

INTERNATIONAL CONFERENCE ON FLOOD MANAGEMENT (ICFM)

WEBINAR NO.2

THE FLOOD CHALLENGE TO RESILIENCE



# MICHIGAN DAM FAILURES: A MESSAGING & EVACUATION CASE STUDY



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FEMA

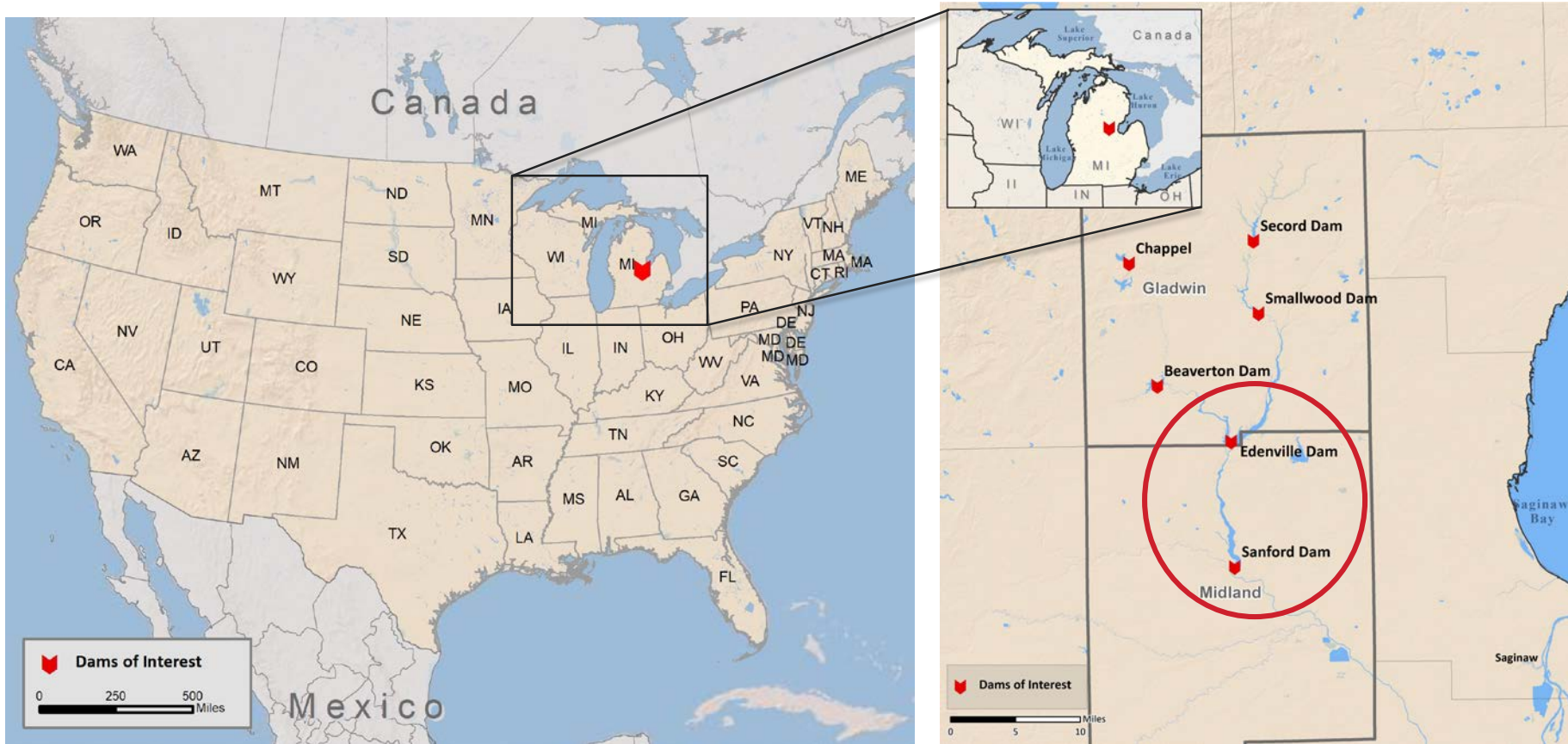
# MICHIGAN DAM SAFETY PROJECT

## Incident Specific technical Assistance (ISTA)

- *Funded by the Federal Emergency Management Agency's (FEMA) National Dam Safety Program and National Integration Center*
- Project Goals:
  - Observe damages from the recent Michigan dam incidents and understand what occurred
  - Study and compare actual flood data relative to inundation model results
  - Study the hydrologic and hydraulic characteristics of the post-dam failure floodplain
  - Gain insights from the rapid evacuation of communities at risk.



