



# *Recovering from the Northeastern Minnesota Floods*

**17th Annual TERRA Pavement Conference**  
February 14, 2013

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MnDOT District 1 Duluth

*Your Destination... Our Priority*



According to my calculations, this is going to be expensive!

We thought we had problems after Memorial Day



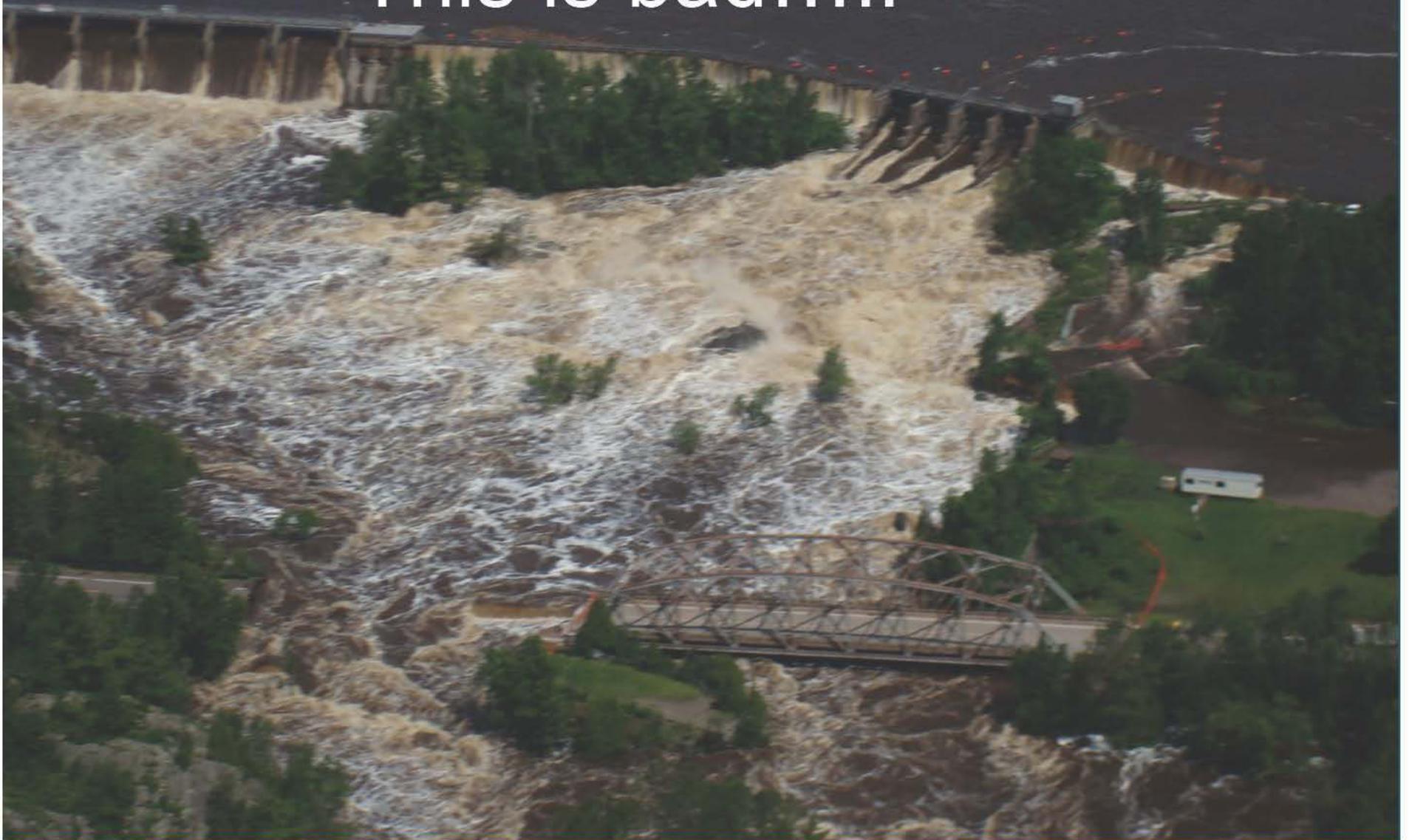
# This is good.....



10.22.2010



This is bad.....



# Video of St. Louis River at Thomson



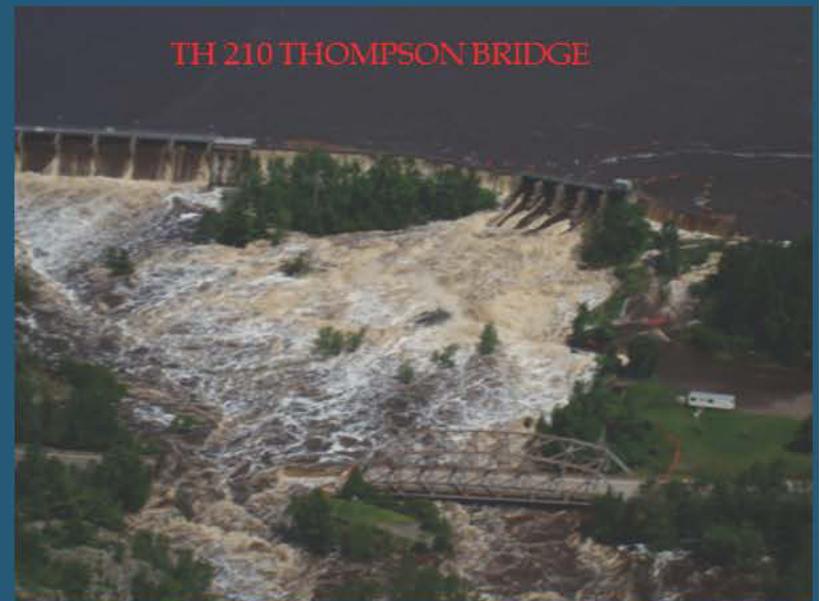
# Statistical Information

## Thomson Dam

§ Summer	580 to 1,000 cfs
§ Spring Runoff	10,000 cfs
§ Alarms sound	25,000 cfs
§ Spike	55,000 cfs

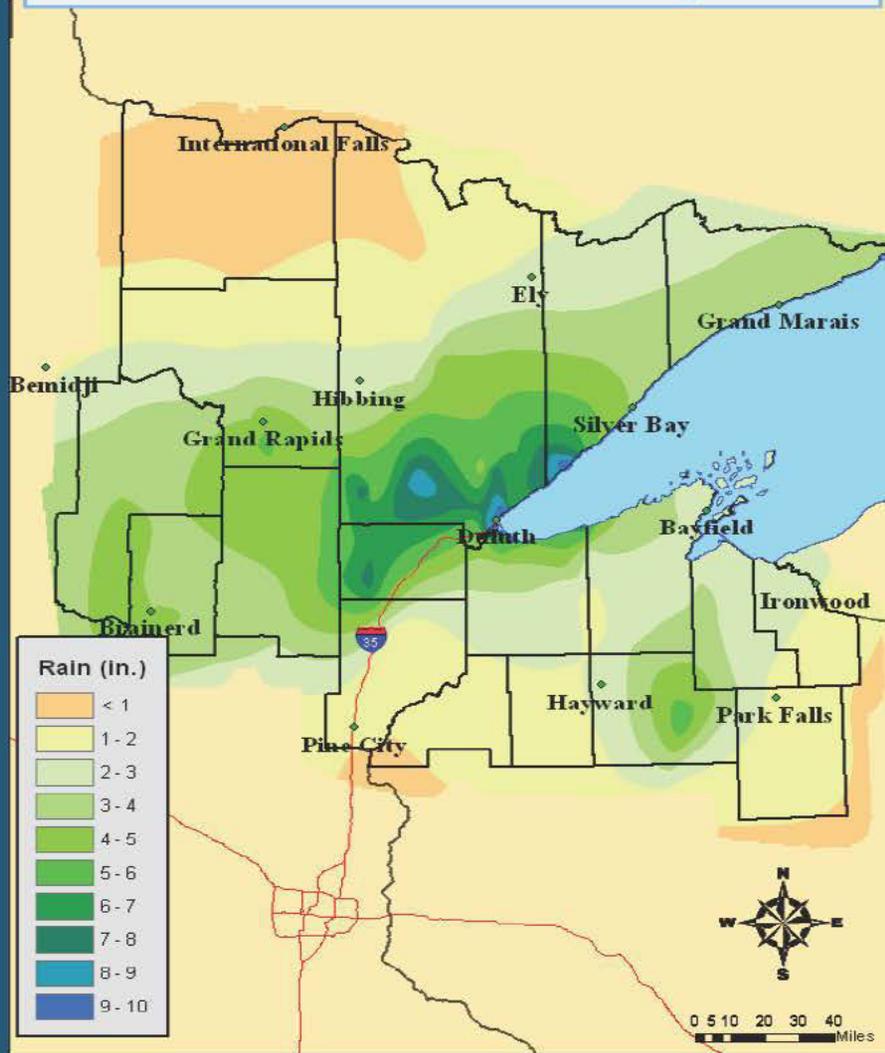
*Note: previous high was  
39,600 cfs from April 1, 1979  
flood*

*By comparison, Niagara Falls  
carries 100,000 cfs*



# What happened?

## June 19-20, 2012 Flooding Rains



Torrential rain and flooding turned the southwest corner of Lake Superior a muddy brown, seen here a satellite image from NOAA taken Thursday, June 21, 2012. (Photo courtesy National Oceanic and Atmospheric Administration)



