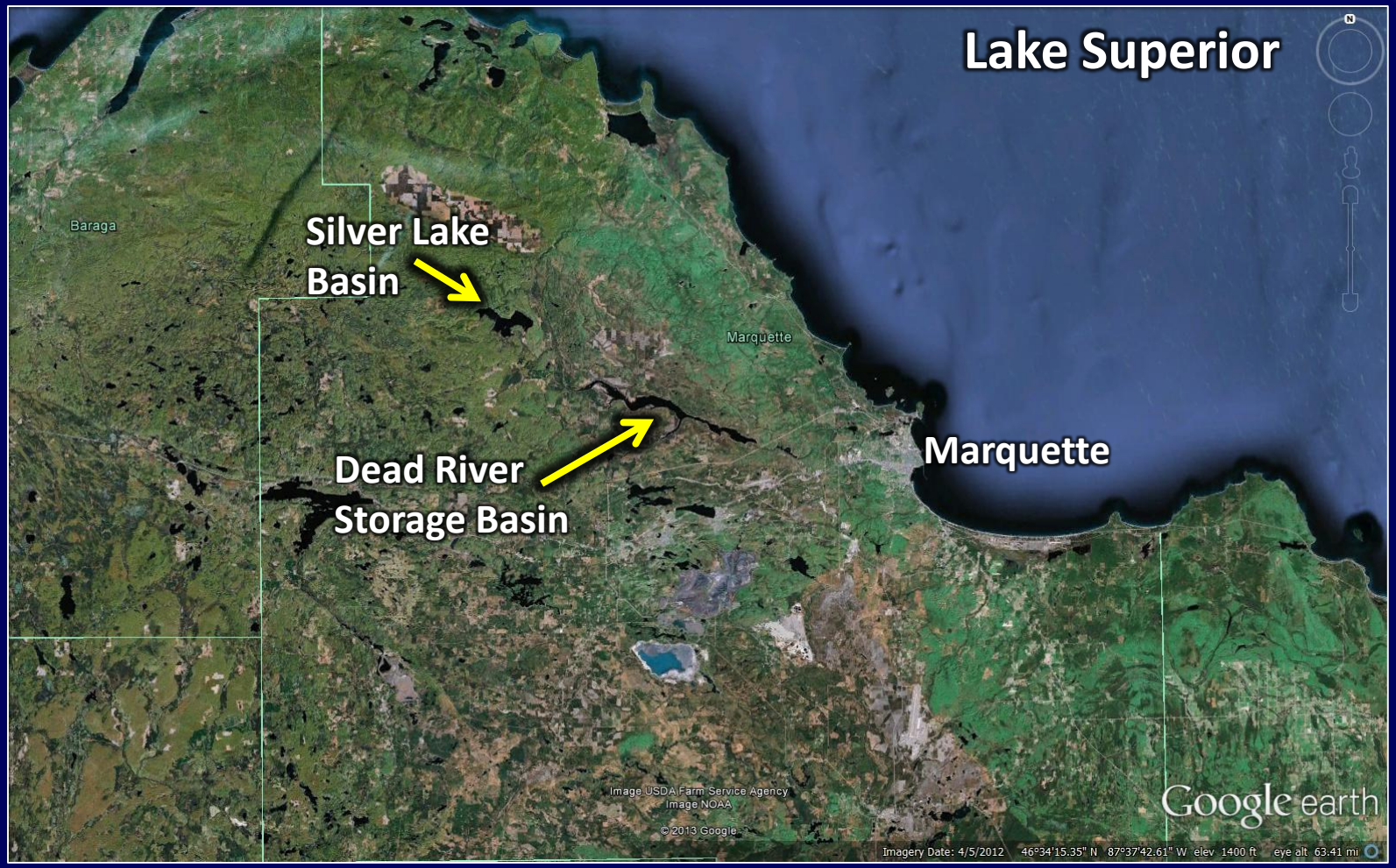
The 20th Anniversary of the Dead River Flood

