# Environmental Congress

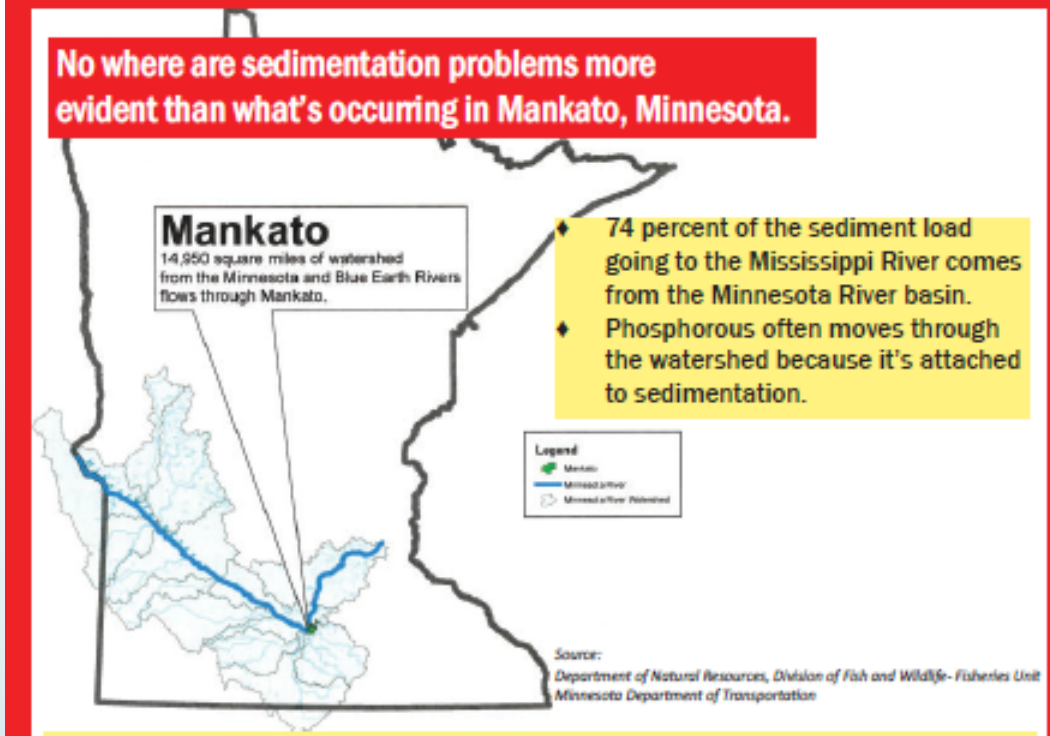
## December 3, 2019

Excessive precipitation

Erosion

Threatened drinking water and infrastructure investment

**No where are sedimentation problems more evident than what's occurring in Mankato, Minnesota.**




- 74 percent of the sediment load going to the Mississippi River comes from the Minnesota River basin.
- Phosphorous often moves through the watershed because it's attached to sedimentation.

**It's clear that without funding for these emergencies:**

- 35 percent of Mankato's drinking water supply is lost.
- Water quality continues to deteriorate with excessive sedimentation.
- Major regional assets are threatened.
- Ravine erosion will threaten private property and water quality.

**Approve these emergency bonding requests and help protect the river, drinking water supply, regional assets, recreational opportunities, river access and positively impact affordability and quality of life.**