# MICHIGAN DAM INCIDENT OVERVIEW



# INCIDENT TIMELINE

May 17-19

- Stalled weather front brought 5-8 inches (10-20 cm) of rain over 3 days
- Began the morning of May 17 and continued into the afternoon of May 19

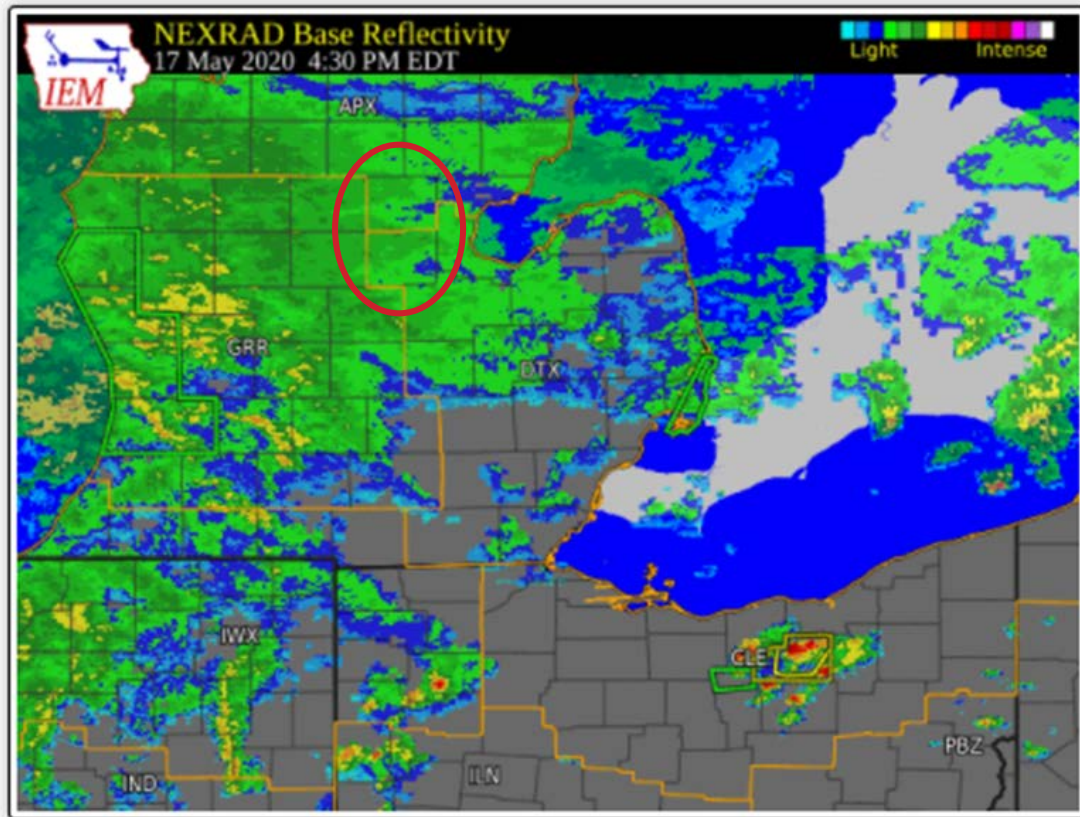


Image Source: weather.gov

# INCIDENT TIMELINE

May 18

- Historic flooding across the region
- All dams in the area were running with gates wide open
- Chappel Dam had a near overtopping, but was able to mitigate and prevent failure