May 14th to May 16th, 2003

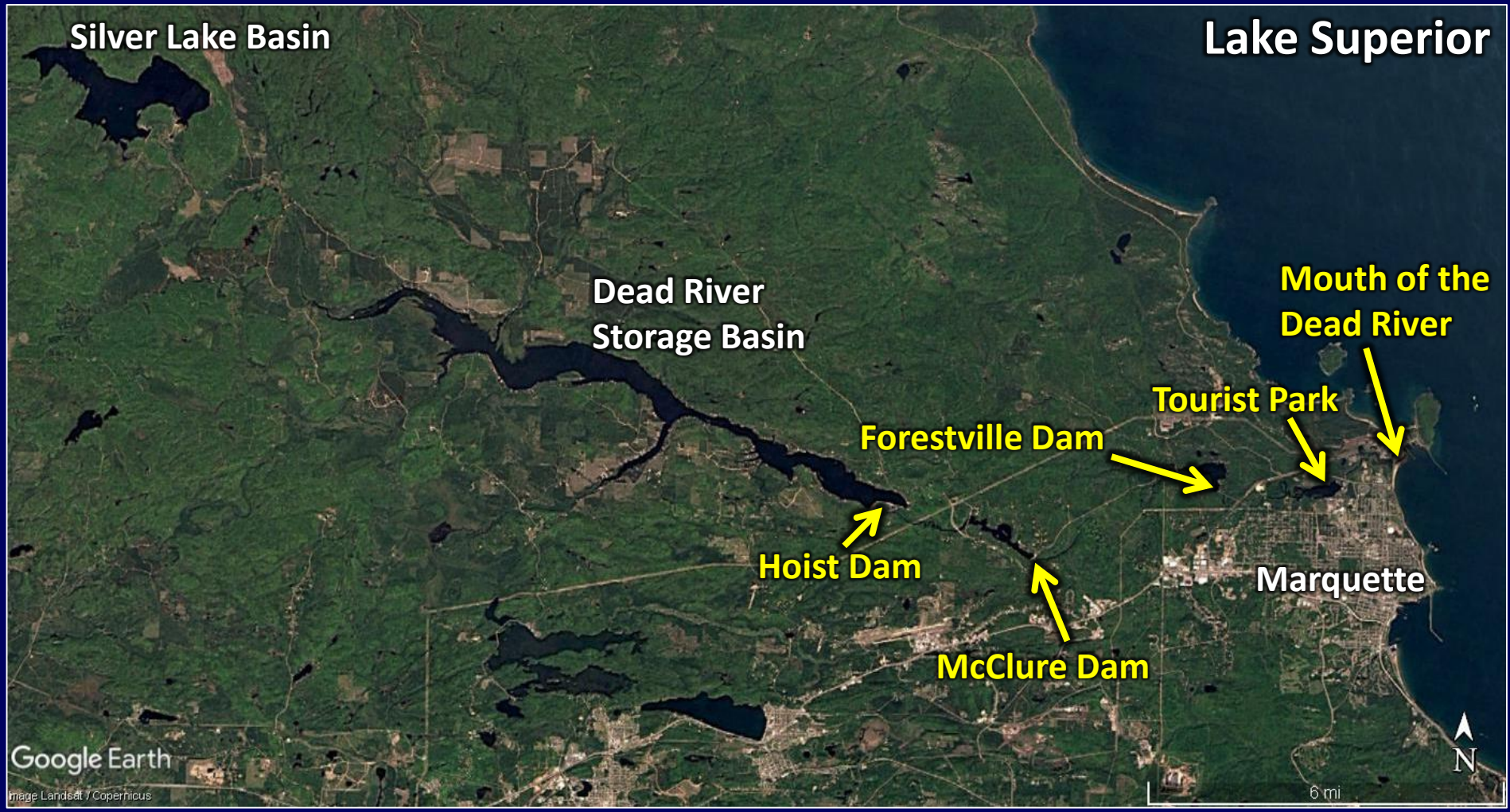
National Weather Service
Marquette, MI
May 2023

Dead River Flood May 2003



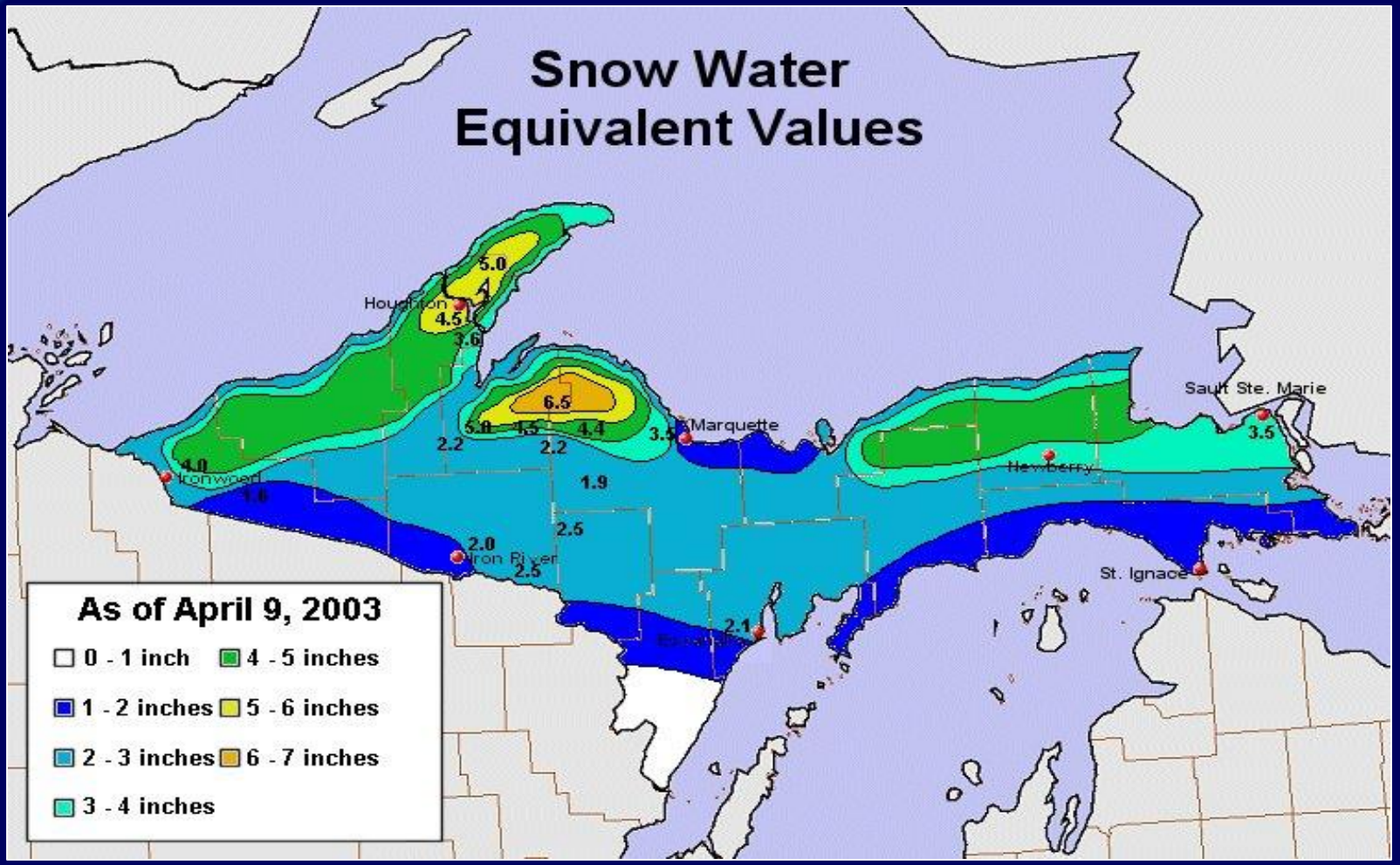
The Dead River flood began with the breach of the fuse plug at the Silver Lake Basin located in northwest Marquette County in the Huron Mountains area, roughly 22 miles from the city of Marquette. From Silver Lake, the Dead River flows approximately 27 miles to its outlet into Lake Superior on the north side of the city of Marquette.