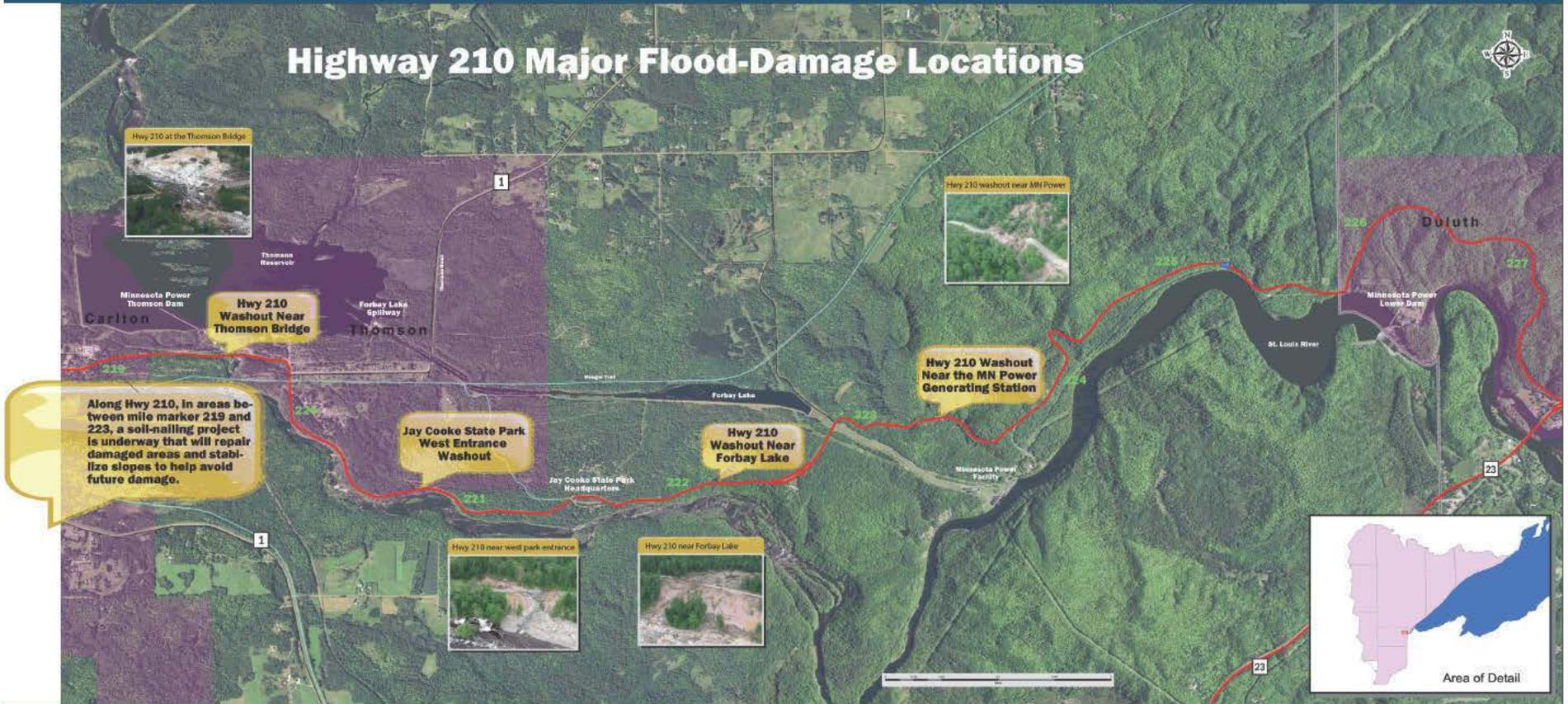
# Major Bridge Impact Damage Areas

-  TH 210 and Bridges 09001/91032 in Thomson
-  TH 210 in Jay Cooke State Park
-  TH 23 and Bridge 5757 in Fond du Lac area
-  TH 2 and Bridge 91146 from Proctor to I-35 in Duluth
-  TH 61 at Knife River Bridges 9339 & 9341



# TH 210 - Thomson to TH 23

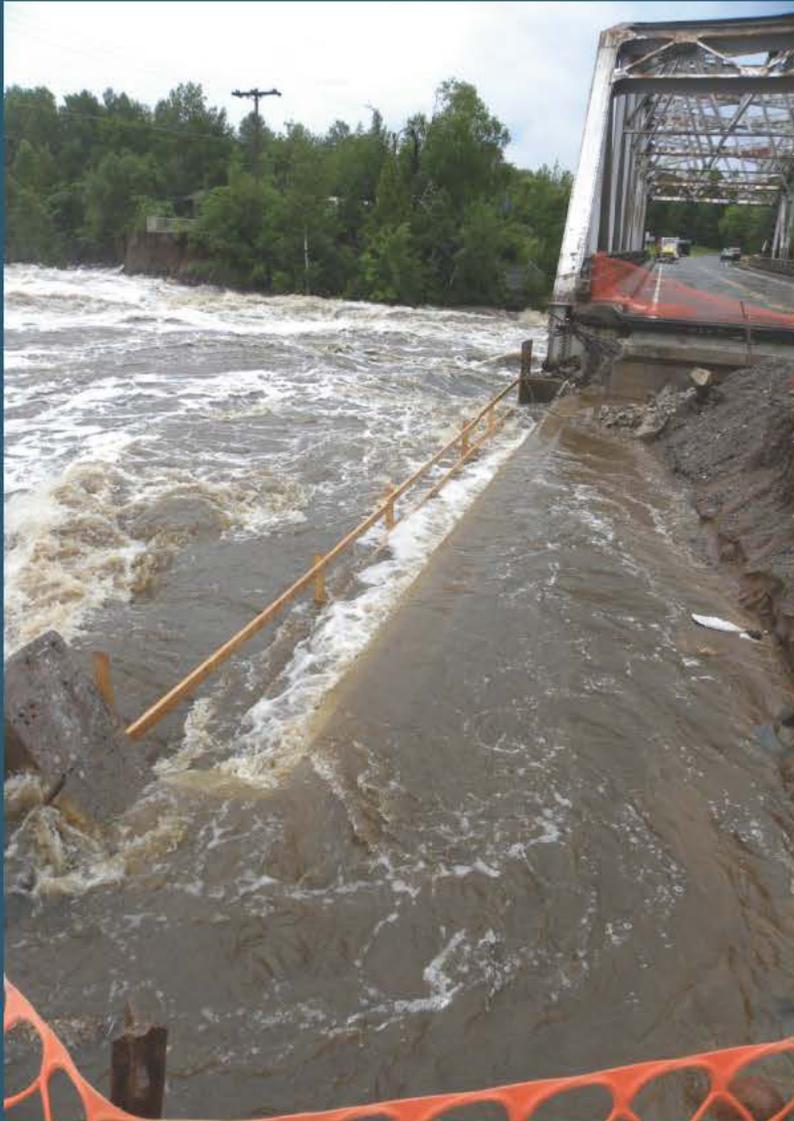
## Highway 210 Major Flood-Damage Locations