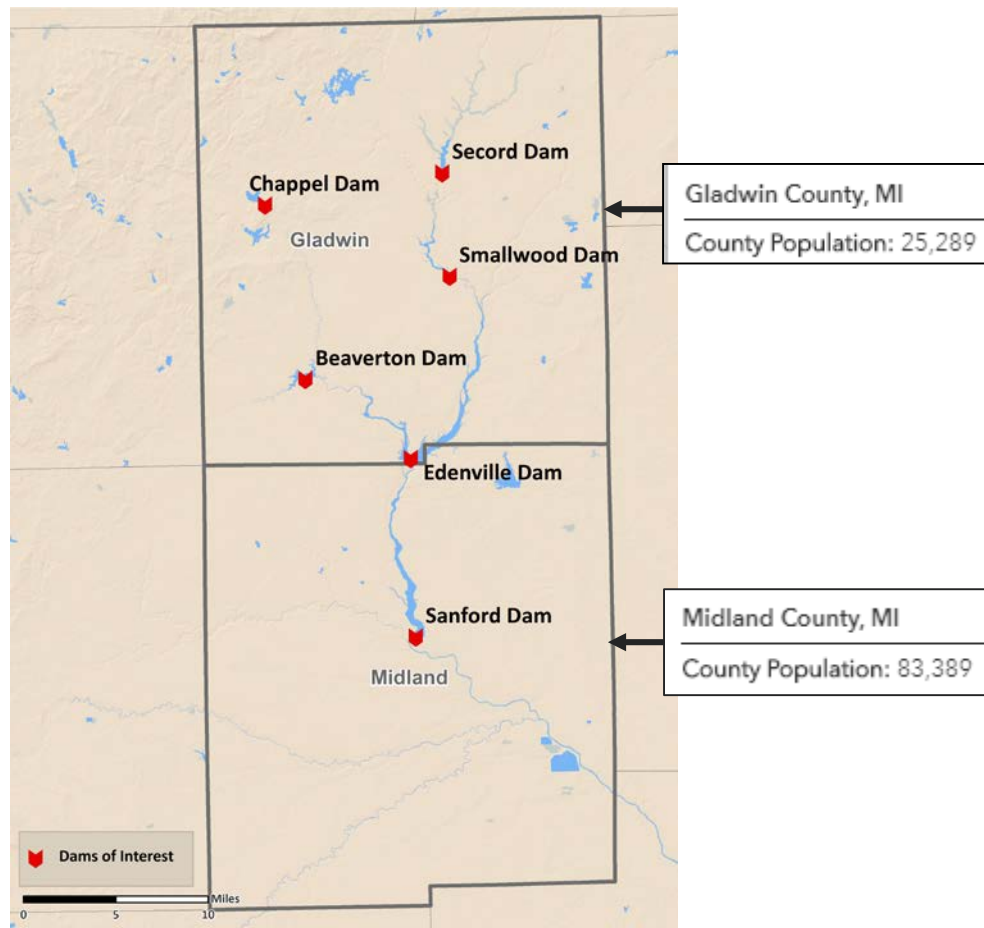


Image Source: Argonne National Laboratory



# INCIDENT TIMELINE

May 19

- ~12:30 am: Dam operators initiated the emergency action plan process for all 4 dams on the Tittabawassee
- ~3:30 am: Smallwood Dam sounded the siren because high water levels were concerning
- ~5:45 pm: Edenville Dam failed
- ~8:00 pm: Sanford Dam failed



# INCIDENT TIMELINE

May 20

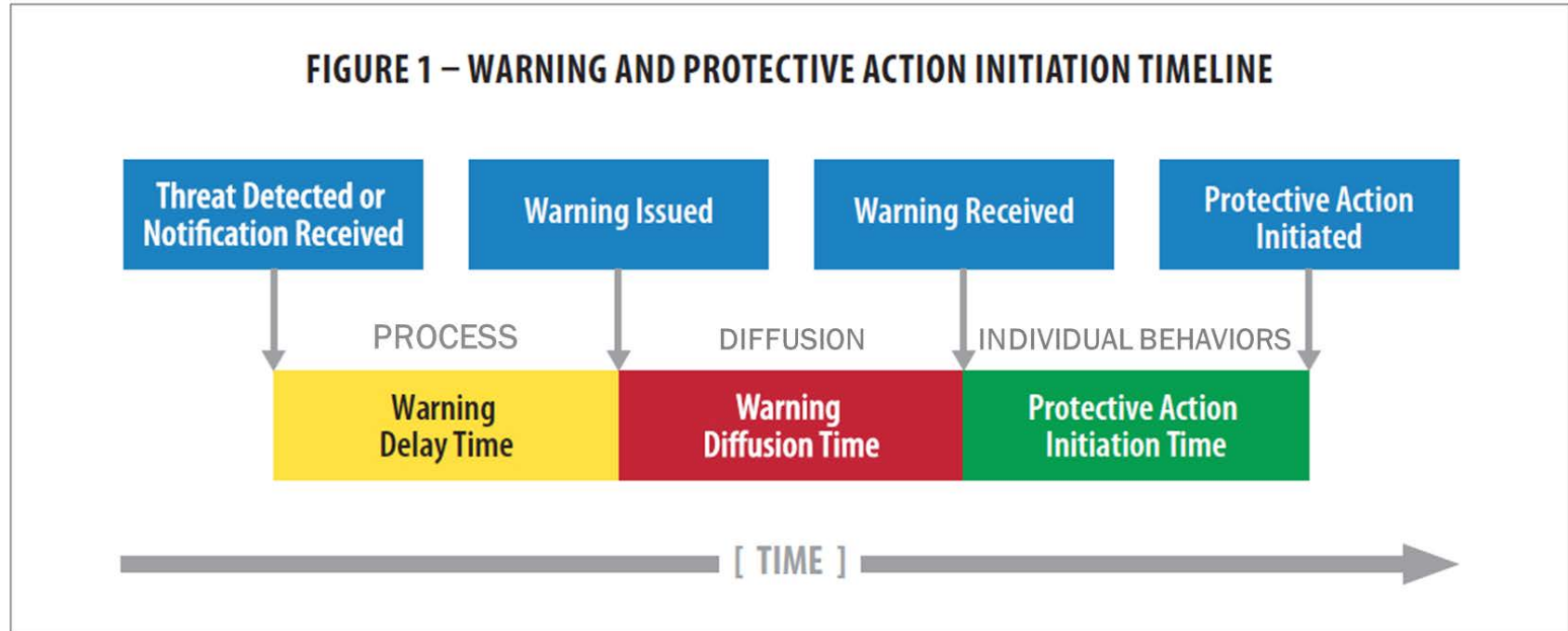
- Tittabawassee River crested at 35.05 feet (10.68 m)
- Historic flooding in the towns of Edenville and Sanford, and city of Midland.
- Damage included:
  - Complete destruction of a number of homes
  - Washout of numerous roads and bridges
- Nearly 11,000 people were evacuated; no loss of life





