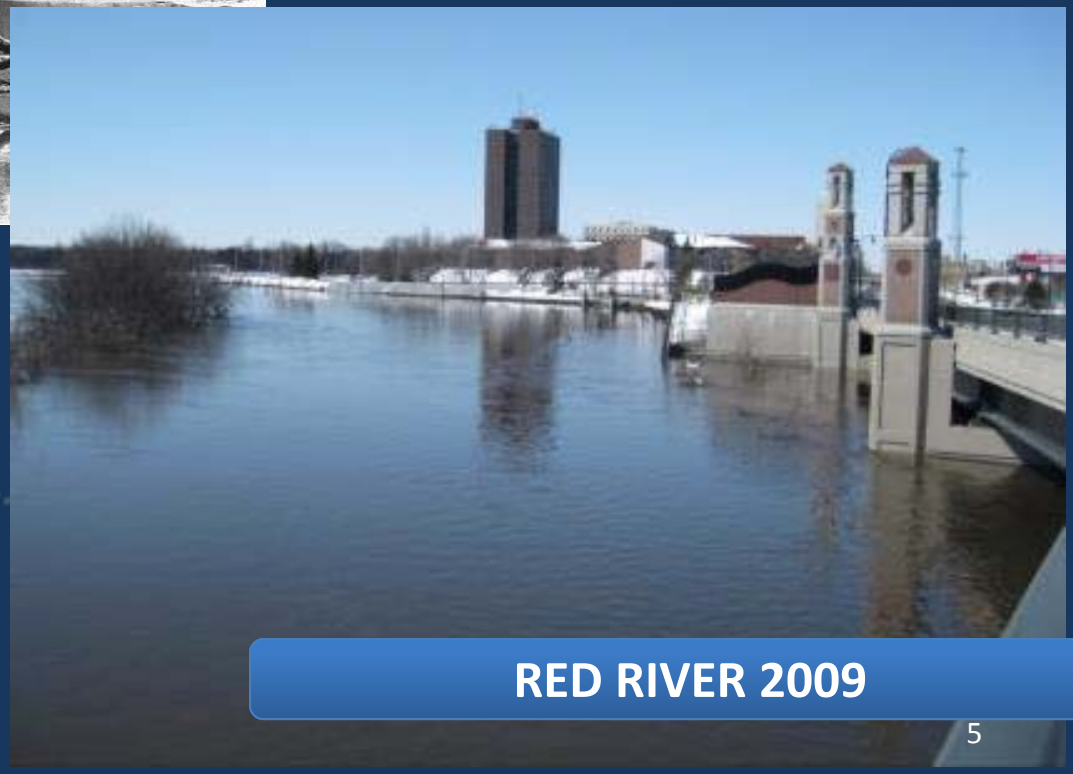
Devils Lake discharges may provide 2-3 years of water.

Lake Ashtabula will provide an additional 1 year.