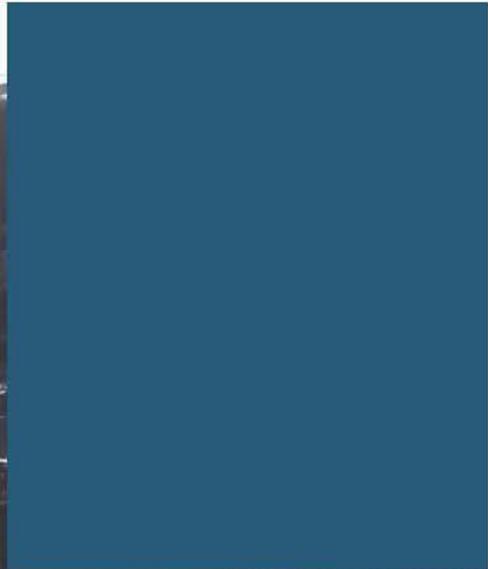
# CITY OF THOMSON



# TH 210 below THOMSON DAM







# Truss Rehab Project Scoping October 2010





# TH 210 WEST PARK ENTRANCE

## Jay Cooke



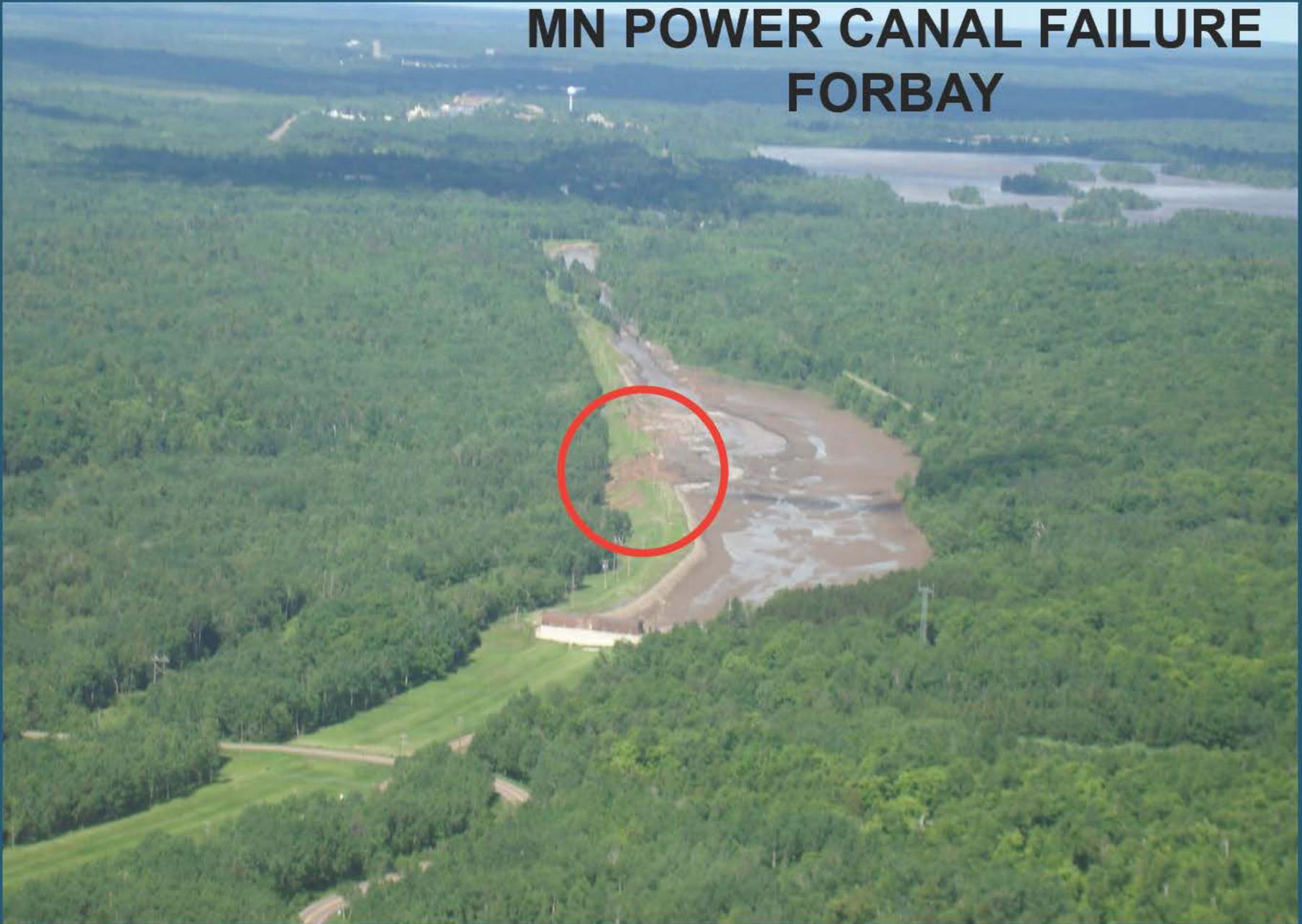
# TH 210 WEST PARK ENTRANCE



➡ No access to Park HQ



# MN POWER CANAL FAILURE FORBAY

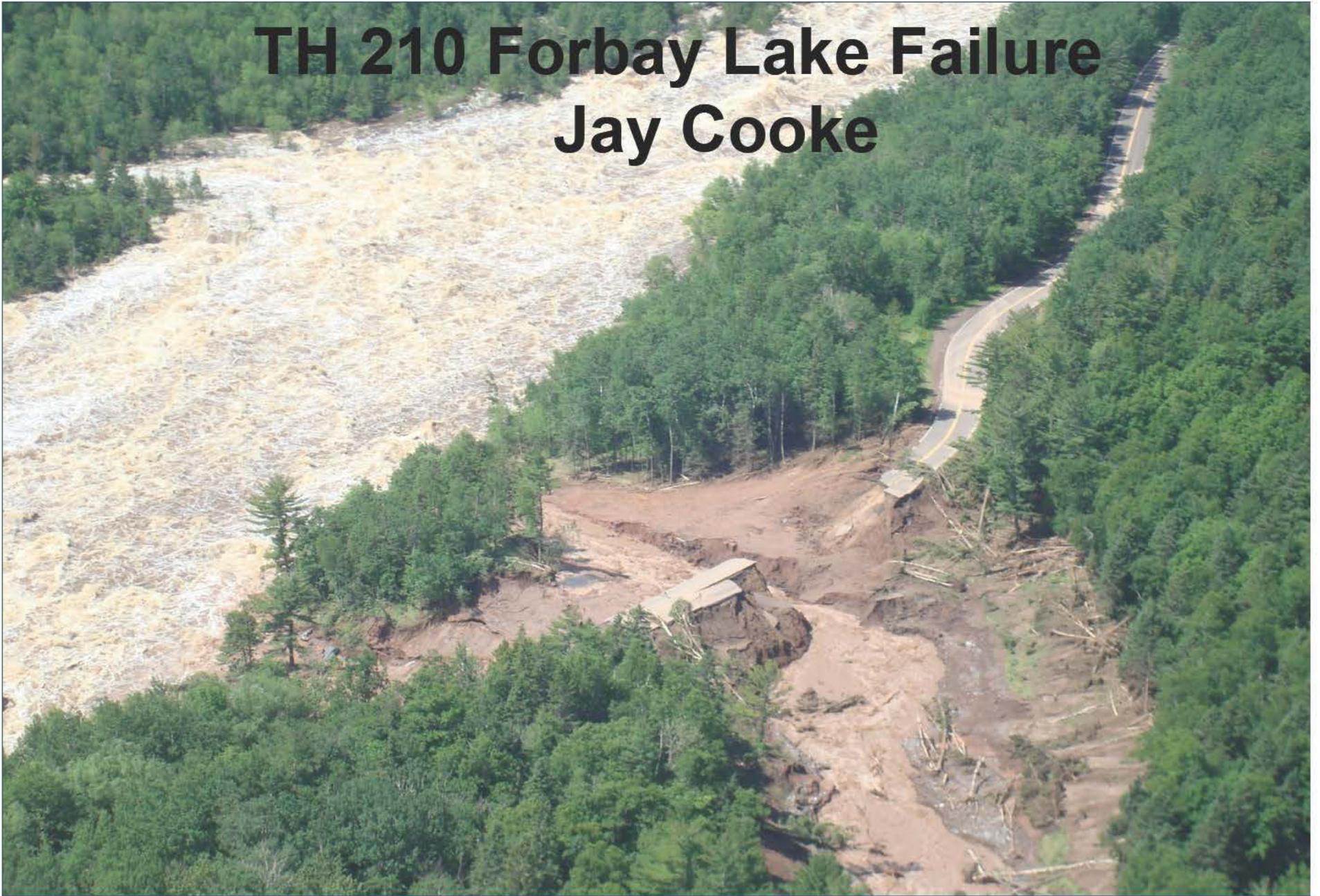


# Forbay Lake – New ‘Outlet’



# TH 210 Forbay Lake Failure

## Jay Cooke











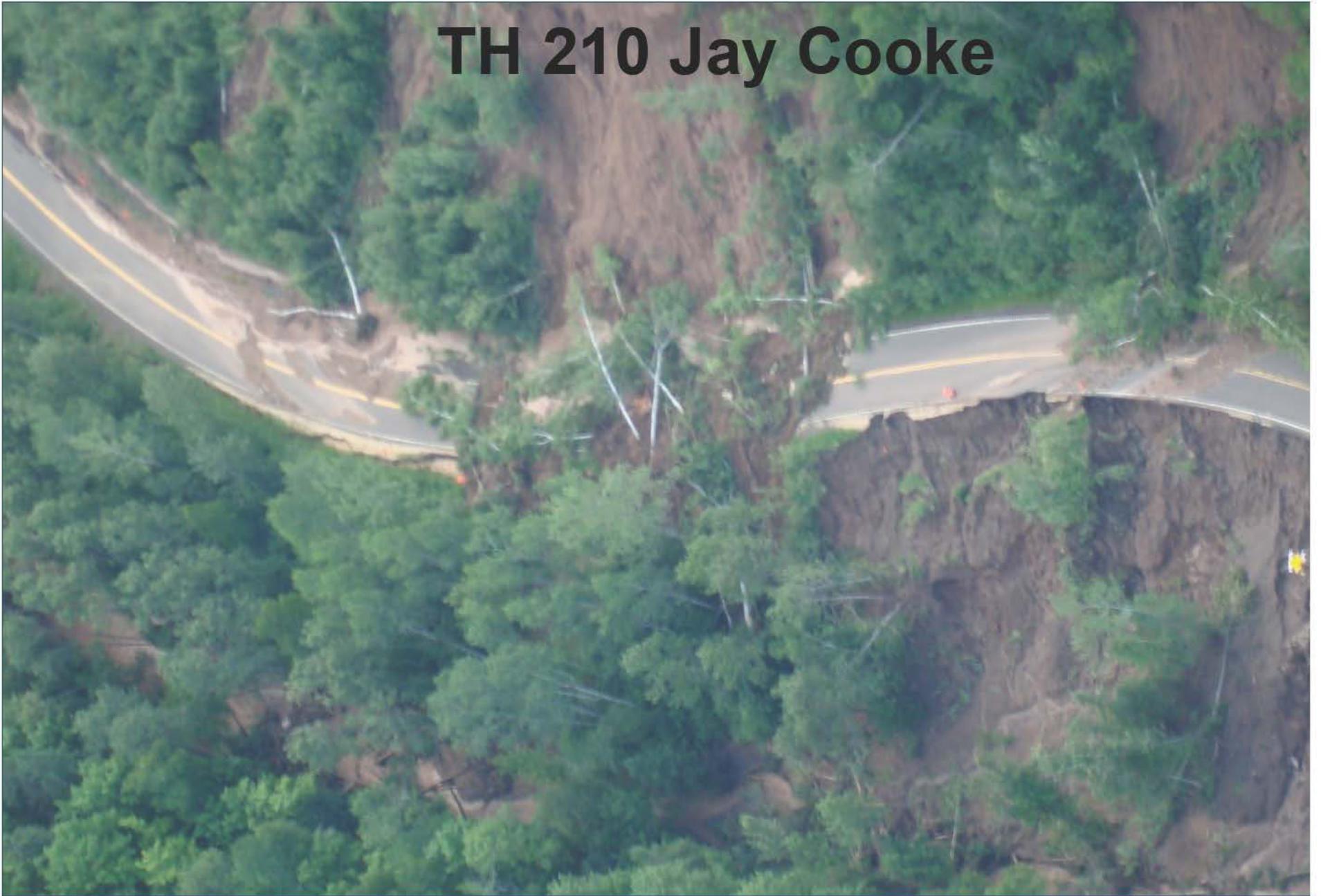
# TH 210 MN Power Station

07.02.2012





# TH 210 Jay Cooke



# TH 23 Video near Fond du Lac



# TH 23 Fond du Lac



# TH 23 Fond du Lac near junction of TH 210



# TH 23 near Mission Creek in FDL



# TH 23 Fond du Lac Historic Mission Creek Bridge

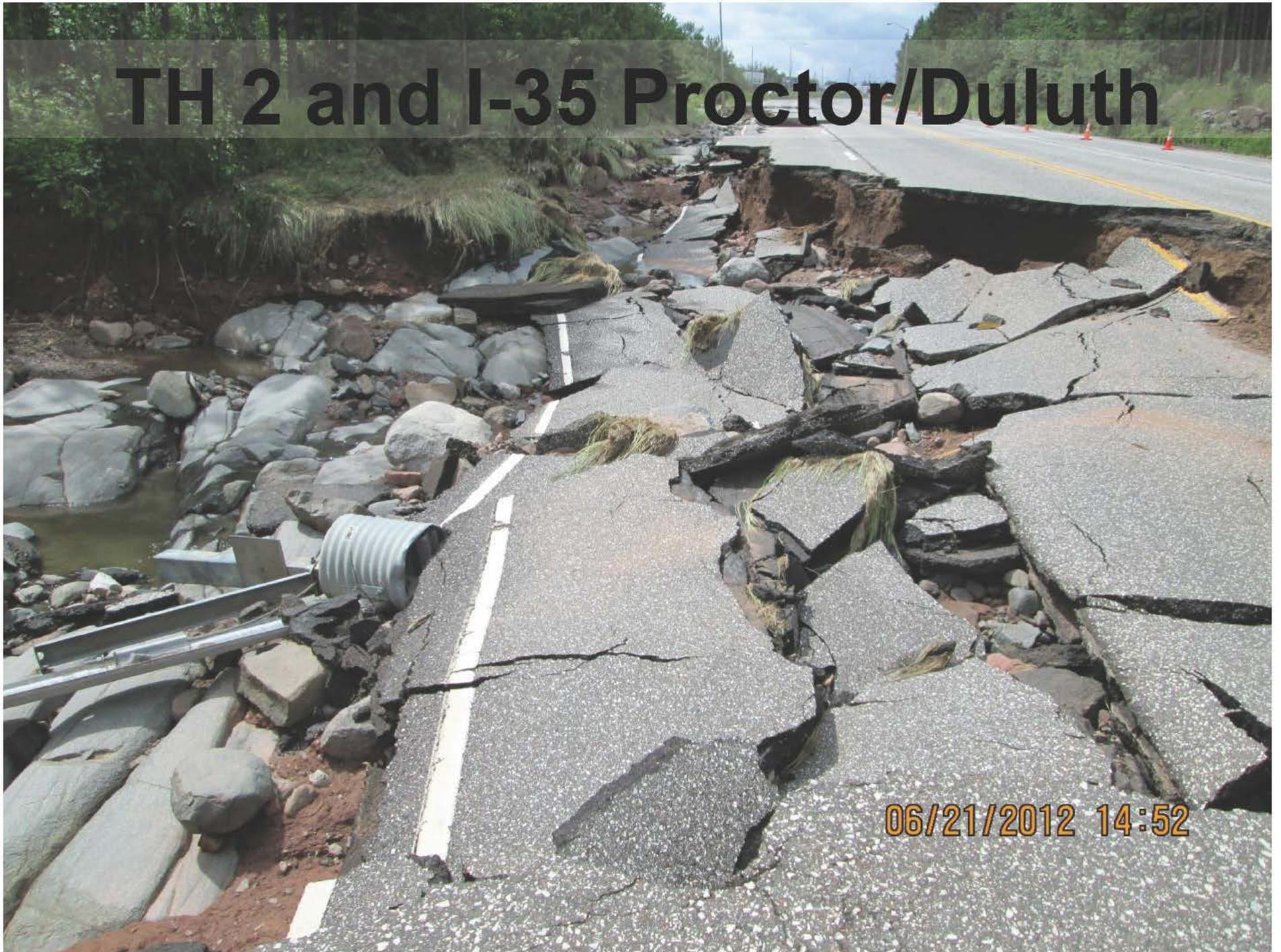


# Water Street – Fond du Lac





# TH 2 and I-35 Proctor/Duluth



06/21/2012 14:52

# TH 2 Near Proctor



# TH 61 KNIFE RIVER



# TH 61 KNIFE RIVER



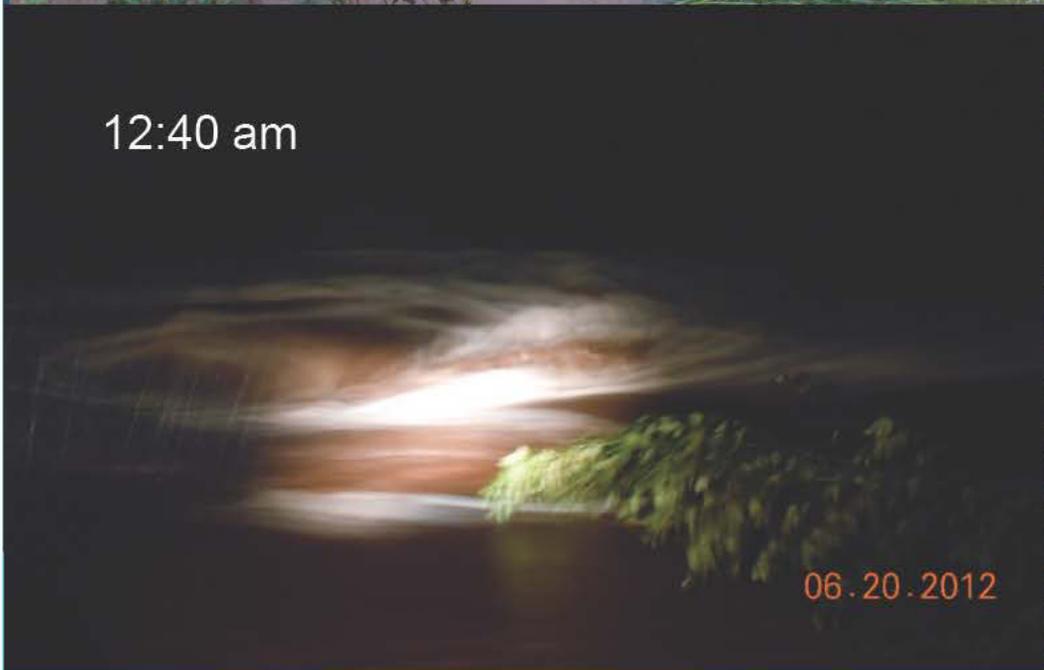