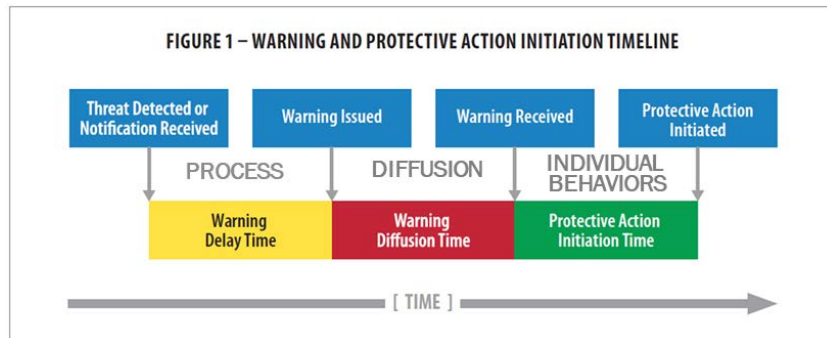


# WARNING AND PROTECTIVE ACTION TIMELINE



Source: Mileti and Sorensen, 2015, *A Guide to Public Alerts and Warnings for Dam and Levee Emergencies*, United States Army Corps of Engineers

# EXPLORING POTENTIAL AREAS OF EFFICIENCY OR DELAY



Source: Mileti, 2018, FEMA PrepTalk: Modernizing Public Warning Messages

## ■ Process

- Familiarity with A&W channels
- Coordination between agencies
- Protocols that support or inhibit dissemination

## ■ Diffusion

- Reach of A&W channels

## ■ Individual Behavior

- Receipt of the warning
- Desire to corroborate information
- Understanding warning content
- Advanced planning and preparation
- Desire to stay and defend