# Domestic Water Treatment Efforts



**Water Treatment Plant**

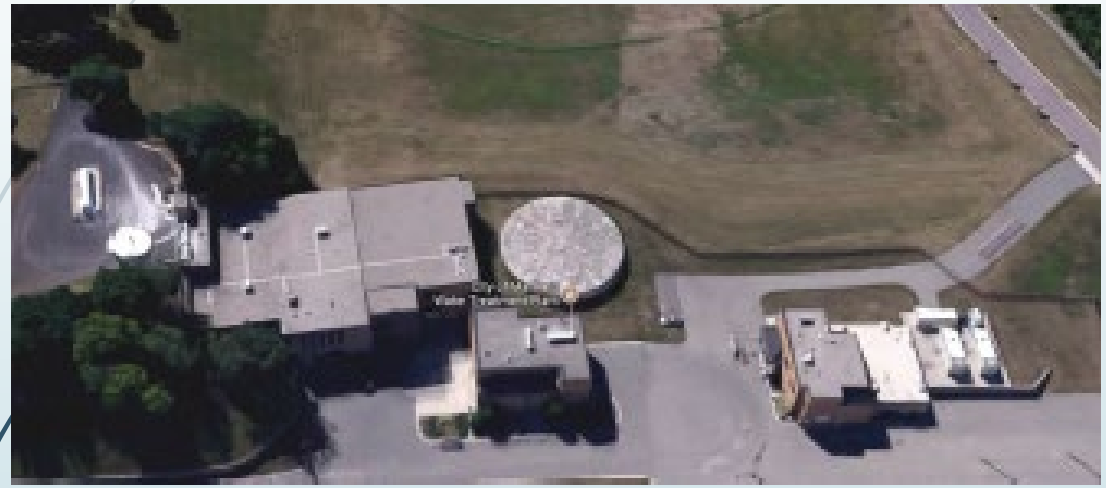
- $145 Million asset providing 11.25 million gallons per day (MGD) potable water
- $50 million investment in water treatment efforts
- Diversity of water sources: 75% shallow collector wells; 25% deep aquifers
- Upgraded water treatment
- State of the art filters
- Treatment to remove titrates will require additional $20-30 Million investment
- Established water conservation program with water loss prevention, irrigation restrictions, rate structure redesign
- Reduced dependence on deep wells (Mount Simon aquifer) by about 50%

# Domestic Water Treatment Efforts

- To improve water quality, city invested $40 million between 2008 and 2013 to install state of the art membrane filters and lime softening.
- Spent lime from softening process at treatment plant is taken by an ag vendor and applied to farm fields for pH adjustment after crops harvested.
- To reduce volume of treated water wasted to backwash membrane filters, city completed a water reuse project within treatment process saving 180 million gallons annually in treated water that would otherwise be sent to wastewater treatment plant.
- Increasing nitrate levels in Blue Earth River affects city's shallow collector wells. In 2015, city installed new horizontal collector well to draw water from Minnesota River Water table to reduce use of existing deep wells in Mt. Simon Aquifer.