TOO WET / TOO DRY PARADOX

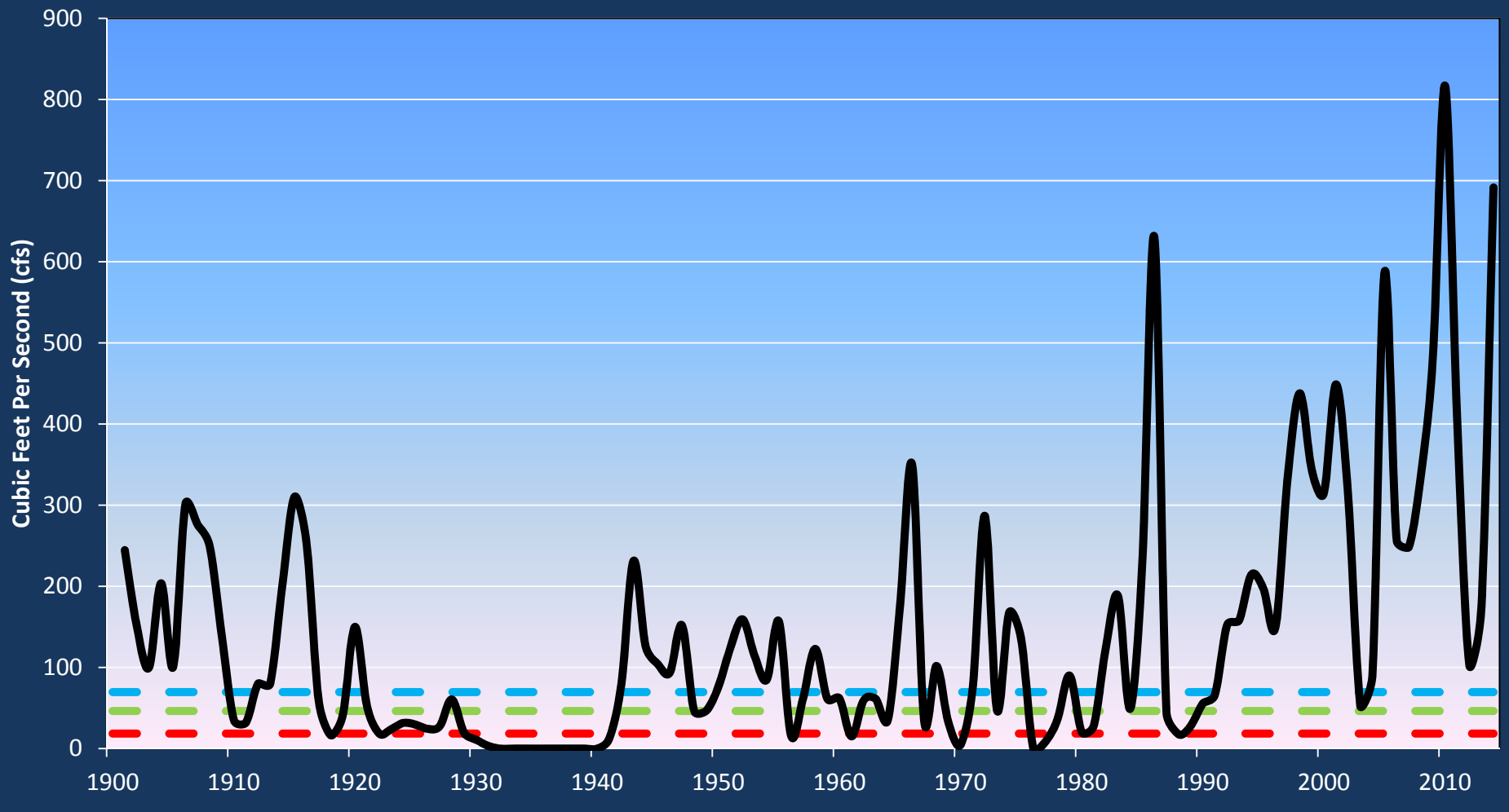


RED RIVER 1988



RED RIVER 2009

RED RIVER DROUGHT LIKELIHOOD AT FARGO



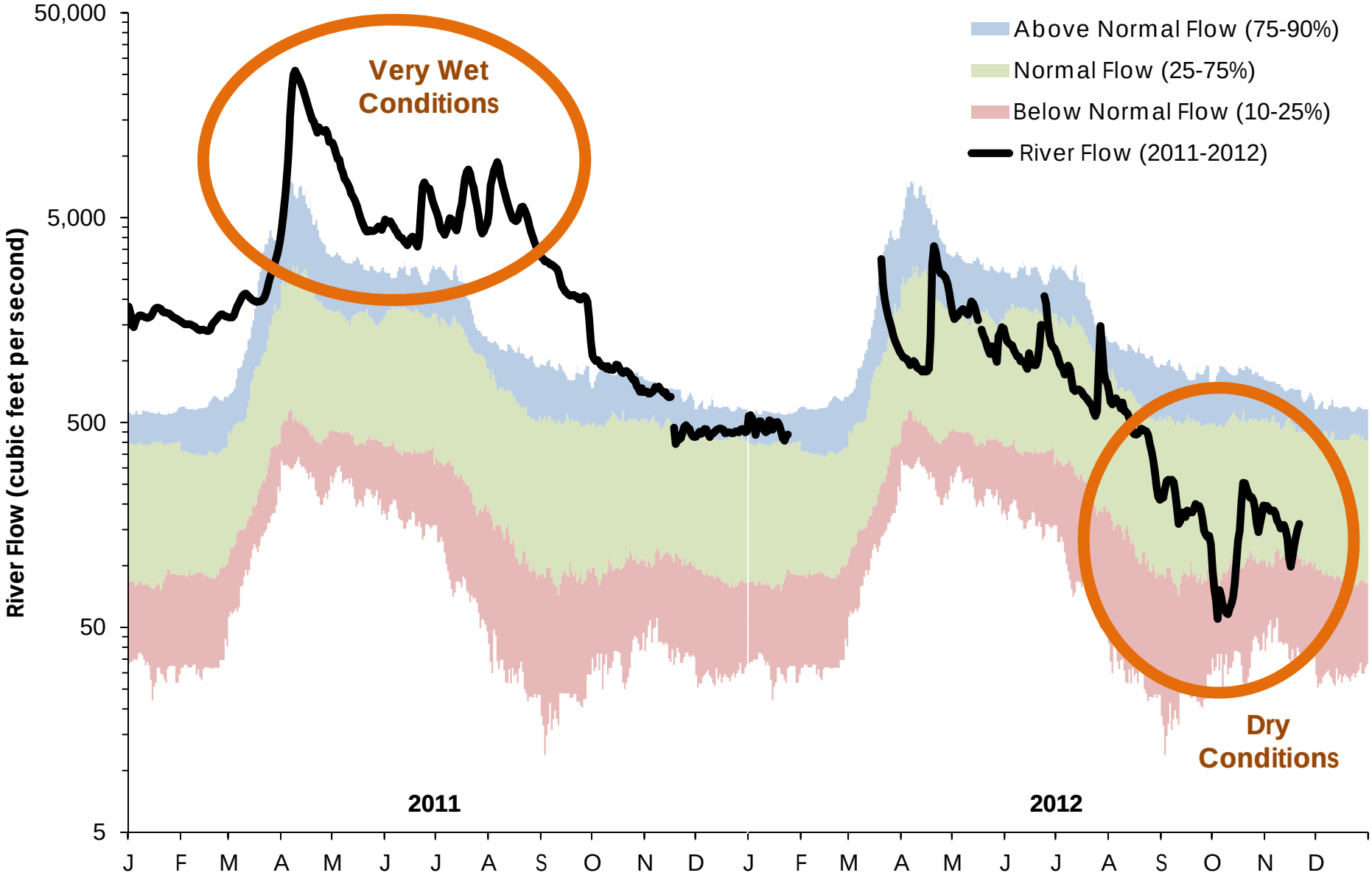
Average Daily Water Demand (12 MGD = 18.57 CFS = 13,442 Acre-Ft/Year)

Existing Water Treatment Plant Capacity (30 MGD = 46.42 CFS = 34,604 Acre-Ft/Year)

Future Water Treatment Plant Capacity with Expansion (45 MGD = 69.63 CFS = 50,406 Acre-Ft/Year)