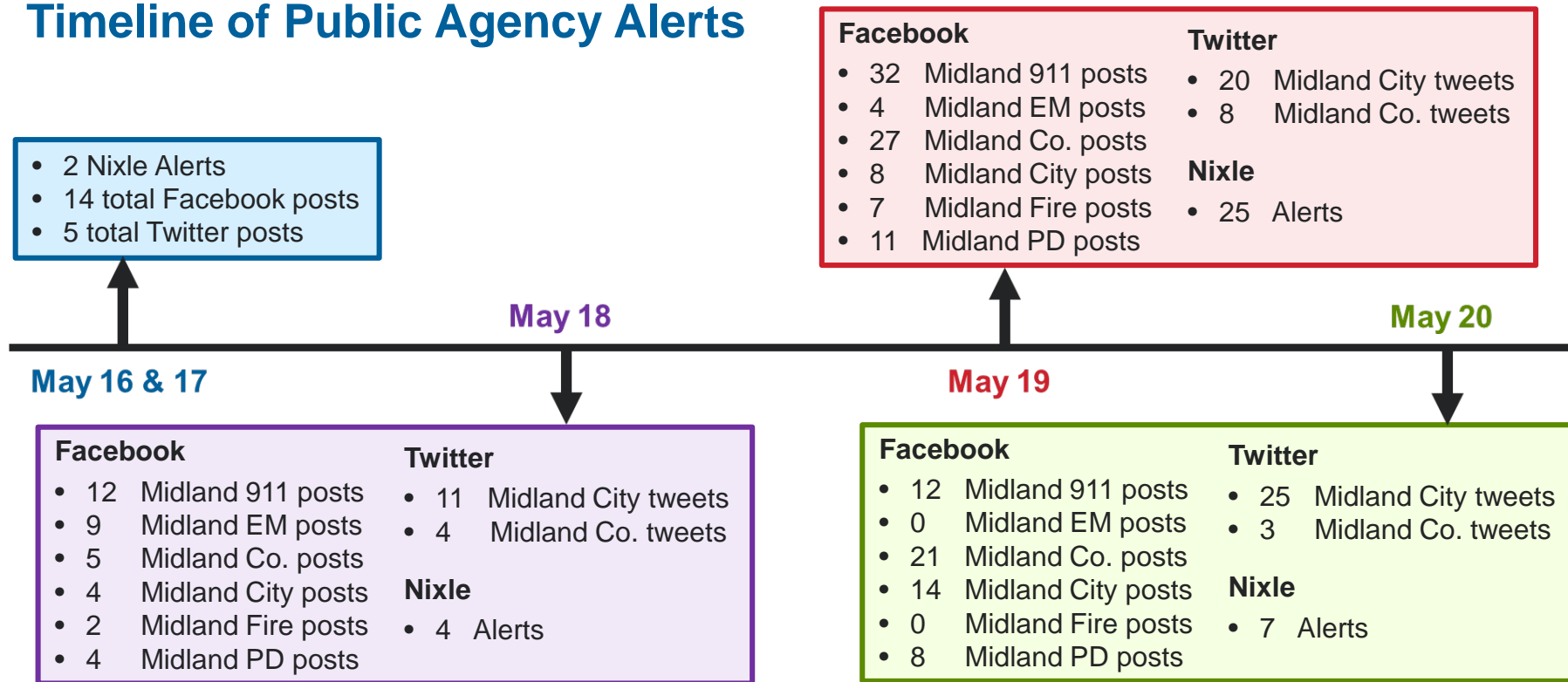
# ALERTING PROCESS HIGHLIGHTS

## Midland County

- Relationships with Gladwin EM, NWS offices, Boyce Hydro, Dow Chemicals
- Coordination and communication processes in place prior to event
  - Informal: Frequent touch base with key players via phone call or text.
  - Formal notification: Boyce Hydro → Central Dispatch → Midland EM
- Alert Platform Familiarity: Frequent use of NIXLE; First use of Wireless Emergency Alerts (WEA).
- Issuance protocols: 911 dispatch develops and issues; jurisdiction's experts
- Alerting process: same 911 dispatch resources also sending internal communications alerts (activating EOC, alerting key agencies, etc.)
- City, County PIOs in EOC – Single agency leads messaging for whole county

# WARNING DIFFUSION

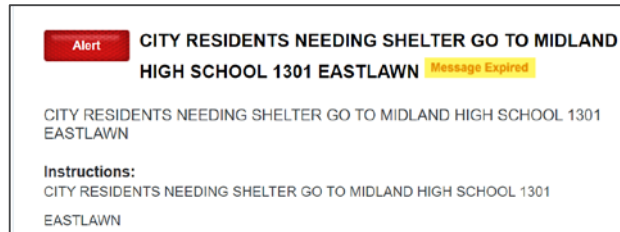
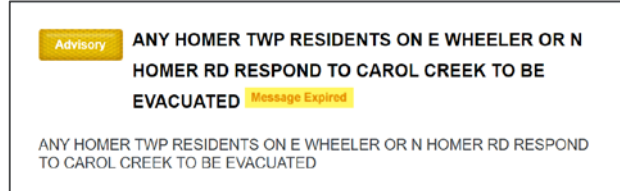
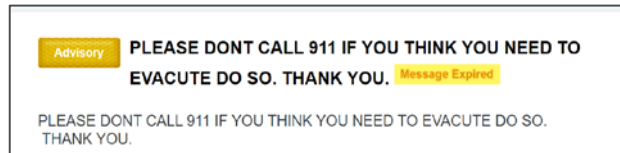
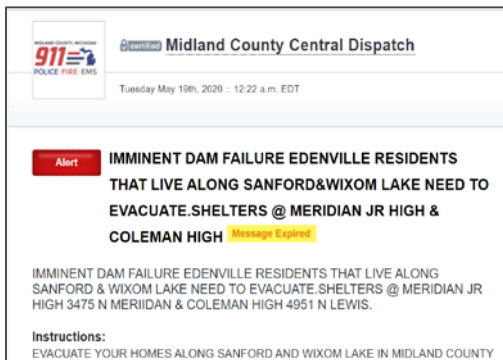
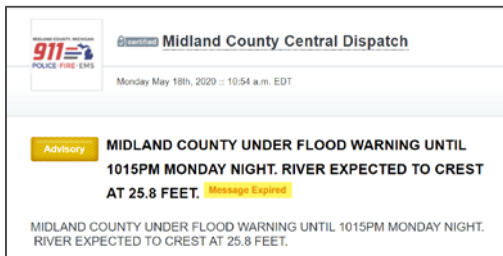
## Timeline of Public Agency Alerts