# TH 61 KNIFE RIVER



# TH 61 SILVER CREEK



11:40 am  
06-20-2012

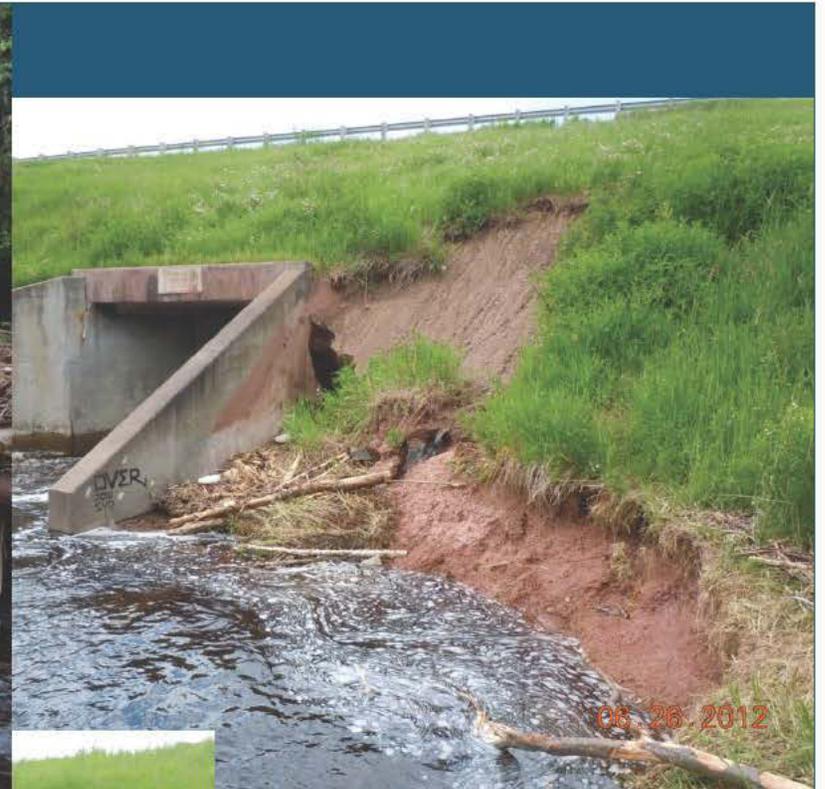


12:40 am

06.20.2012



06.21.2012



# TH61 over Sucker River



# TH61 over Stewart Riv



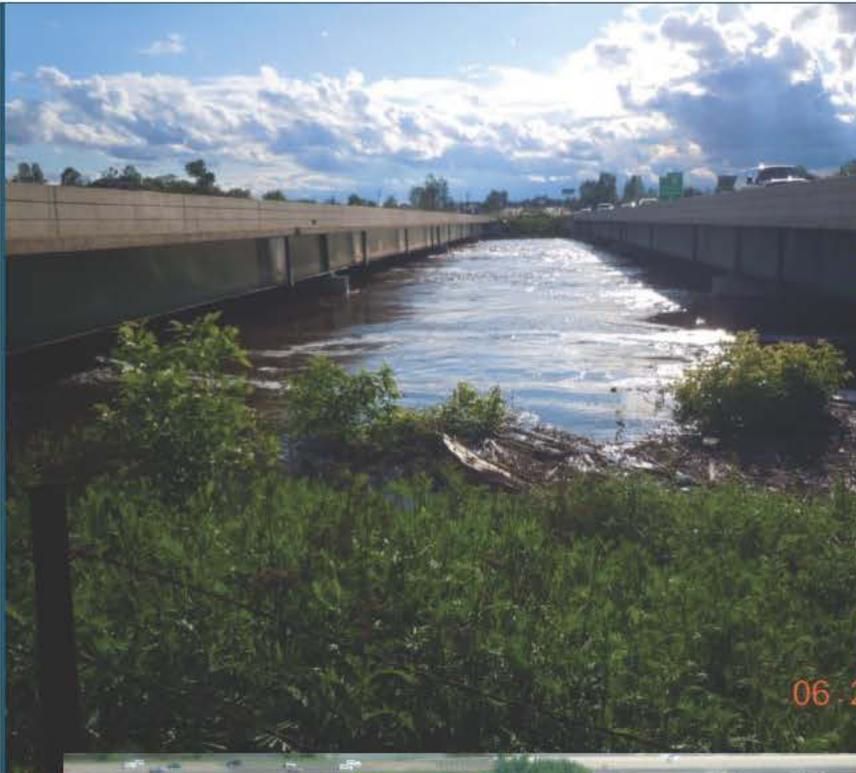
Bridge 88544 TH23  
over Kingsbury Creek  
in West Duluth





Bridge 5718 – TH123  
Kettle River at Sandstone





# St. Louis River at I-35 & CSAH 61 in Scanlon



TH 73 over Moose Horn  
River in Moose Lake

06.22.2012



# Local Stories & Photos



# Miller Hill Mall Area on TH 53



# Boy survives being swept through flooded culvert in Duluth

9:00 AM, Jun 21, 2012 | 5 comments



Recommend 0 Tweet 0 +1 0



Written by KARE 11

FILED UNDER  
Local News

DULUTH, Minn. - An 8-year-old boy is OK after being swept about six blocks through a culvert in flooded Duluth.

8 year old Kenneth Markaewict was playing in a culvert when suddenly the pressure sucked him under and took him for a frightening one-mile ride.