RED RIVER AT FARGO

2011-2012 River Flow Versus Historical Percentiles Since 1908



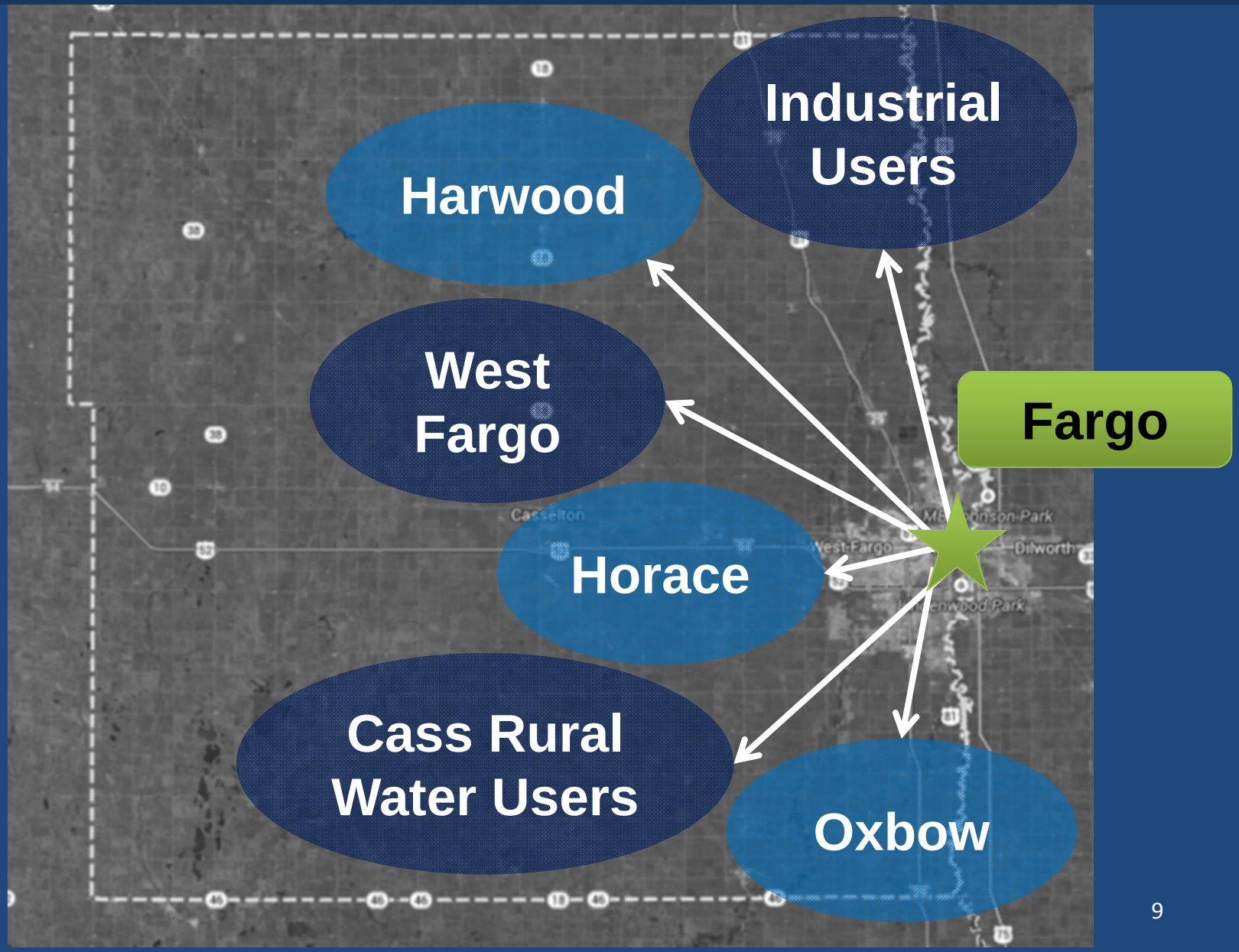
DROUGHT IMPACTS & WATER SUPPLY NEEDS

RED RIVER 1936

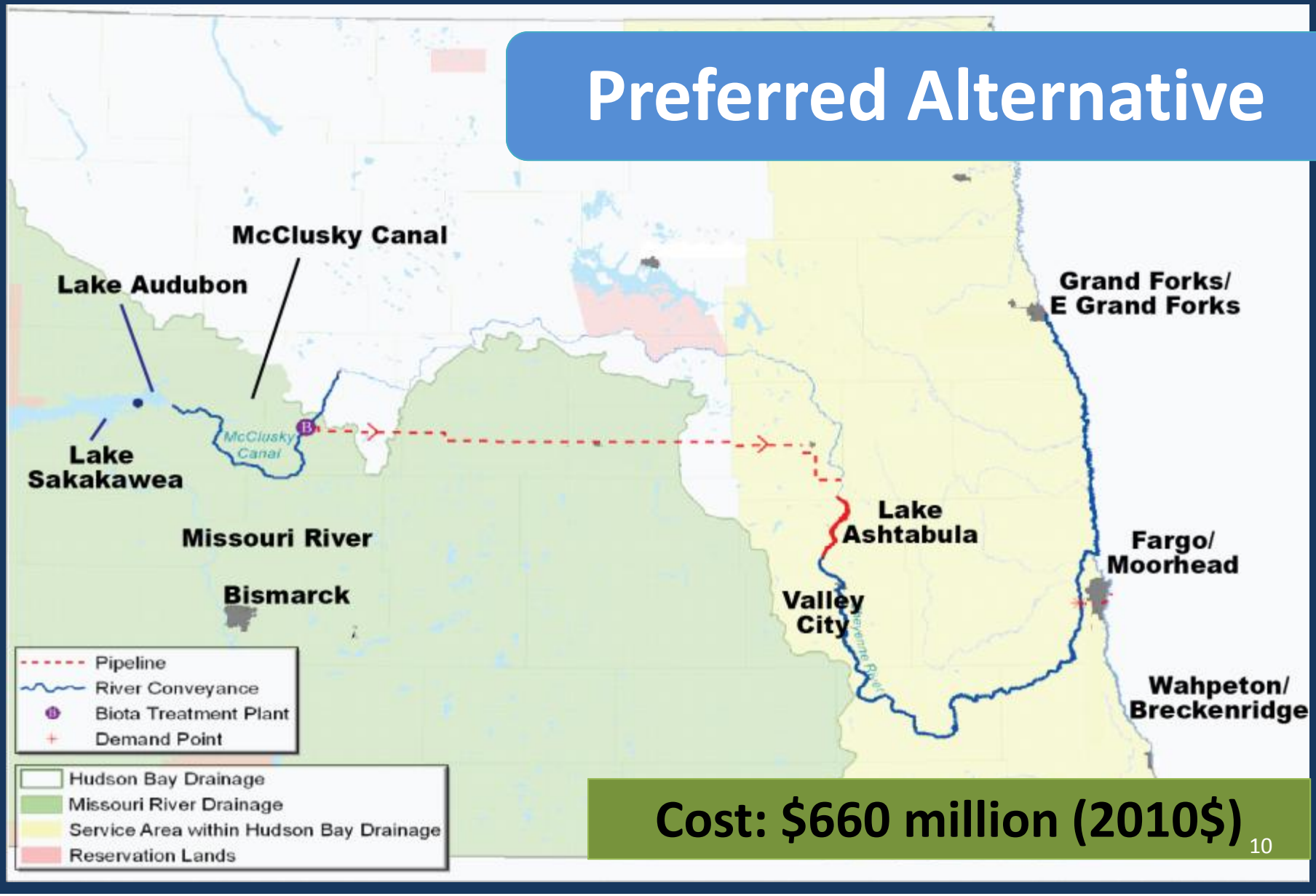
NEEDS

- Existing Red River Valley water supplies will be inadequate during drought
- A 1930s type drought would be devastating to our water supplies
- Expected economic impact **≈ $20 Billion over 10 years**
- The water supply needs will continue to grow