# OPT-IN ALERTS: NIXLE WARNINGS

- Community buy-in pre-event
- Messages not pre-scripted
- Brief, frequent updates:
  - Conveys urgency
  - Specific locations/ instructions
- Clear instructions in each message:
  - What's happening
  - Where it's happening
  - What you need to do



# OPT-IN ALERTS: NIXLE WARNINGS

## ■ Encouraging Just-in-Time Opt-In

- Prominent placement on 911 website, including Nixle feed
- Simple to sign up
- English and Spanish alerts
- City, county websites direct to Nixle sign-up

MIDLAND COUNTY, MICHIGAN  
**911**  
POLICE · FIRE · EMS

HOME CURRENT ALERTS GET HELP WITH CALLING 911

**Get Help With**

- Business Emergency Information Form
- Citizen Emergency Information Form
- Complete Flood Damage Questionnaire
- Flood Resources
- Freedom of Information Act
- Missing Person Form

**SIGNING UP FOR NIXLE**  
Home > Get Help With > Signing up for Nixle

Sign up for alerts from the  
**Midland County Central Dispatch**  
& other public safety agencies in your area.

Mobile #  (Public safety text messages sent here)

Email  (Public safety email sent here)

Zip Code  (Selects messages for your location)

Language  (English)

☐ I would like [Nixle & NixleAlerts](#) with [911-2020](#)

**Sign Up**

For help, reply **HELP** to 911-2020. To cancel, reply **STOP** to 911-2020. No charge but Msg. & Data rates may apply. Msg. rates only: [\\$24.99](#) /day. \*Standard. Sprint, Verizon Wireless & most carriers supported. Support: [@NixleUS](#)

powered by **NIXLE**

MIDLAND COUNTY, MICHIGAN  
**911**  
POLICE · FIRE · EMS

HOME CURRENT ALERTS GET HELP WITH CALLING 911

**>>>CLICK HERE TO COMPLETE FLOOD DAMAGE REPORT<<<**

Recent messages from:  
**Midland County Central Dispatch**

**Alert** there is a severe thunderstorm warning for midland county until 0930 am heavy wind gusts can be expected [More](#)  
Entered: 1 day, 6 hours ago

**Alert** Severe Thunderstorm Warning until 06:30AM [More](#)  
Entered: 1 day, 6 hours ago

**Sign Up**

powered by **NIXLE**

## Be Informed

Home > Emergency Management > Be Informed

**RECEIVING ALERTS & INFORMATION**

Where to Get Official Emergency Information

When emergencies happen it's important to get official information as quickly as possible. The following options are available to you to seek or receive alerts and information.

**Text Messages**

Sign up for Nixle and receive text messages and emails from Midland 911 sent directly to you. Learn more and sign up at [www.midland911.org](http://www.midland911.org)

## Emergency Services & Contact Information

Communications and resources to help in times of community emergencies is a top priority for Midland and our surrounding communities. Below are links pointing to information and suggested safety measures that citizens can review before an emergency strikes, and as emergency situations are occurring.