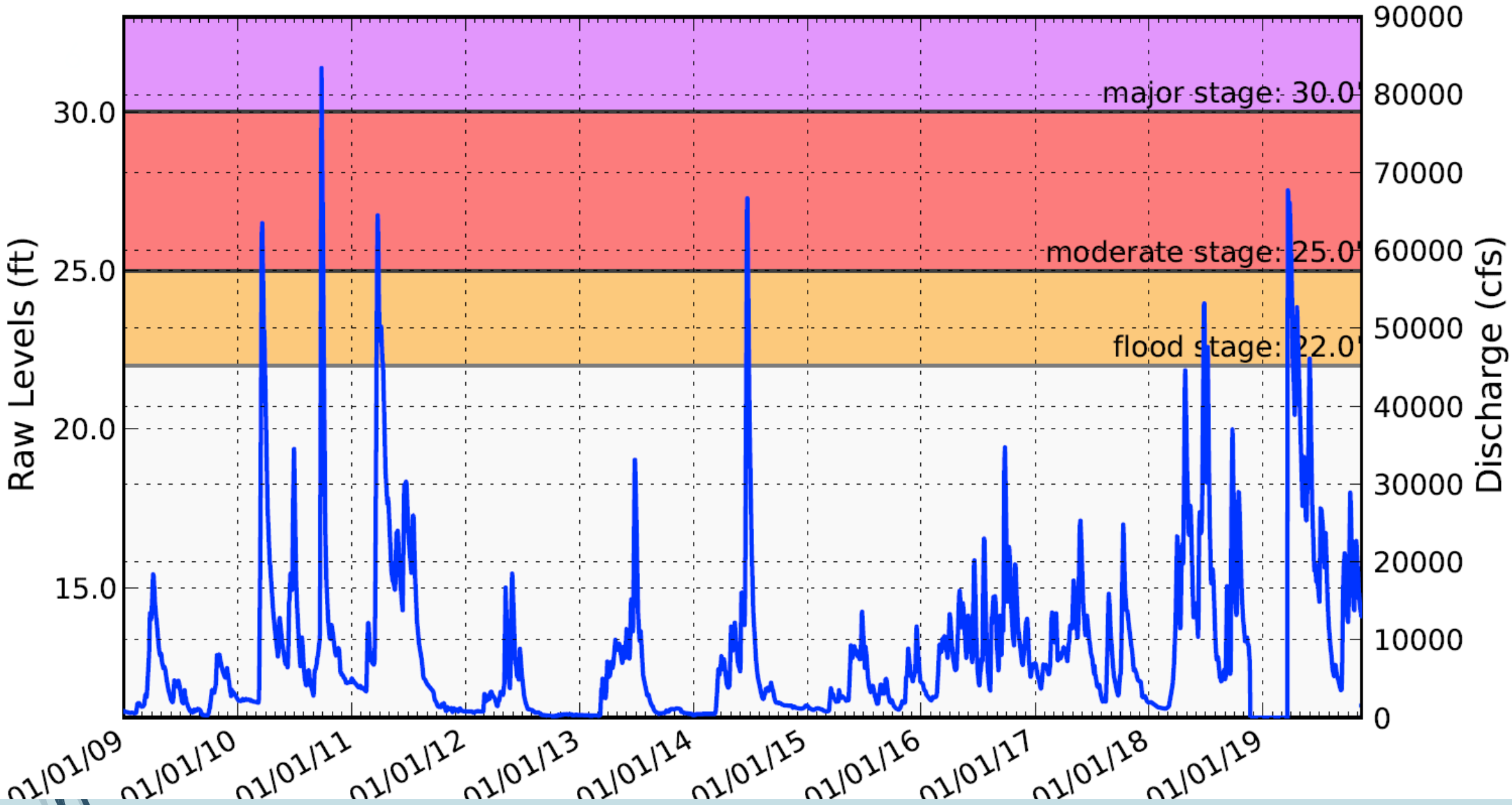
# Water Treatment Facilities





Water Treatment Plant

Shallow collector well – 75% of city's water supply comes from 2 collector wells influenced by Minnesota and Blue