FARGO'S ROLE IN REGIONAL UTILITY SERVICES



RED RIVER VALLEY WATER SUPPLY PROJECT



RED RIVER VALLEY WATER SUPPLY PROJECT

Plan B Alternative

FARGO'S NEED FOR WATER SUPPLY & DROUGHT MANAGEMENT

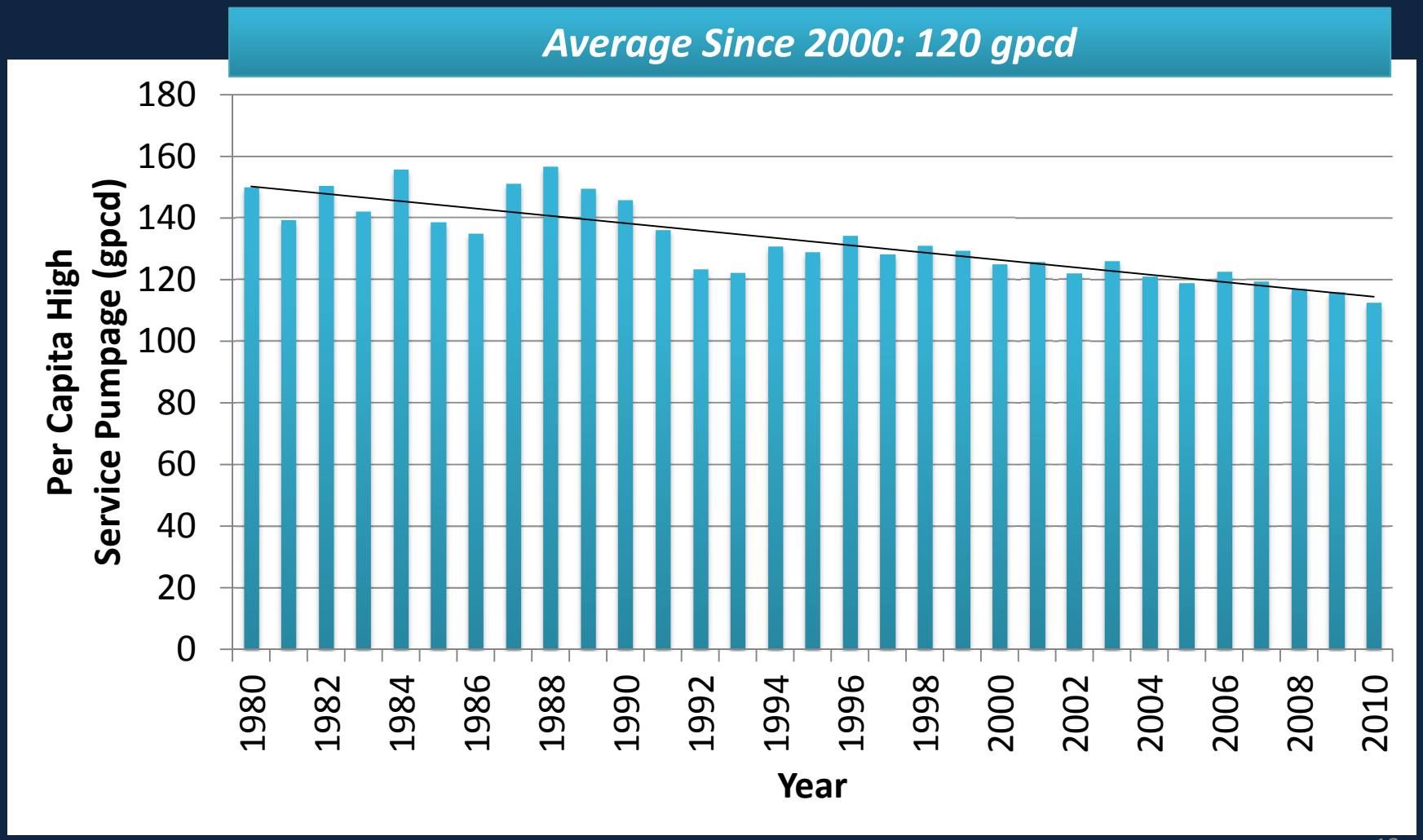
SHORT-TERM SOLUTION

- Drought and Water Service Management Plan
- Devils Lake water

LONG-TERM SOLUTION

- Red River Valley Water Supply Project
- Adaptive Drought and Water Service Management Plan