### Emergency Communications Resources

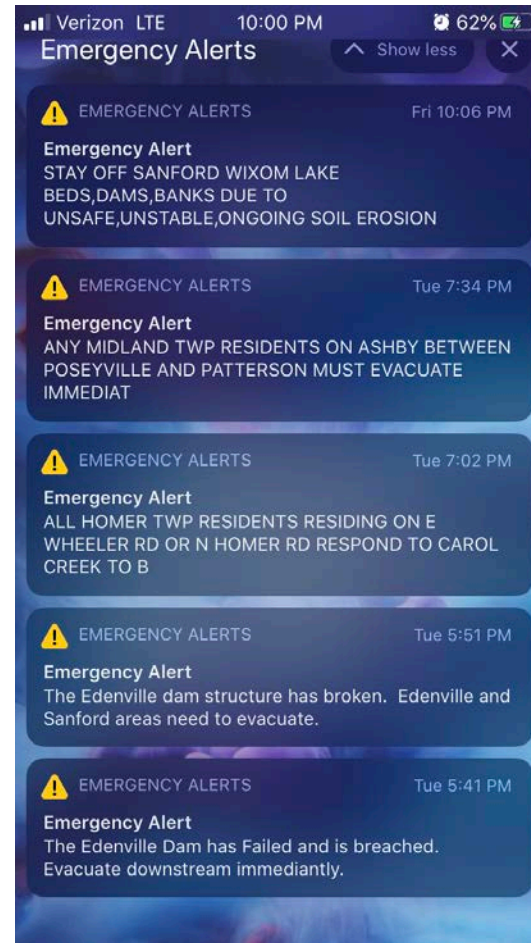
These resources can be conduits for emergency information during and, in some cases, before disaster strikes.

- 1-888-TELL-MORE
  - Call for [specific emergency news and instructions](#)
- [Midland County 911](#)
  - County-wide source for information
- MGTV-188, Charter Cable in Midland
  - Tune in for message board information
- [Nixle Alerts](#)
  - Sign up for free email or cell phone alerts to community emergencies

# WEA MESSAGES

## Warning Diffusion

- First time using of Wireless Emergency Alert Messages (WEA)
  - Geo-targeted to all phones in range of cell towers
  - Not subject to bandwidth limitations
  - 90 character limit for all phones, 360 characters for newer phones
- Central Dispatch led WEA message creation, dissemination



Dam Breach

# ALERTS AMPLIFIED THROUGH SOCIAL MEDIA

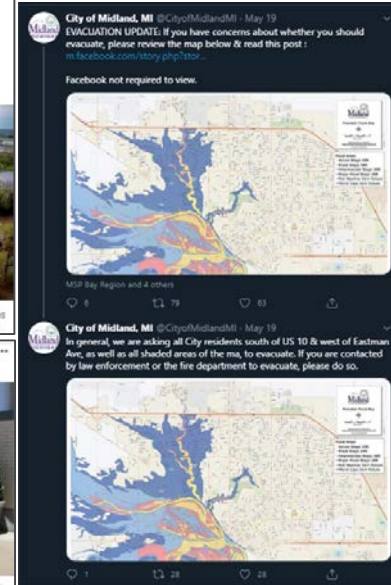
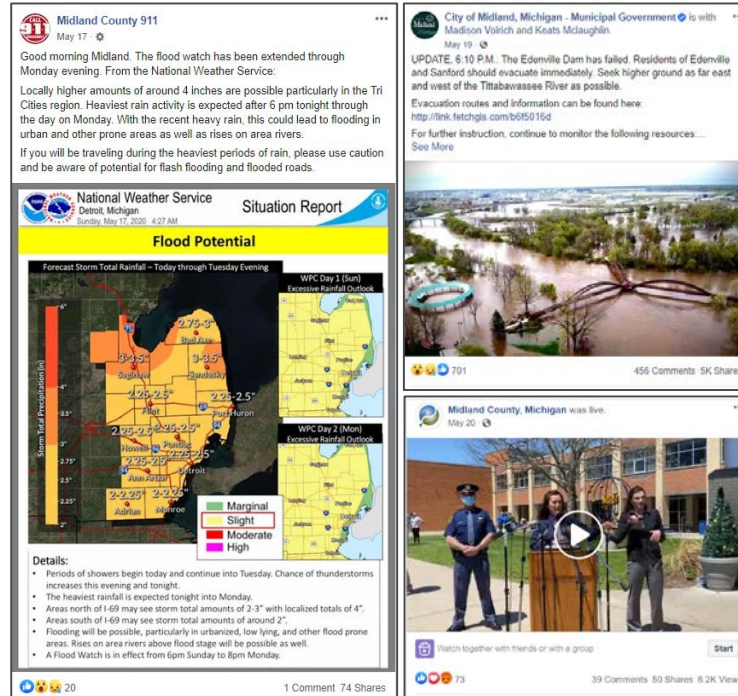
## Warning Diffusion