Dead River Flood May 2003



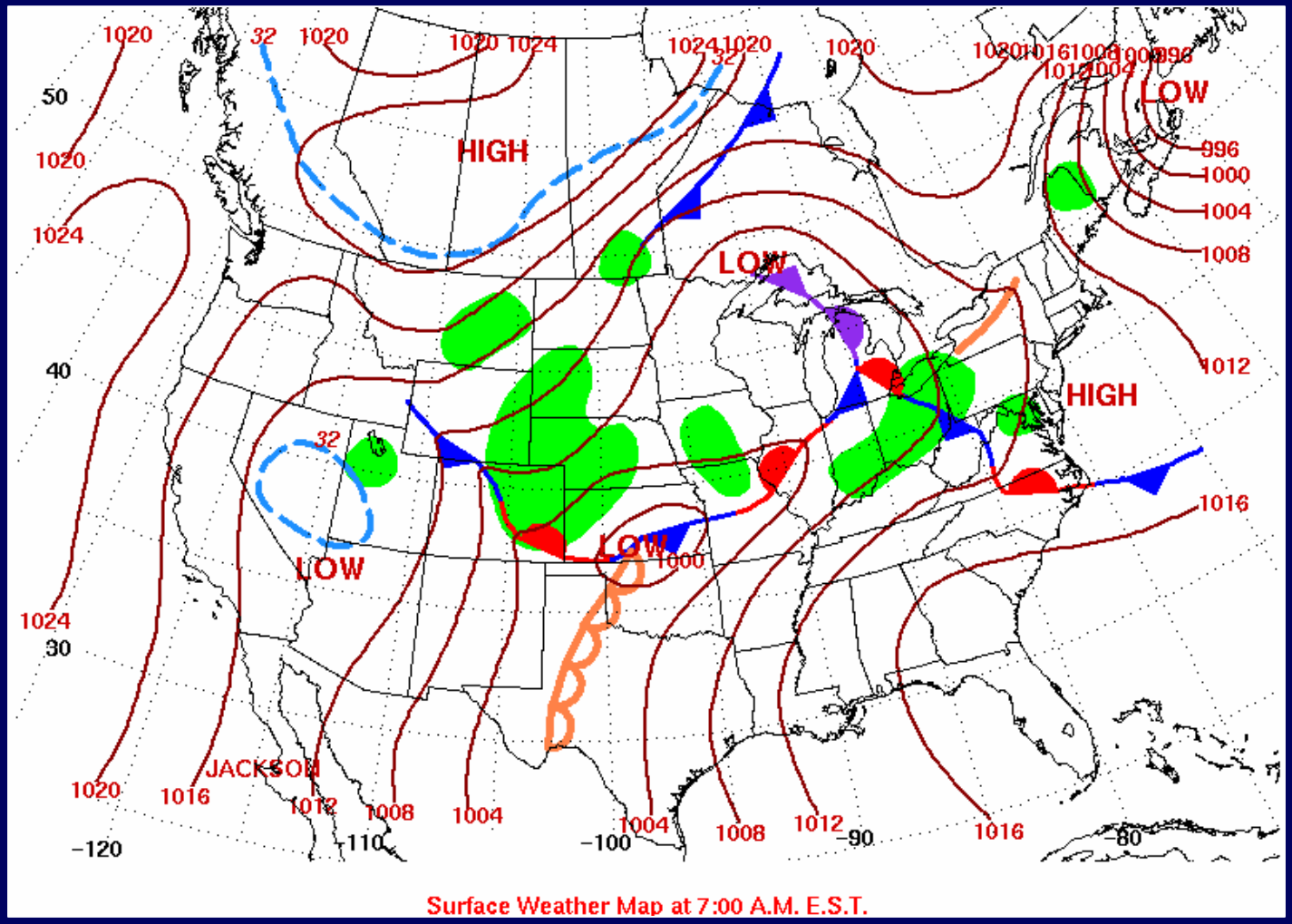
Here are some of the important points of interest along the Dead River that will be examined more closely in this presentation.