Emergency responders swept every exit point using pipe poles to locate Kenneth until a Proctor man finally located him in the woods, close to the Zenith terrace trailer park complex.

Kenneth's family says he was horrified and upset by the incident, but his uncle is relieved the boy is alive and hopes parents can learn a lesson from their close call.

Xcel Energy

**START SAVING ENERGY AND MONEY.**

GET OPTIONS

### MOST VIEWED ARTICLES

- Suspected drunk driver hits 6 pedestrians near U of M
- Teen critical after being shot in the head with an arrow
- Missing veteran from North Branch found safe
- Signs of hope for Hastings teen injured in crash
- Edina man dies in dock mishap on St. Croix River

SEE MORE

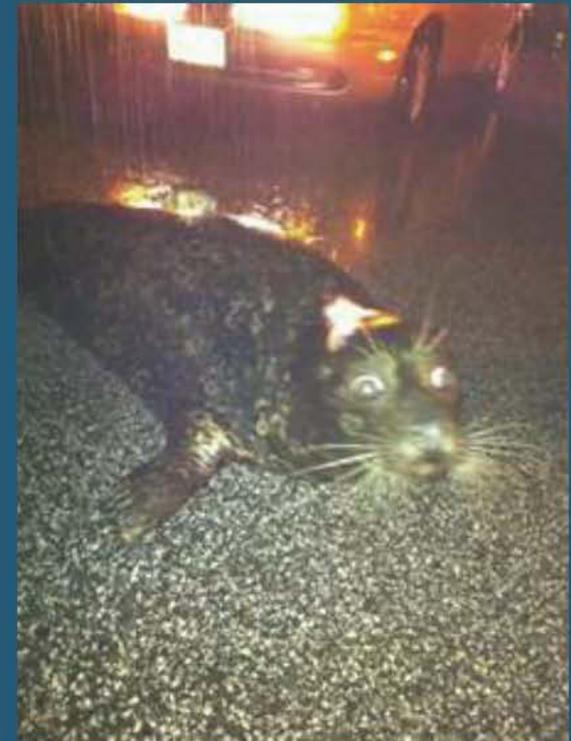
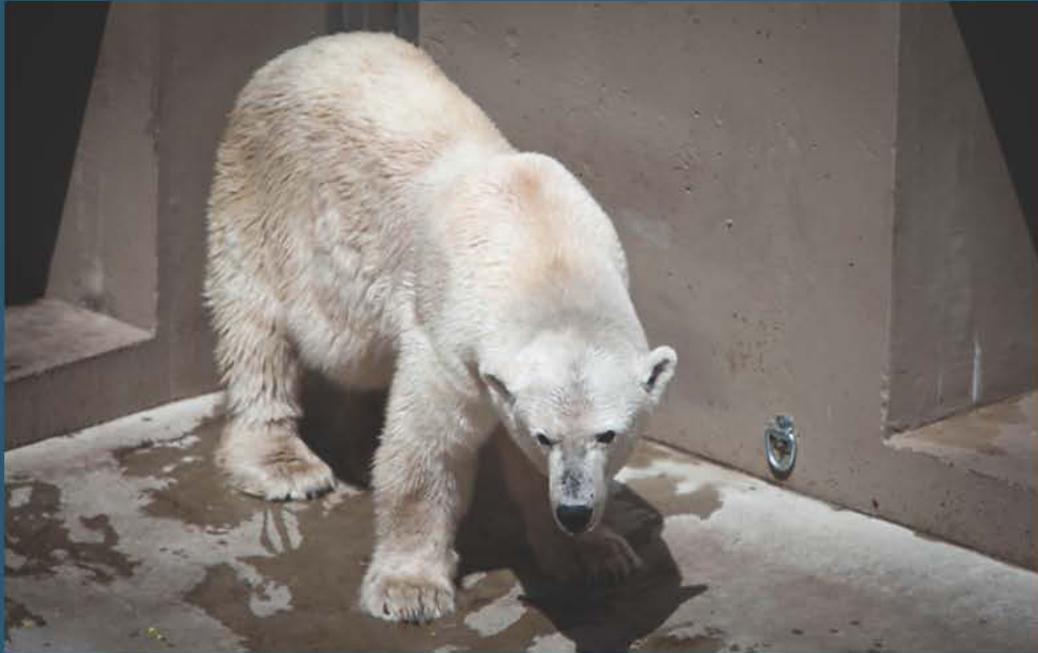
### MOST WATCHED VIDEOS

- Signs of hope for Hastings teen injured in crash

# The missing truck.....



# The missing critters.....



.....Nicki's monkey sighting.....