### ■ FACEBOOK

- Primary content generator: Midland County 911 Dispatch
- Supported by Midland County, City of Midland, Midland County EM, Midland PD, Midland Fire

### ■ TWITTER

- City of Midland, Midland Co.
- Content supported by visuals
- Directs people to web and other platforms – reduces milling

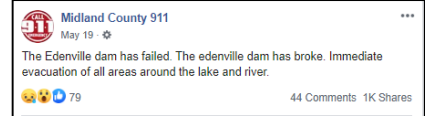
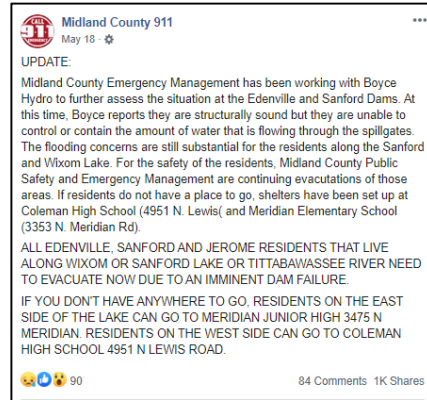




# ALERTS AMPLIFIED THROUGH SOCIAL MEDIA

## Warning Diffusion

- Prioritized Facebook content
- Consistent key messages across platforms, agencies
- Regular use of images, video
- High rate of shares by followers
- Frequent updates
  - On May 19: 32 Facebook posts from one agency, 27 from another
- Sharing Nixle alerts on social media reaches those who don't opt-in to Nixle
- Proactively addresses questions with “should I evacuate” map








# INDIVIDUAL BEHAVIOR

- Nearly 11,000 evacuated – no loss of life
- Pre-event evacuation to avoid night-time evacuation on dark, flooded roads
- Heavy promotion of NIXLE; frequent use for road closures and weather alerts
- Heightened awareness of flood risk due to extensive flooding experienced in 2017
- Community-wide concerns over dam maintenance and reliability

# SHELTER IN THE TIME OF COVID-19

- Shelter locations clearly articulated
  - Not “if” shelters exist, but “where”
- Parking lots used as shelter-in-place by many to avoid COVID risk
- Community-run shelters and Red Cross-managed shelters
- Individuals with long term needs moved to hotels.

 American Red Cross Michigan Region  
May 20

**MIDLAND AREA FLOODING DISASTER RESPONSE**

Yesterday our Emergency Management partners in Mid-Michigan issued evacuation orders for approximately 3,500 homes along Sanford Lake and Wixom Lake, adjacent to the Tittabawassee River near Midland.


• In support of our emergency management partners, the American Red Cross – Michigan Region is currently planning mass care services and supporting two emergency shelters for evacuees located at:


Sanford Lake (East Side): North Midland Family Center, 2601 E Shearer Rd, Midland, MI 48642

Sanford Lake (West Side): Coleman Community High School, 4951 N Lewis Rd, Coleman, MI 48618

The Michigan Region also has activated two Shelter Strike Teams in order to support these two locations. Our trained Disaster Cycle Services staff and volunteers are immediately focused on providing mass care and sheltering services to evacuees, in support of local emergency management operations, and will be on the ground helping for the duration of this emergency situation.

Individuals interested in becoming a Red Cross volunteer should visit:  
[RedCross.org/Michigan/Volunteer](https://RedCross.org/Michigan/Volunteer)



 American Red Cross Michigan Region  
May 21

**Midland Flooding Shelter Location Update:**

Our relief efforts continue in response to recent flooding. Individuals and families needing assistance should contact the following locations.

Current Open Shelter Locations include:

Coleman High School \*\*  
4951 N. Lewis Road  
Coleman, MI 48618

Saginaw Center Courts \*\*  
3320 N. Center Road  
Saginaw, MI 48603

North Midland Family Center \*\*  
2601 E. Shearer Road  
Midland, MI 48642

Swan Valley High School  
8380 Ohern Road  
Saginaw, MI 48609

Midland High School  
1301 Eastlawn Drive  
Midland, MI 48642

West Midland Family Center  
4011 W. Isabella Road  
Shepherd, MI 48883

Bullock Creek High School  
1420 S. Badour Road  
Midland, MI 48640

Hemlock High School  
733 N. Hemlock Road  
Hemlock, MI 48626

\*\* indicates American Red Cross managed shelter

# Questions?

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