Dead River Flood May 2003



First, let's take a look at the amount of water that was stored in the snowpack that melted during April 2003. Notice that over northwest Marquette County in the area of the Huron Mountains, 5 to 7 inches of water was stored in the snowpack as of April 9th, 2003. Some of this snowmelt became water storage in Silver Lake.

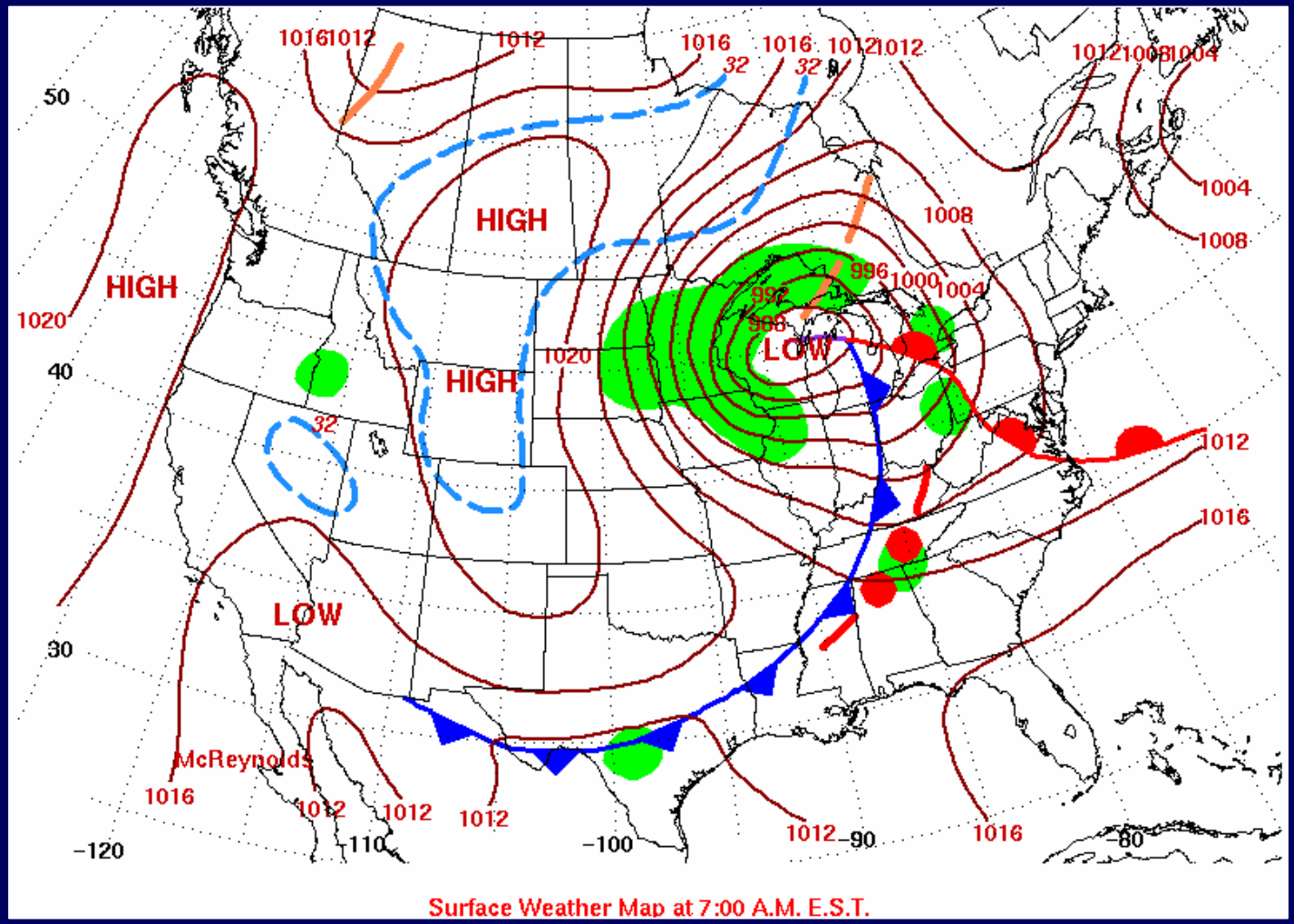
Dead River Flood May 2003



Surface Weather Map at 7:00 A.M. E.S.T.