Earth Rivers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moderate stage: 25.0
flood stage: 22.0
Raw Levels (ft)
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Discharge (cfs)
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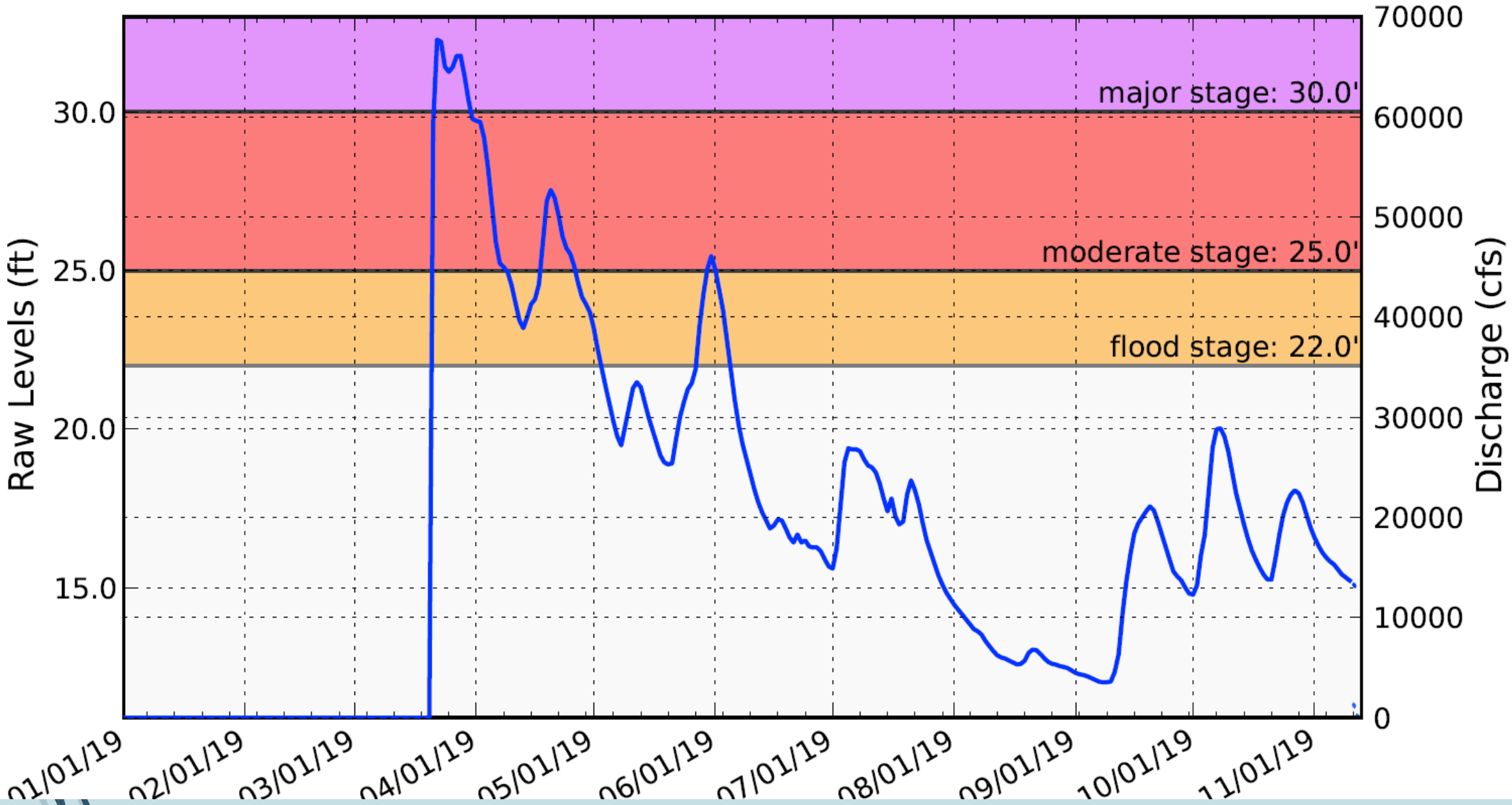
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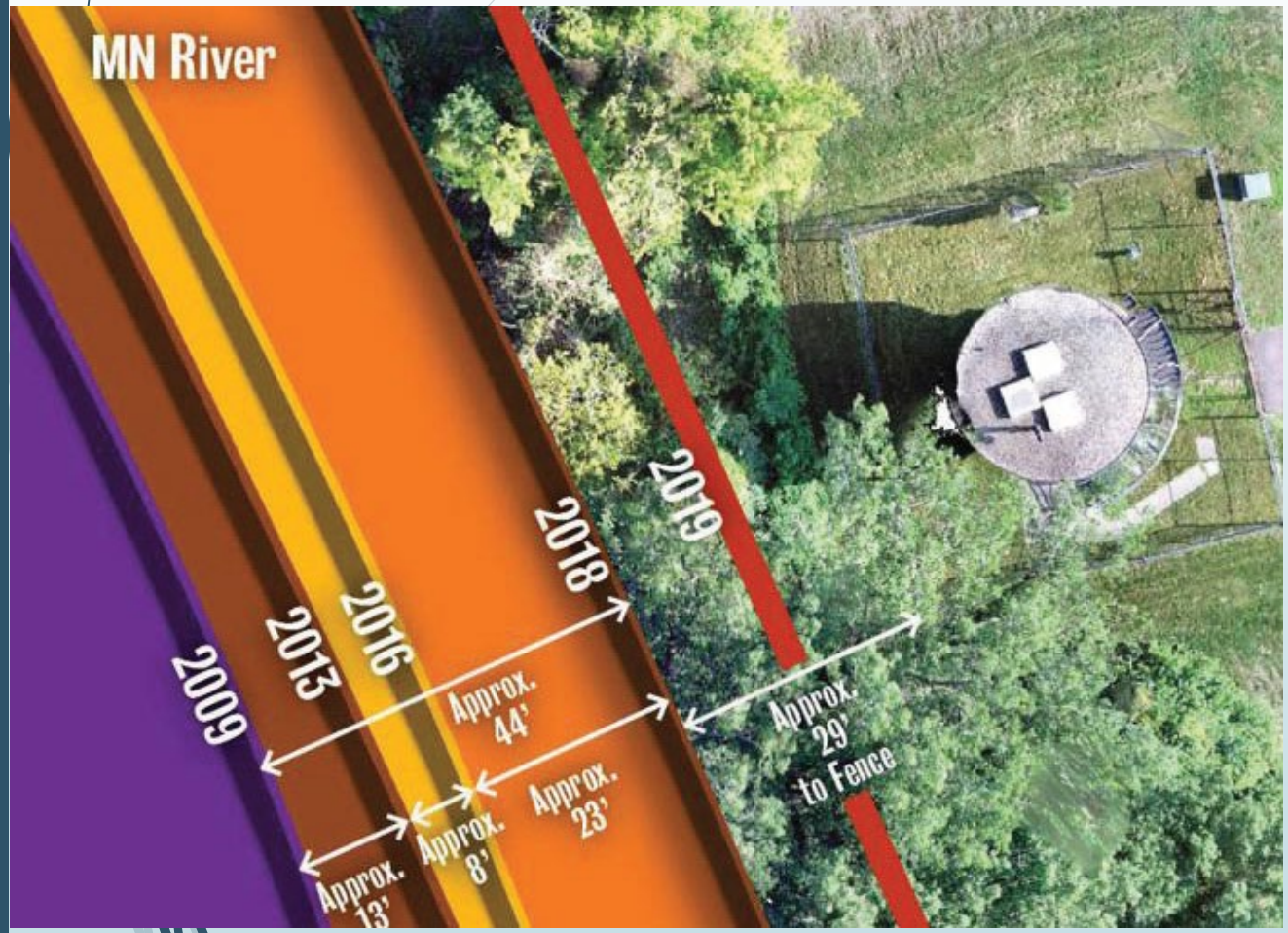
# Erosion Progressively Worse
## 38 Feet since 2016