# OK – now what ???

- ☒ Inspect & assess bridges, culverts and roads
- ☒ Close roads as safety became compromised.
  - Up to 26 closures at one time
  - Many had no detours
  - Flooding was so widespread that MnDOT and local agencies ran out of signs
  - Personnel at barricades 24/7
- ☒ Get roads open ASAP



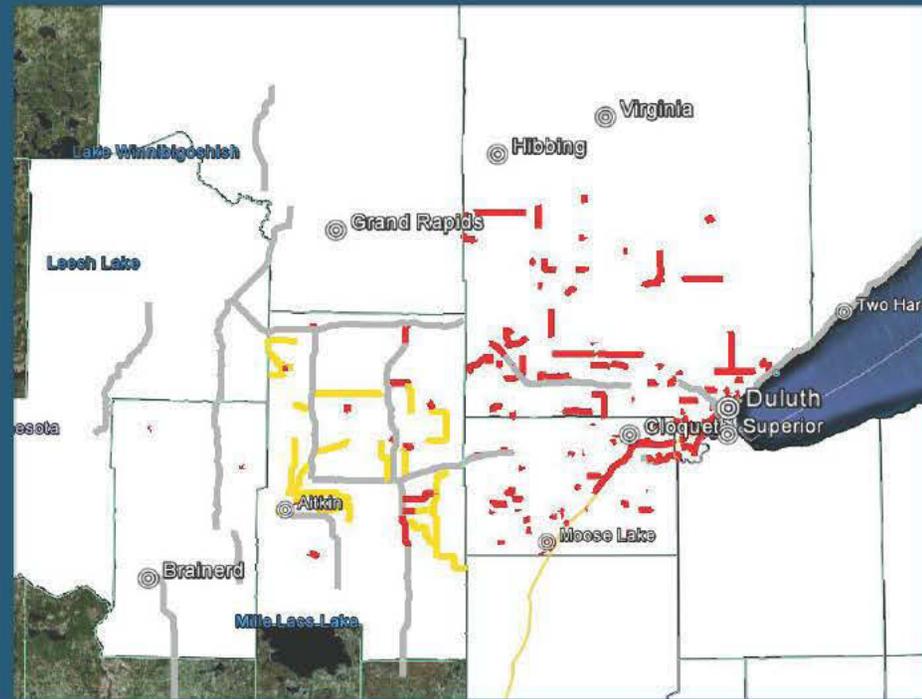
# Incident Command Structure

- MN and Local Emergency Declarations
- MnDOT and Local EOC's
- Tactical Response Teams
  - Individual Emergency Repairs
  - Bridge Assessments
  - Corridor Assessments
  - Detour Signing Crews
  - Engineering Investigations
    - Hydraulic Analysis
    - Bridge design
    - Foundation design
    - Environmental assessment

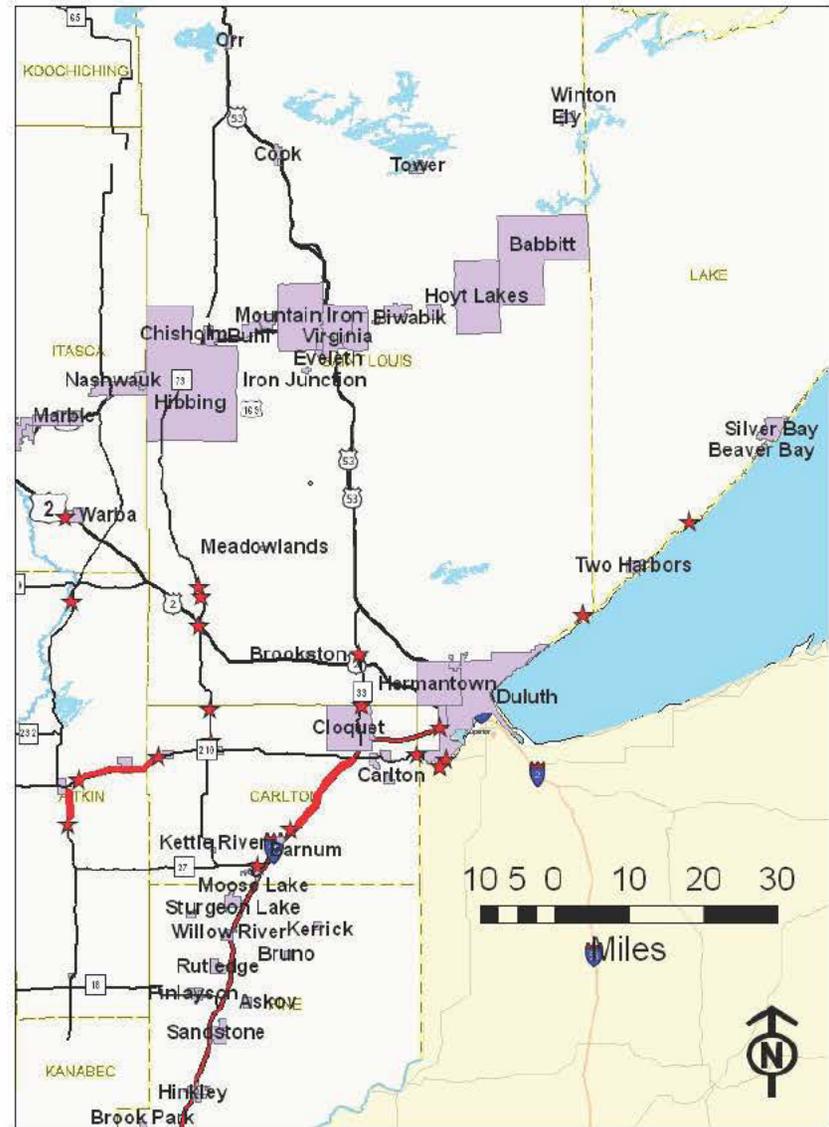


# Tools to Track Damage

-  MnDOT Damage Map
-  Regional Road Closure Map



## Flood Incidents - District 1



# Closure Site Tracking List Updated and Distributed Regularly

Time	HWY	RP start	RP end	From	To	Status	Description
	2	220.7	232	Floodwood	Brookston	Completely under water 1-2' MSP has closed	From floodwood to brookston
	2			Proctor	I-35 (Thompson Hill)	down bound from Proctor into Duluth closed - west also closed 2:44 pm	Up bound is open (East) - now closed 2:44 pm
	2			Iron Horse Saloon	To the Train	Proctor from Iron Horse Saloon to golf course (the train) closed	
	23			TH39 Gary New Duluth to 1/10th mile south of the St. Louis River in Fond du lac		completely closed evacuating community completely flooded and St. Louis River bridge closed	
	33	9		White Pine River	North of Cloquet	closed 3' water over the Rd	
	33	13.5				Both lanes - 6' deep water	signing water across road markers (open) - 7:00 p.m.
	33	17				Road open	Moving water over the road
	39			west bound by McQueen St		traffic control devices at washout	single lane
	53			NB & SB @ Maple Grove Rd	Near Miller Mall	Water over road. All lanes closed.	Opened at 22:25 on 6-20-12
	53	26		Hellwig Creek		Open but check	Water up to the bridge
	61			at Knife River		closed with detour in place	
	61			at Silver Creek Tunnel		open with shoulder damage	
	65	107	112	8 miles south of McGregor	12 miles south of McGregor	completely shut down 1-3' water over rdwy could see washouts	
	65	145.95		1 mi. s. of Jacobson		culvert failed, road collapsed; single lane	one lane open with flagger - 4:48 pm
	73	31.5		6 miles north of Cromwell		1-2' water over rdwy still open undetermined damage - now open - 2:30 p.m.	
	73	46.3		3 miles north of Floodwood		1-2' water over rdwy still open undetermined damage	Combined
	73	47.4		4 miles north of Floodwood		1-2' water over rdwy still open undetermined damage - in process of dosing 2:30 p.m.	Combined
	73	27.4 SB		2 miles north of Cromwell		shoulder completely gone - passable but no shoulder	
	200	196.2	TH65	Hwy 2	Hwy 65	Completely washed out	Local traffic only
	210	179				4 MILES east of McGregor - in process of dosing 2:30 p.m.	closed as of 2:30
	210	179-190		McGregor	Tamarack		water over the road - State Patrol at each end routing traffic - 3:19 p.m. Va sign shop going to fortify detour
	210	Jay Cook State Park		Jay Cooke Park		completely closed	
	73	15		West of Moose Lake		Closed	Road is washed out
	73 & 27			West of Moose Lake	At the exit		West of Moose Lake, Gillespe Creek under water
	135	236	227	Hwy 210	Mahtowa	closed	change detour sb to Barnum and contact 511
	135	thru downtown Duluth		Duluth near ore dock	South bound only	closed between Central Ave and 28th Ave E/ different areas	deared and now open - 3:37 p.m.



# Project Development Mission: Damage Assessment & Project Initiation



# TH 23 Mission Creek Team Work!



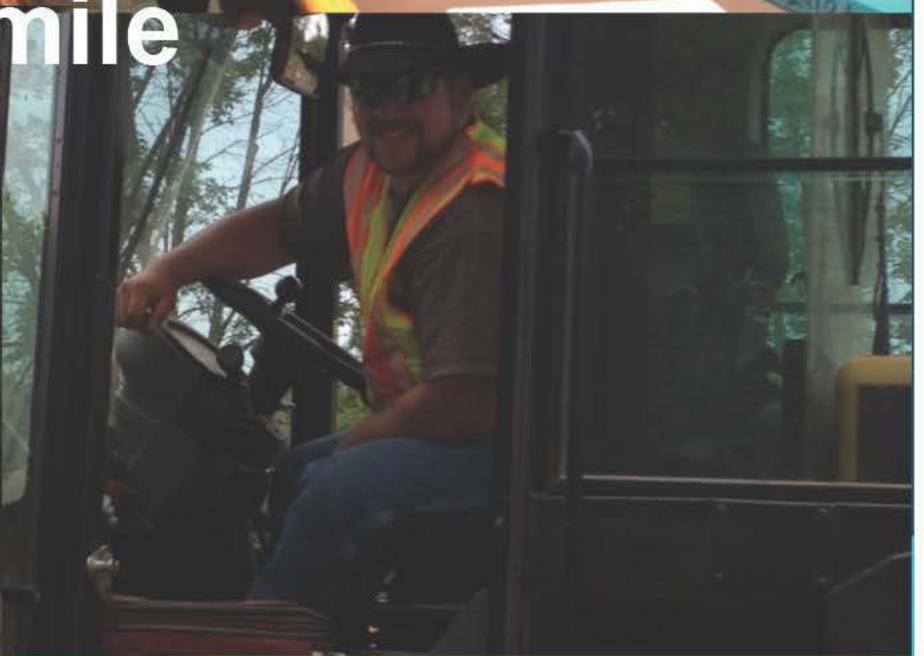
# MnDOT Bridge & Hwy Maint Teams:

-  Inspection teams dispersed in all directions
-  Close for safety if necessary
-  Daily monitoring
-  Damage inspections & repair assessments
-  Set & remove signing; portable barriers; gates
-  Perform clean up, stabilization and/or repairs
-  Re-open roadways when safe
-  Long hours.....