One month later, on May 10th, 2003, a weak low pressure system was passing over the Upper Great Lakes region. This low produced light rainfall over Upper Michigan on May 9th and 10th. However, the more important low pressure system was just beginning to organize over the central and southern Plains States. As this new low tracked northeast, it strengthened.

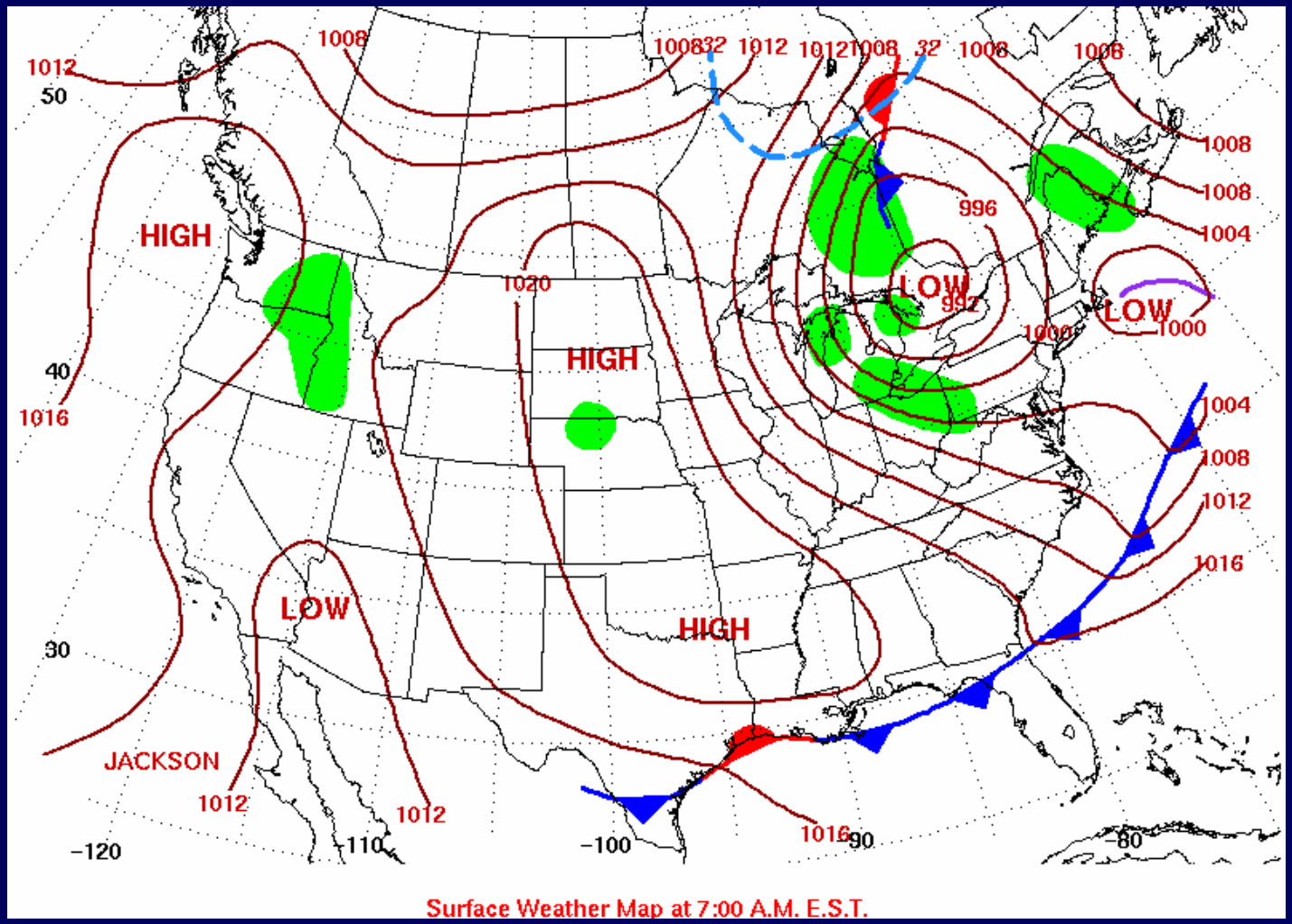
Dead River Flood May 2003



Surface Weather Map at 7:00 A.M. E.S.T.

On the morning of May 11th, 2003, a strong low pressure system was located near Menominee, MI. To the north and west of the low, moderate to heavy rainfall was occurring across northwest Upper Michigan.