- Well 15 in Land of Memories Park, which provides 35 percent of Mankato's drinking water, is in danger because of erosion.
- Since 2009, the riverbank has eroded approximately 60 feet, and 15 feet of erosion has occurred in the last year.
- As of 2019, there's approximately *14 feet of land between the river and the fence around Well 15*. One large event can be disastrous.
- Protect Land of Memories Park, which provides river access, is significant to the Dakota heritage in the area and serves as the Mahkato Wacipi Pow Wow grounds.

# 2017 – Minnesota River at Well #15
## Facing North

# 2018 – Minnesota River at Well #15
## Facing North



Continued Undermining of
Tree Root System

# Summer 2019 – Minnesota River at Well #15
## Facing North



# Save well, stop erosion - $2.3 Million




- **Vegetated Geogrids** – constructing geotextile wrapped soil layers with vegetation and planting to stabilize the bank. This would be in conjunction with riprap at the bank toe, below the normal water level.
- **Riprap Bank Armoring** – constructed alone, or with joint planting or live staking to increase vegetation.
- **Bendway Weirs/Stream Barbs** – with intermediate live staking or other re-vegetation techniques.
- Possibility that cabled concrete block or other structural reinforcement with sheetpile or secant walls depending on final design.

# Alternative - Abandon shallow well tap Mt. Simon Aquifer

- Abandon $10 million asset
- Resite well (potential impact to Sibley Park) out of harms way. This results in a deep well site that requires DNR approval to impact Mt. Simon Aquifer which is not a renewable resource
- Significant cost to build new well. Potential impact to water treatment process

- RISK – time to site and permit still results in loss of shallow well which provides 40% of water source in Mankato
- Next threatened area is Water Resource Recovery Facility ($250 million asset serving six communities)

# How do we manage erosion and surface water?

# What else are we protecting?

# Surface Water Management Program



Surface Water Management Policy/Customized In-House Development

- Public and Private activities along natural waterways
  - Vegetation and erosion management

Grading and Drainage Manual/Customized In-House Development

- Design requirements for development
  - Increased nutrient & pollution removal and rate control

Model MS4 Program/Customize In-House Development

- Strategic partnership with neighboring MS4 permitees
- Staff activities for permit compliance
- Street sweeping & leaf pick up, infrastructure & Flood Control inspection and proactive maintenance
- Illicit discharge elimination

Municipal Separate Storm Sewer System (MS4 Permit)

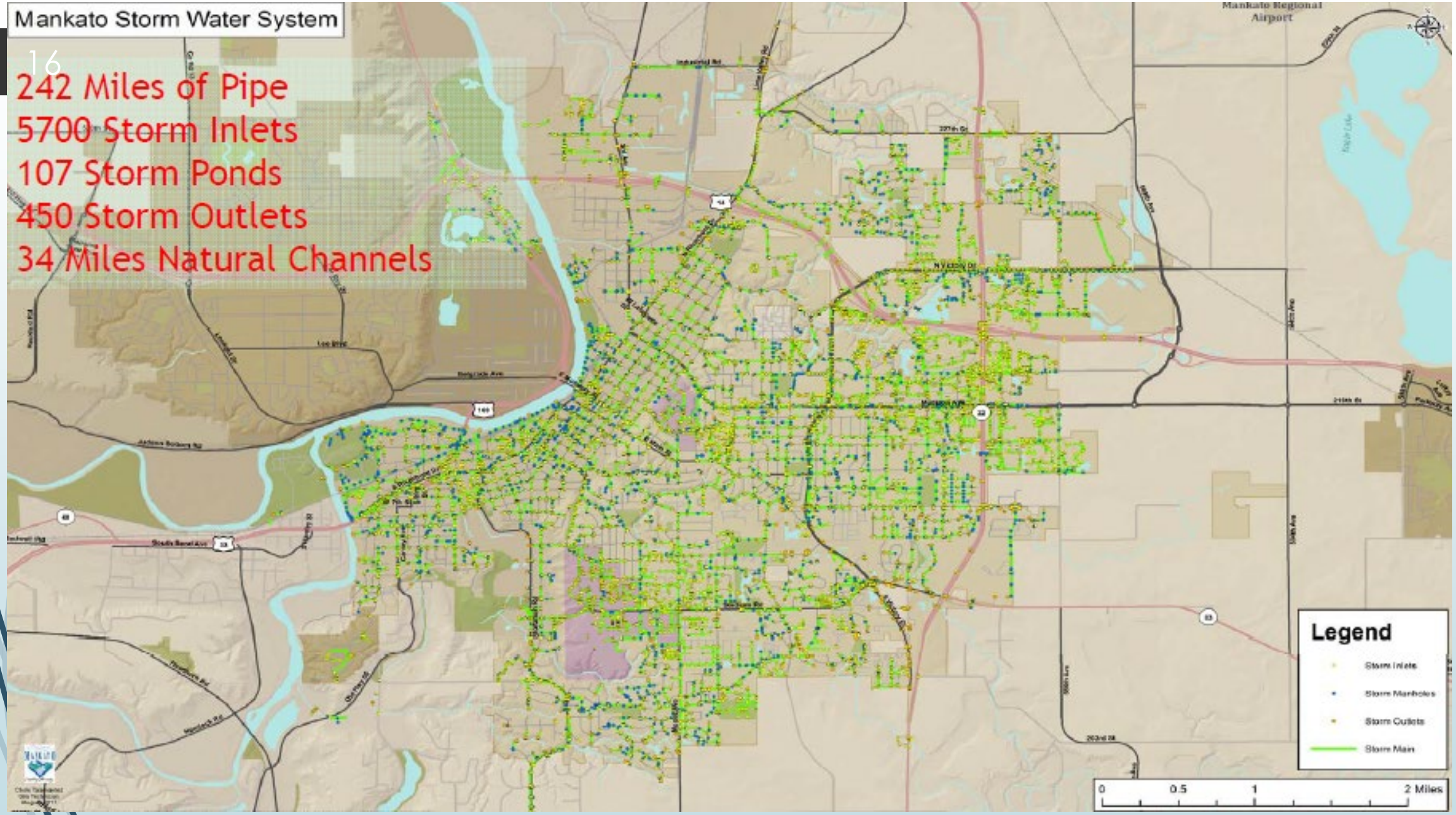
- In compliance with the provisions of the federal Clean Water Act (CWA)
- This permit establishes conditions for discharging **stormwater** and specific other related discharges to **waters of the state.**
- This is accomplished by protecting the City of Mankato Storm drain system from avoidable pollution. We achieve this using a combination of education, best management practices and enforcement.