FARGO PER CAPITA AVERAGE DAY DEMAND



WHAT MAKES UP WATER DEMAND?

Residential/Commercial Water Demand

- Essential Water Use (Baseline Water Demand)
  - Indoor use, consumption, hygiene, etc.
- Non-Essential Use
  - Lawn care, water features, swimming pools, etc.

Industrial Water Demand

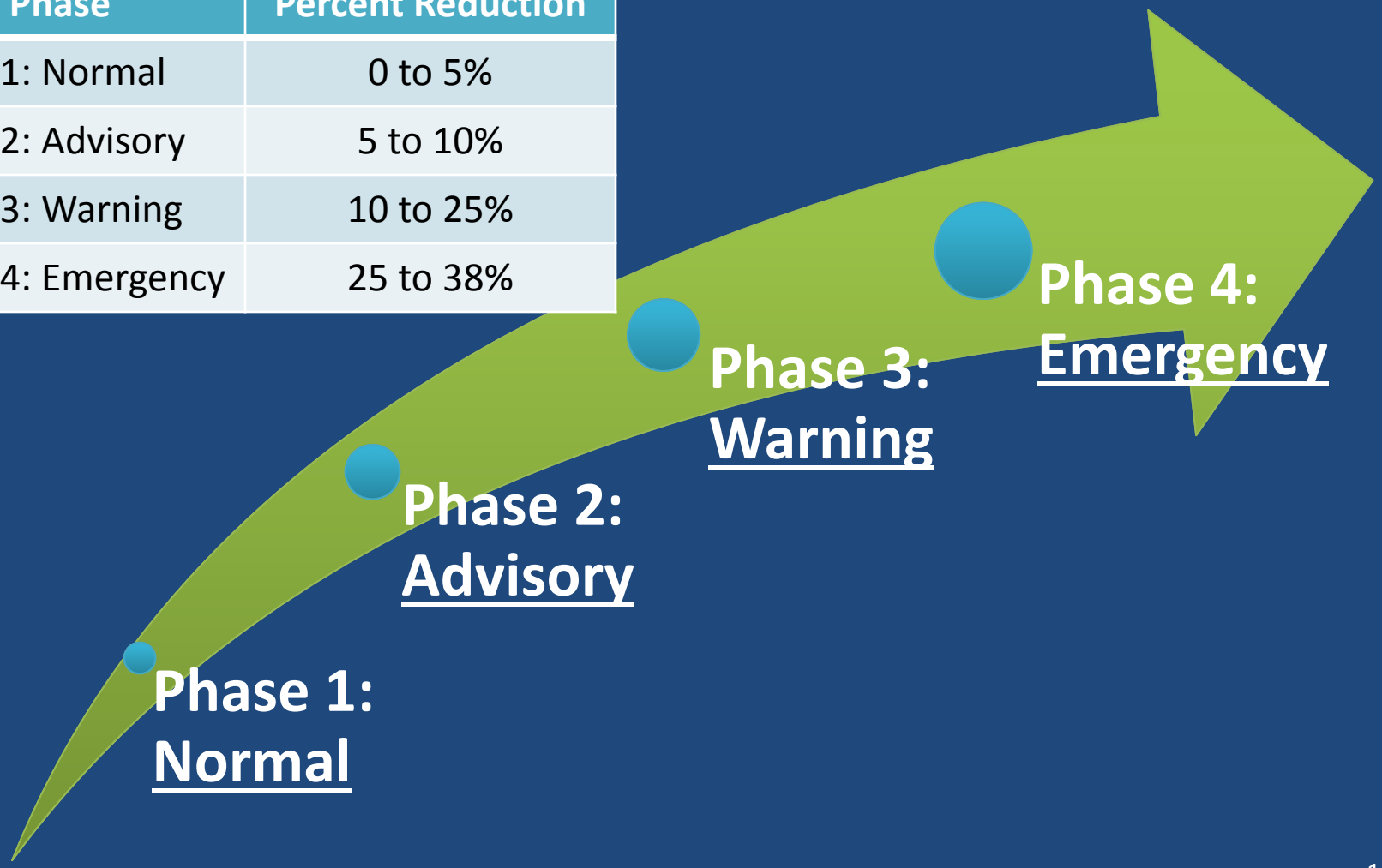
- Large Industry Water Use
- Not Forecasted for Fargo since Industrial Demand is Relatively Small or Follows Residential/ Commercial Trends

