



MICHIGAN DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY

# State of Michigan Dam Safety Program

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# Who Are We?

# Dam Safety Program Staff

- Mario Fusco, Jr., P.E., Supervisor
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- Dan DeVaux, P.E.
  - Cadillac                      989-370-1528 devaund@Michigan.gov
- Luke Trumble, P.E.
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# What do we do?

# Statutes Administered by Dam Safety Program

Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA)

- Part 307, Inland Lake Levels
- Part 315, Dam Safety

# Overall Goal: Reduce/Prevent Dam Failures



- An incident resulting in an unplanned or uncontrolled release of water from a dam.



# Part 307, Inland Lake Levels

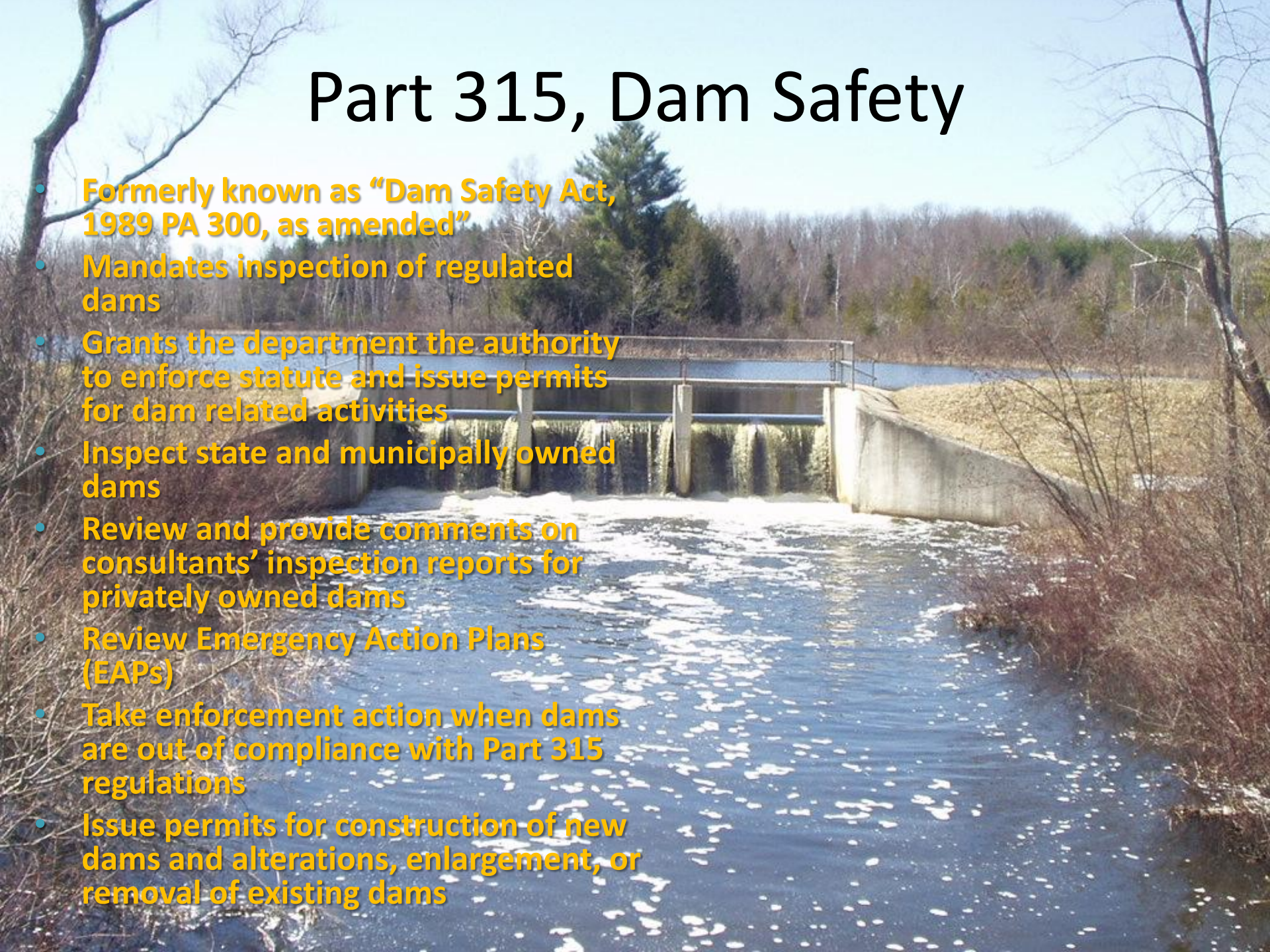
- **Process to establish and maintain legal lake levels**
- **Set up special assessment districts to fund construction, inspection, maintenance, and repair of dams**
- **Requires dam inspection every three years**
- **We review inspection reports and provide comments**
- **Do NOT issue Part 307 permits**  
– review plans and issue approval letters