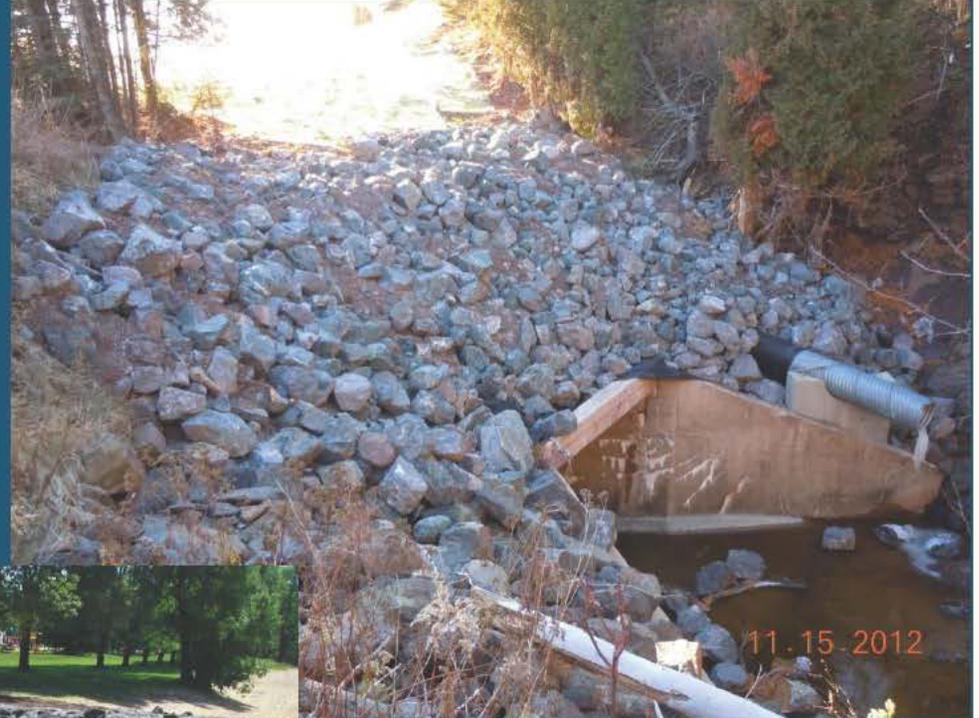




.....and still  
able to smile



# Getting back on track.....



# FDL/Mission Creek Clean Up

- Mutual Aid – requested by City of Duluth
- MnDOT Forces
- Sensitive Stream Bed Issues – DNR
- Shared / Rental Equipment







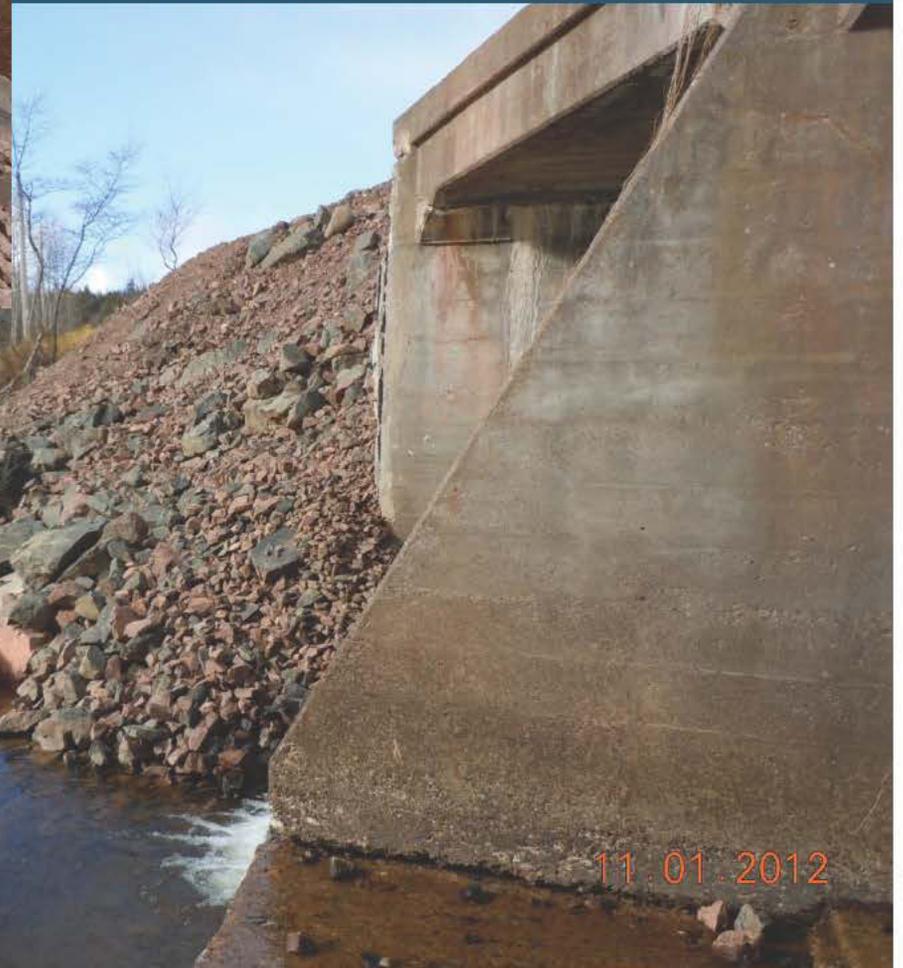
07/02/2012 19:29



# TH61 Silver Creek outlet inslope



06.26.2012



11.01.2012



# MnDOT Damage Repair

- Contract Work
  - Focus on repairs beyond the capability of MnDOT resources
  - Construct Bridges and large box culverts
  - Reconstruct road grades and pavement
  - Clear Debris
  - Set long term detours that required significant signing
  - Perform specific engineering designs
  - Soil stabilization
  - Contract work to date about \$30M



# TH61 Knife River Restoration



\$250K

1006 CY riprap

Back open on 6/29/12



# TH 2 west of I-35 in Proctor

- ☒ \$3.1M emergency repair contract (Shafer)
- ☒ ½ mile grading and concrete pavement, 16'x10' box culvert

Opened November 8, 2012



# TH 210 Thomson Overflow Bridge

- ❑ \$1.7M reconstruction contract (Northland)
- ❑ Replace washed out 18' D steel multi-plate w/ 110' bridge
- ❑ MnDOT supplies steel bridge beams
- ❑ Opened 12/12/2012



# TH 210 Thomson to Jay Cooke SP HQ

- ❑ \$2.3M emergency repair contracts (Ulland, KGM, and Soil Nail Launchers)
- ❑ Stabilize slopes, install 12'x8' x 250' long box culvert, replace small culverts and paving
- ❑ Road reopened October 23, 2012



# TH 210 Jay Cooke Road to Thomson Hydro

- ❑ Critical access for MN Power & Light to access their facilities
- ❑ Place 144" CMP and construct fill (Reuben Johnson and Sons)
- ❑ Slope stabilization using soil nails (Soil Nail Launchers, Inc.)
- ❑ \$3.7M