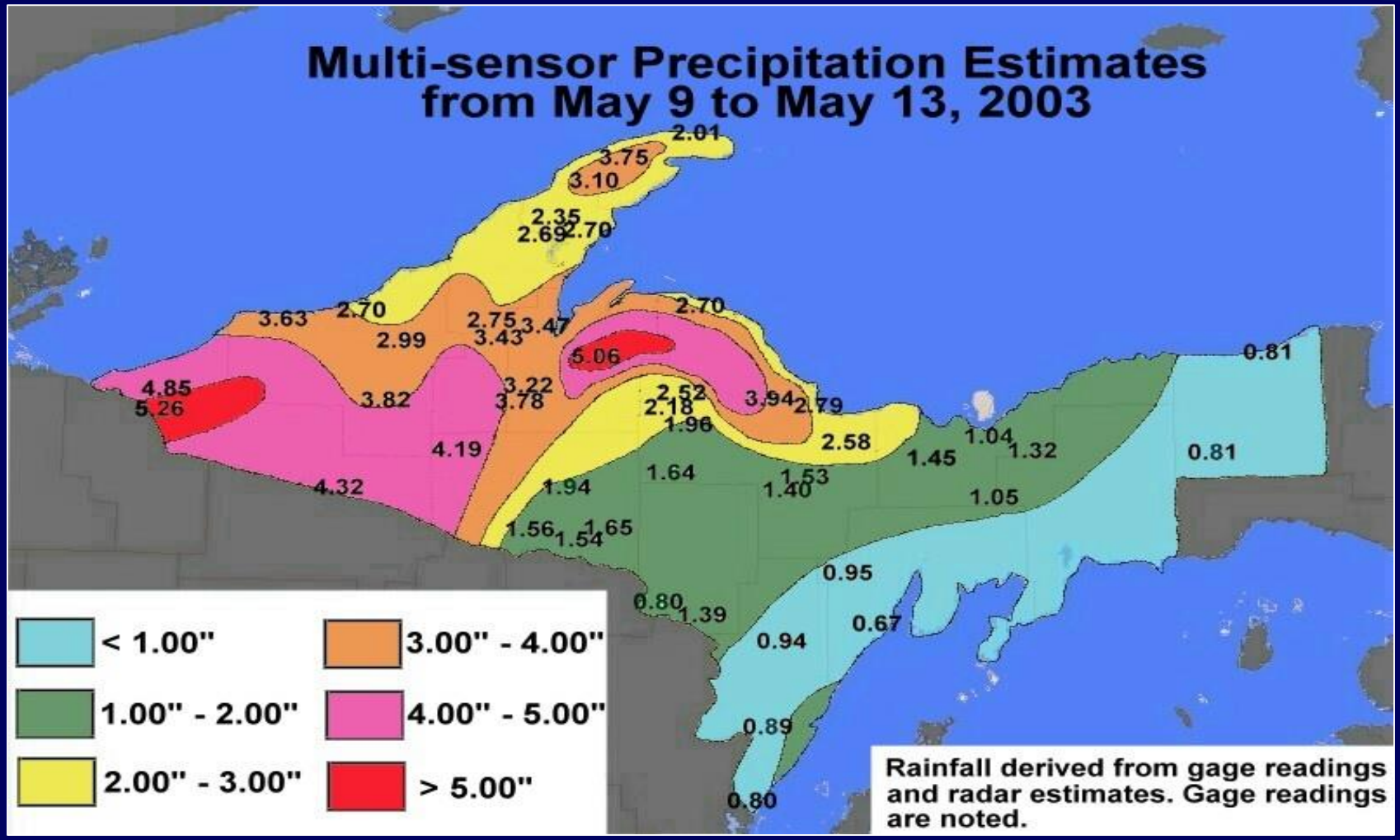
Dead River Flood May 2003



Surface Weather Map at 7:00 A.M. E.S.T.