Drought Management Plan History

- Original Plan Developed in 2002
- City Ordinances Updated in 2006
- 13 Years Since Originally Developed
- Address Impacts from Devils Lake
- Recent Dry Spell
- Addition of Water System Infrastructure Limitations

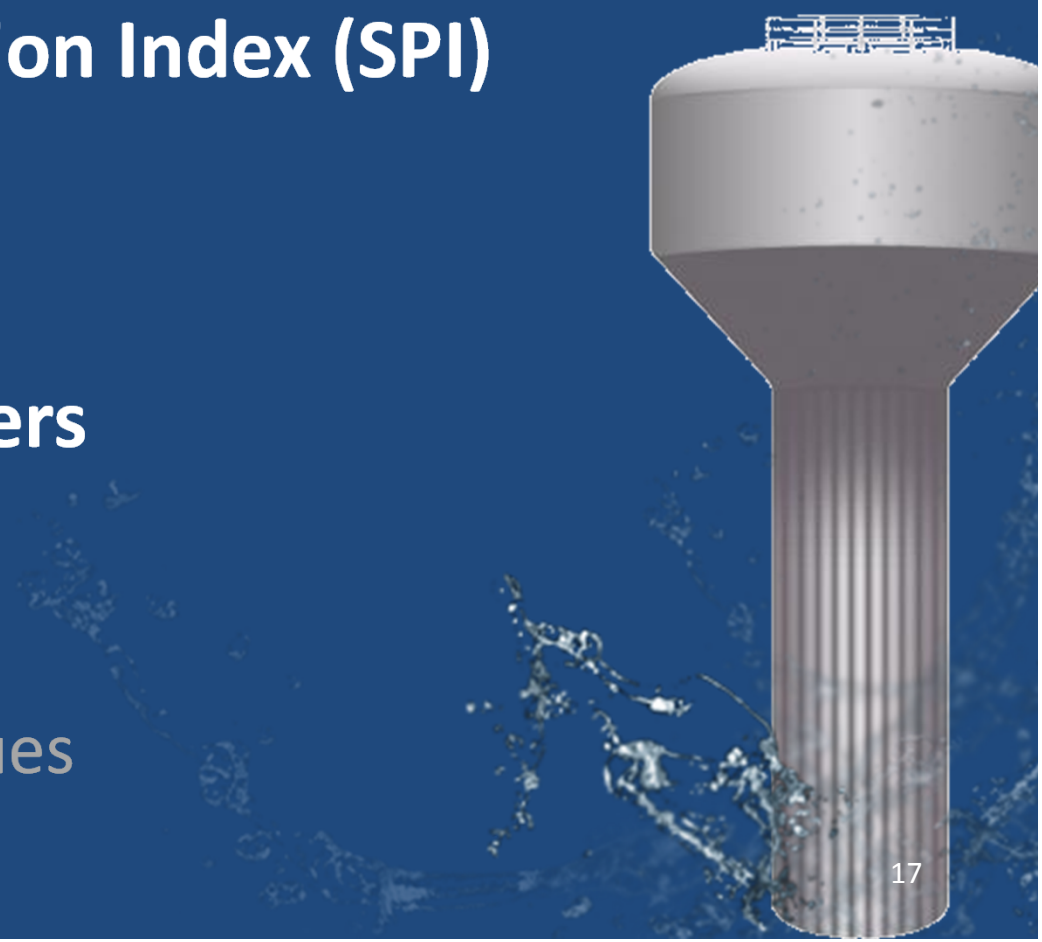
PHASED DROUGHT MANAGEMENT PLAN

Phase	Percent Reduction
Phase 1: Normal	0 to 5%
Phase 2: Advisory	5 to 10%
Phase 3: Warning	10 to 25%
Phase 4: Emergency	25 to 38%



DROUGHT INDICATORS THAT CAUSE PHASE CHANGES

- **Palmer Drought Severity Index (PDSI)**
- **Standard Precipitation Index (SPI)**
- **Stream Flows**
- **Reservoir Levels**
- **Infrastructure Triggers**
  - Watermain break
  - Water Tower Failure
  - Treatment Plant Issues



Drought and Water Service Plan Summary

Indicator	*Response Level*			
	Phase 1 Normal	**Phase 2 Watch**	**Phase 3 Warning**	**Phase 4 Emergency**
PDSI	-1.99 and above	-2.99 to -2.0	-3.99 to -3.0	-4.0 and below
SPI	-0.99 and above	-1.49 to -1.0	-1.99 to -1.5	-2.0 and below
Stream Flow Exceed.	Below 85%	85% to 90%	90% to 95%	Above 95%
Reservoir Levels				
Baldhill	Above 1,266.0’	1,262.5 to 1,266.0’	1,257.0 to 1,262.5’	Below 1,257.0’
Orwell	Above 1,064.0’	1,060.0 to 1,064.0’	1,050.0 to 1,060.0’	Below 1,050.0’
Traverse	Above 976.0’	974.0 to 976.0’		Below 974.0’
Devils Lake	Above 1,446.0’	1,445.0 to 1,446.0’		Below 1,445.0’
Infrastructure Trigger	Normal Conditions	Distribution System Disruption	Treatment System Disruption	Treatment System Failure

DROUGHT RESPONSES

Drought Phase Response	Phase 1	Phase 2	Phase 3	Phase 4
Promote Conservation	V	V	V	V
Promote Residential Reduction		V	V	V
Odd/Even Lawn Watering	V	M	B	B
1-Day Lawn Watering		V	M	B
Other Outdoor Use Restriction		V	M	B
Vehicle Washing Restrictions		V	M	B
Hydrant Flushing Restrictions	V	M	M	B
Water Cops and Fines		V	M	B

V = Voluntary / No Enforcements
M = Mandatory / Enforcement with Warnings / Lesser Penalties
B = Ban / Enforcement with Penalties

Water Use Reduction Goals

Parameter	Phase 1 (Normal)	Phase 2 (Advisory)	Phase 3 (Warning)	Phase 4 (Emergency)
Per Capita Water Demand (gpcd)	115 to 120	115	115	< 115
Peak Day Peaking Factor	2.0	1.75	1.5	< 1.25
Peak Day Per Capita Water Demand (gpcd)	230 to 240	201	173	< 144
Percent Reduction	**0 to 5%** (Promote Conservation)	**0 to 10%**	**10 to 25%**	**25 to 38% or More**
Comparative Water Use Condition	Dry Years	Average Years	Wet Years	Winter Demands

RRVWS Project - Fargo

- Active member of the Lake Agassiz Water Authority (LAWA)
- Supporting a supplemental water supply project that follows the “northern” alignment.
- Working with LAWA and GDCD on funding development and project cost allocations.
- Critical project for Fargo’s regional long-term water supply needs.

CITY OF Fargo