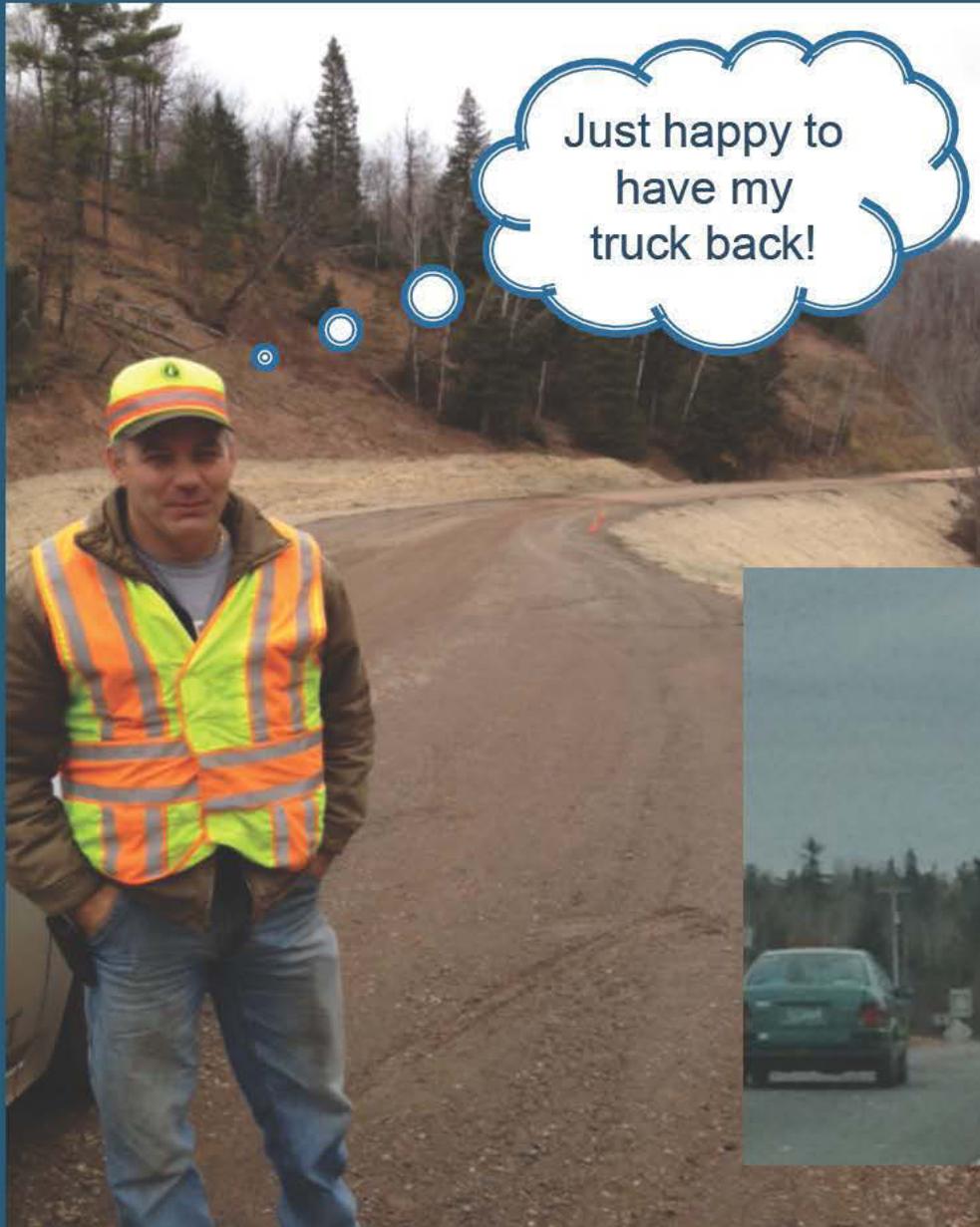


WAS: 72" RCP  
NOW: 12' CMP



11/20/2012 10:57



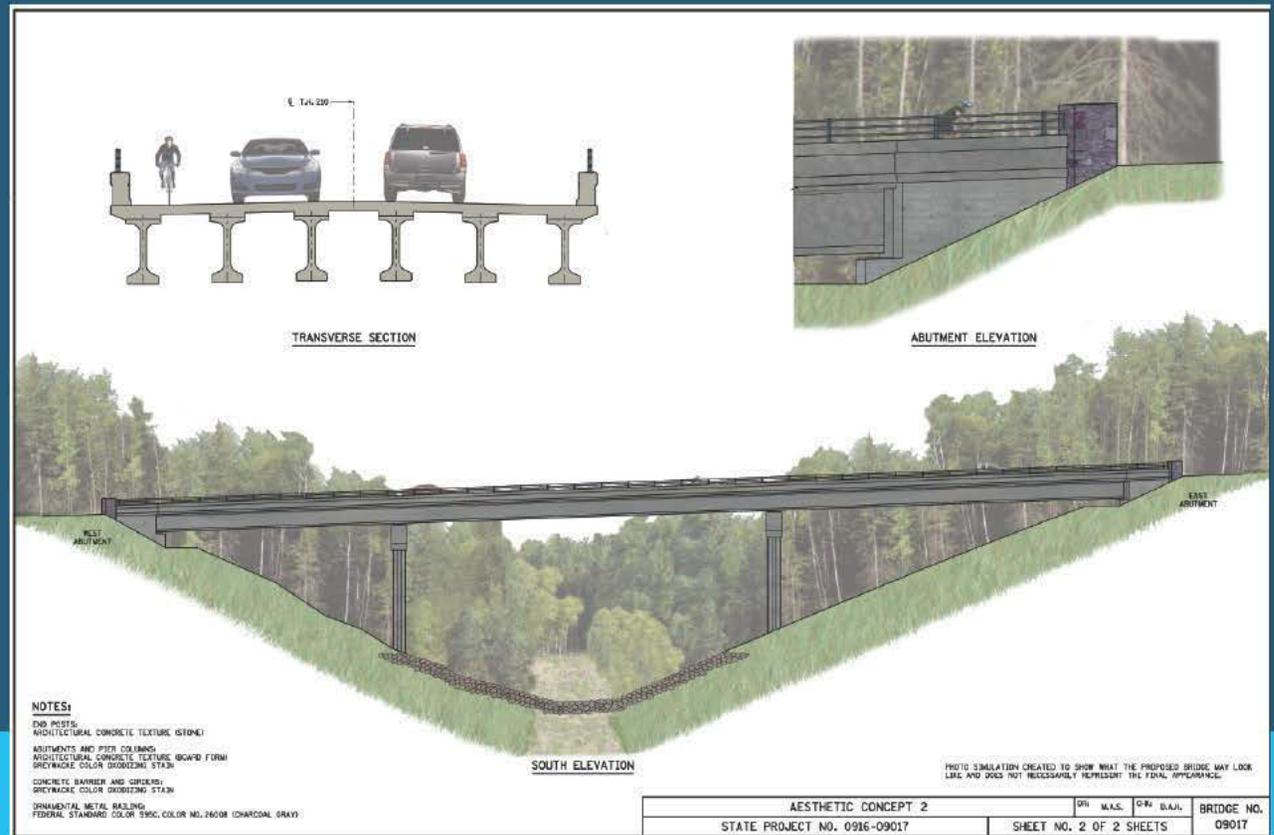


# TH 210 Forbay Reservoir - Jay Cooke SP HQ to Jay Cooke Road

- Design contract with Parsons Transportation Group
- Re-align roadway on more stable alignment
- Significant environmental process
- April 2013 letting
- \$3.4M est.

WAS: ?' culvert

NOW: 365' bridge



# TH 210 MN Power to TH 23

- Remains closed to public travel
- Provided work road through entire corridor and access to the MPL facilities from east
- Significant environmental process to determine permanent solution with many options
- Arrowhead Regional Development Commission Study underway
- Long-term solution TBD.....



# Future MnDOT Flood Projects (\$36M)

- ☒ TH 61 Silver Creek Bridge
- ☒ TH 23 Mission Creek Bridge in Fond du Lac
- ☒ TH 23 storm sewer work in FDL
- ☒ TH 210 New Bridge at Forbay Lake outlet
- ☒ TH 210 in Jay Cooke SP.....TBD
- ☒ TH 61 London Rd culverts in Duluth
  
- ☒ Net Bridge change: 3 new bridges in JCSP; 2 replacements – only 1 completely destroyed
  
- ☒ Total damage estimate \$75M



# Local Agency Damage (Cities and Counties)

- State Aid System
  - 99 permanent repair projects and 80 emergency repair projects
  - Applies to about 20% of Duluth Streets and 50% of county highways
  - Over 1000 miles of local roads and 225 structures had some flood impact
  - Local agency damage exceeds \$100,000,000



# Local Agency Damage – Bridge Inspection Program

- Special post flood bridge inspection program
- 6 consultant teams managed by SEH
- 177 local bridges inspected in Duluth, St. Louis, Carlton and Lake counties
- Another 58 local structures with obvious damage were inspected by local agencies
- Inspections started on July 5, ended August 8
- Cost \$250,000 – 1/3 FHWA, 2/3 by legislature through local flood bond
- Contract administered by St. Louis County



# Local Agency Damage – Bridge Program

- 58 local bridges will be replaced or need major rehabilitation - \$25,000,000
- 75 structures with minor damage - \$2,200,000
- All major road and bridge work are or should be under design by January 2013 with about 50% ready for spring 2013 lettings.
- All work should be authorized by June of 2014



# Community response/participation:

- Media involvement (Releases, Interviews, web, phone, email, leadership updates, meetings)
- Working with partners – numerous cities and counties
- DNR (Jay Cooke Park)
- Minnesota Power (St. Louis River Hydro facilities)
- Support from the top
- FHWA and FEMA training
- Local meetings with Governor and Legislators
- Community meetings
- Press conferences



# Resources:

- Incredible cooperation between gov't agencies like FHWA, DPS, SHPO, DNR, MPCA
- Cooperation from local law enforcement
- Local agency cooperation between MnDOT, cities and counties
- FWHA assistance was immediate
- Emergency contracting authority, consultants and contractors
- Most of all, our MnDOT PEOPLE! Many Offices and Districts.



# The Lessons

- ❑ No injuries in the flood response!
- ❑ We have an awesome bunch of people that worked together as a team.
- ❑ Don't be afraid to ask for help. People are happy to do it.
- ❑ Communication, communication, communication.
- ❑ Document, document, document.
- ❑ Debrief. Share lessons learned and apply them in the future.
- ❑ **Bridge system: *Got lucky or we're good!!***