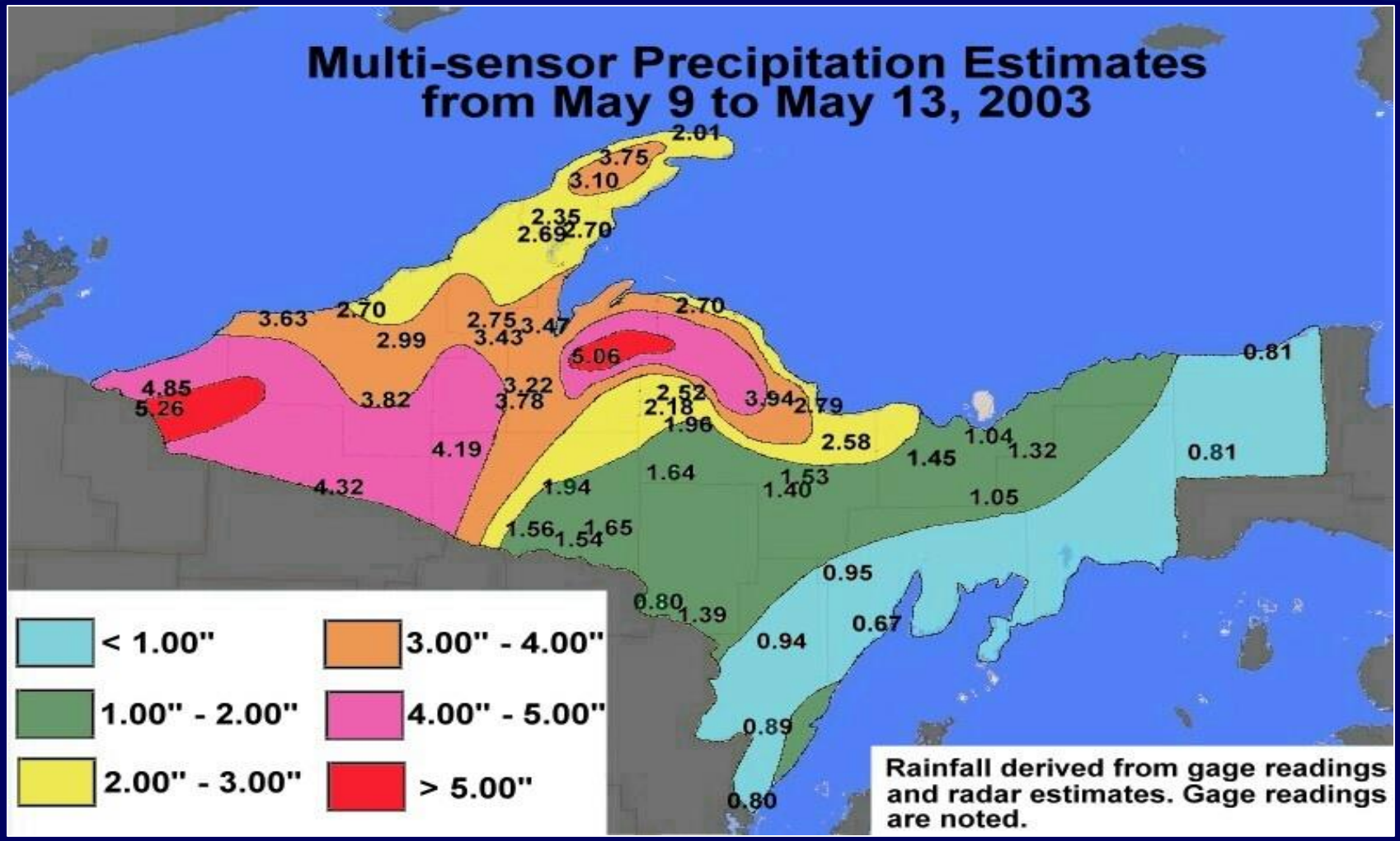
On the morning of May 12th, 2003, the low pressure system had moved east into southern Ontario, and moderate to heavy rainfall over northwest Upper Michigan was diminishing.

Dead River Flood May 2003



Being north and west of the low pressure track, north to northeast winds led to enhancement of the rainfall over the higher terrain of west and north central Upper Michigan. Over the higher terrain of northwest Marquette County, 4 to as much as 5 inches of rain fell with the majority of the rain falling on May 11th and 12th.

Dead River Flood May 2003



The return frequency of 4.5 inches of rain over northwest Marquette County (the Huron Mountains) during a 48 hour period is about 25 years. For 5 inches of rain, it is about 50 to 75 years (*Rainfall Frequency Atlas of the Midwest* by Floyd A. Huff and James R. Angel).

Dead River Flood May 2003

Silver Lake fuse plug failure near the beginning of the event

- May 14, 2003. Two days after the end of the heavy rainfall, the Silver Lake Basin fuse plug fails – approximately 5:00 p.m.

The combination of spring snowmelt and the heavy rain event of May 11th and 12th were contributors to the fuse plug failure.

Dead River Flood May 2003

Silver Lake basin breach

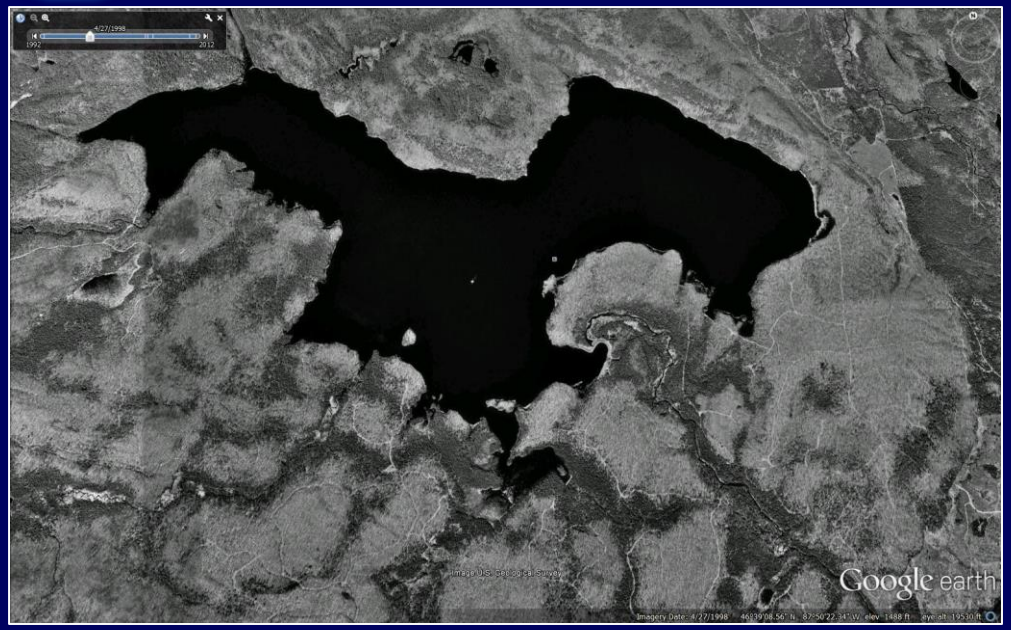
Silver Lake reservoir has a surface area of about 1500 acres and a storage capacity of approximately 34,000 acre-feet. Through the section of the fuse plug that failed at Silver Lake, the rapidly flowing water carved out a new channel approximately 100 yards wide by 25 feet deep and one-half mile long. It was estimated that 25,300 acre-feet of water passed through the new channel with the remaining water being held back by a high point in the lake bottom.