**Stormwater System**

- 242 miles of pipe
- 5700 storm inlets
- 107 storm ponds
- 450 storm outlets
- 34 miles of natural channels

# Mankato Storm Water System

242 Miles of Pipe
5700 Storm Inlets
107 Storm Ponds
450 Storm Outlets
34 Miles Natural Channels



# Minnesota River's Impact on Mankato

**Riverfront Stabilization:**
- Stabilization of Minnesota River Bank
- Protect WRRF & Riverfront Park
- Restore Boat/Canoe Access to Minnesota River
- Budgeted Cost: **$6.7 Million** (80% State/20% Local)


**Land of Memories Park Emergency Infrastructure Protection:**
- Stabilization of Minnesota River bank to protect Municipal Well No 15 and pow wow grounds
- Budgeted Cost: **$2.3 Million** (80% State/20% Local)



Highway 169 Flood Protection

Kiwanis Recreation Area Improvements

Minnesota River

City of Mankato Water Resource Recovery Facility

Restoration of mound with native plantings

Minnesota River Bank Stabilization

Boat Launch

Canoe Launch

Municipal Well No. 14/15

Butterfly Park Bank Stabilization

City of Mankato Water Treatment Plant

Pow Wow Grounds

Canoe Launch

Blue Earth River

East Red Jacket Park Water Protection

**Minnesota River Recreation Preservation:**
- Predesign for new Dakota Trail through Land of Memories Park to connect to Minneopa/Sakatah Trail
- Permanent Amphitheater Canopy
- New Support Structure with Restrooms
- Park & Trailhead Improvements
- Budgeted Cost: **$1.8 Million** (50% State/50% Local)

**Indian Creek Improvements**
- Stabilize Eroded Ravine Segments
- Budgeted Cost: **$5.3 Million** (80% State/20% Local)


**Greater Mankato Water Quality Mitigation Project**
- Land Acquisition
- Bioreactor Construction
- Wetland Restoration
- Budgeted Cost: **$8.3 Million** (50% State/50% Local)

SEH

# Contact Information

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