Dead River Flood May 2003

Just downriver from Silver Lake

- Break unleashed an estimated 8-9 billion gallons of water downriver from Silver Lake.

Dead River Flood May 2003



Silver Lake basin in 1998.

Silver Lake basin in 2005, two years after the flood.

Dead River Flood May 2003

Dead River Basin

- Floodwaters reach Dead River Basin, damaging camps and homes

Dead River Flood May 2003

Dead River Basin

- The torrent of water also destroys roads along the way

Dead River Flood May 2003

- Excessive water backing up in the Dead River Storage Basin behind the Hoist Dam was expected to overtop the dam and lead to flooding of low-lying areas downstream, particularly in the city of Marquette.

- During the morning of May 15th, approximately 2,300 residents north of Wright Street in the City of Marquette and in Marquette Township were ordered to evacuate by emergency management authorities.

- In Marquette, peak water levels on the Dead River occurred in the early afternoon of May 15th.

Dead River Flood May 2003

Hoist Dam

- Floodwaters crest the Hoist Dam and flow farther downriver
- Peak water level at the Hoist Dam was 4.44 feet above the spillway level

Dead River Flood May 2003

Hoist Dam

Dead River Flood May 2003

CR 510 Steel Bridge

- Water continues downstream, crossing CR 510 (Steel Bridge)

Dead River Flood May 2003

McClure Dam

- Downriver, the floodwaters crest the McClure Dam
- Peak water level at the McClure Dam was 5.13 feet above the spillway level

Dead River Flood May 2003

Forestville Dam

- Floodwaters reach Forestville Dam
- Peak water level at the Forestville Dam was 4.4 feet above the spillway level

Dead River Flood May 2003

- Floodwaters destroy train trestle

Dead River Flood May 2003

Tourist Park
Marquette

Flood water reaches Tourist Park. Despite the water level being drawn down 5 feet behind the Tourist Park dam prior to the arrival of the flood wave, water still overtops the dam, and the tremendous surge of water also carves out a new outlet away from the dam near the swimming area.

Dead River Flood May 2003

Damage to Tourist Park in Marquette

Dead River Flood May 2003

Tourist Park and CR 550
in Marquette

Dead River Flood May 2003

Tourist Park and CR 550 in Marquette

Dead River Flood May 2003

CR 550 near Tourist Park in Marquette

- Flood damages bridges on CR 550
- Utility service interrupted to Big Bay

Dead River Flood May 2003

- Considerable damage to Presque Isle Power Plant

Presque Isle Power Plant in Marquette

Presque Power Plant was shut down in early 2019, and demolition of the power plant was completed in 2021.

Dead River Flood May 2003

Lakeshore Boulevard in Marquette

- Flood waters destroy bridge approaches on Lakeshore Boulevard
- Cuts power, gas, and telephone service to residences

Dead River Flood May 2003

Mouth of Dead River. Presque Isle Power Plant, which no longer exists, in lower right of photo

- Silt and debris flow into Lake Superior

Lake Superior

Dead River Flood May 2003

Impacts

- Evacuation of 2300 residents
- Major employers impacted:
  - WE Energy
  - Cleveland-Cliffs, Incorporated
  - Northern Michigan University
  - Marquette Board of Light and Power
  - Argonics
  - Pioneer Labs
- At least 8 small to medium employers affected

Dead River Flood May 2003

Impacts

- Nine bridges damaged or destroyed
- Damage to two parks and three public access sites
- Major river channel realignments
- Major soil and stream bank vegetation loss
- Significant sediment deposition, debris field, and undetermined sheen discharged to Marquette's Upper Harbor
- Fortunately, no deaths or injuries were reported.

Dead River Flood May 2003

Impacts

- Substantial mobilization of emergency response system and support services
- Sheltered or fed (Red Cross) 57 persons
- Energy conservation instituted as a result of power plant shutdown
- Potential of significant personal property loss, carried off in flood waters

Dead River Flood May 2003

Changes along the Dead River since the Flood

Silver Lake Basin in 2005

Silver Lake Basin in 2014. After reconstruction projects to restore the basin for water storage, the basin finally reached full water storage capacity in early May 2013.

Dead River Flood May 2003

Changes along the Dead River since the Flood

At Tourist Park, a new dike and spillway have been constructed where the new river channel was carved out during the flood.

Dead River Flood May 2003

Changes along the Dead River since the Flood

Storage basin at Tourist Park has refilled.

Water is being released at the Tourist Park dam.