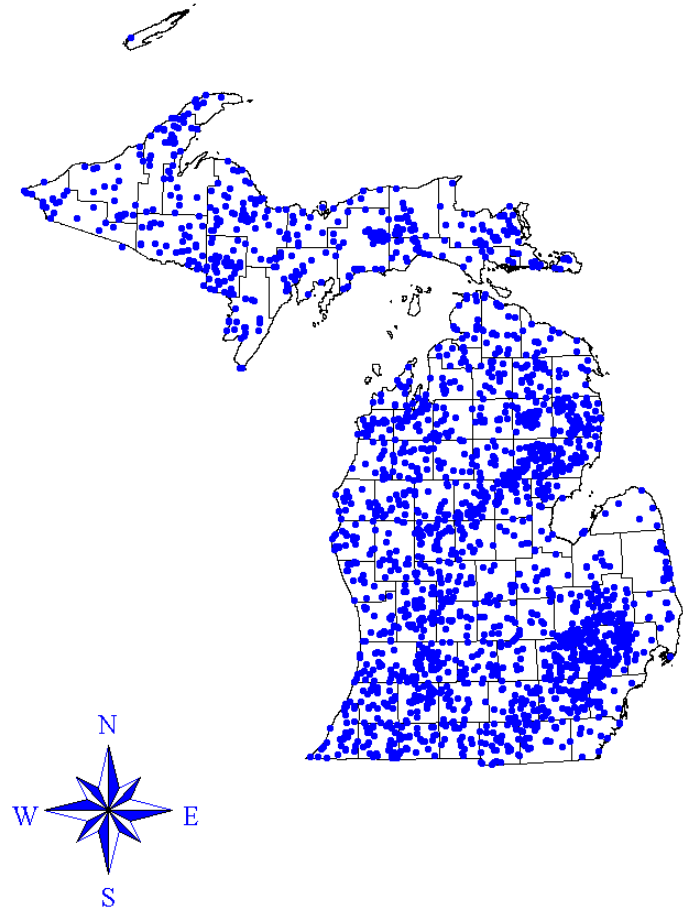
# Part 315, Dam Safety

- Formerly known as “Dam Safety Act, 1989 PA 300, as amended”
- Mandates inspection of regulated dams
- Grants the department the authority to enforce statute and issue permits for dam related activities
- Inspect state and municipally owned dams
- Review and provide comments on consultants’ inspection reports for privately owned dams
- Review Emergency Action Plans (EAPs)
- Take enforcement action when dams are out of compliance with Part 315 regulations
- Issue permits for construction of new dams and alterations, enlargement, or removal of existing dams



# Inventory of Michigan Dams

- In every county
- Over 2600 structures
  - ~825 Part 315 dams
  - ~235 Part 307 dams
- Continuously updated
- Currently updating to a web-based platform
- Interactive Map:
  - <https://mdeq.maps.arcgis.com/apps/webappviewer/index.html?id=f8c0637f34864bcbabb9c794fd8e452b>



# What is a dam?



# Part 315 Regulated Dam – Definition

- An artificial barrier, including dikes, embankments, and appurtenant works, that impounds, diverts, or is designed to impound or divert water or a combination of water and any other liquid or material in the water; that is or will be when complete 6 feet or more in height; and that has or will have an impounding capacity at design flood elevation of 5 surface acres or more.

# Hazard Potential

- Three hazard potential categories:
  - High – expected loss of life, severe impacts
  - Significant – possible loss of life, significant impacts
  - Low – no loss of life, minor impacts
- Inspection Frequency:
  - High – once every 3 years
  - Significant – once every 4 years
  - Low – once every 5 years
- Only High and Significant hazard potential dams require EAPs



# Emergency Action Plans

- Specifies who to notify in the event of an impending or actual dam failure
  - Emergency management and responders
  - Downstream residents
  - National Weather Service
  - Downstream dam owners
  - Technical consultants
  - Contractors
  - Dam Safety Program
- Identify downstream impacts
  - Inundation maps or list of affected areas
  - Downstream infrastructure
- Specifies Actions to be taken
  - Dam repairs (if possible and safe)
  - Evacuations
  - Road closings
- The Dam Safety Program reviews EAPs to make sure they contain the required elements, and provides suggestions to improve the effectiveness of the plans

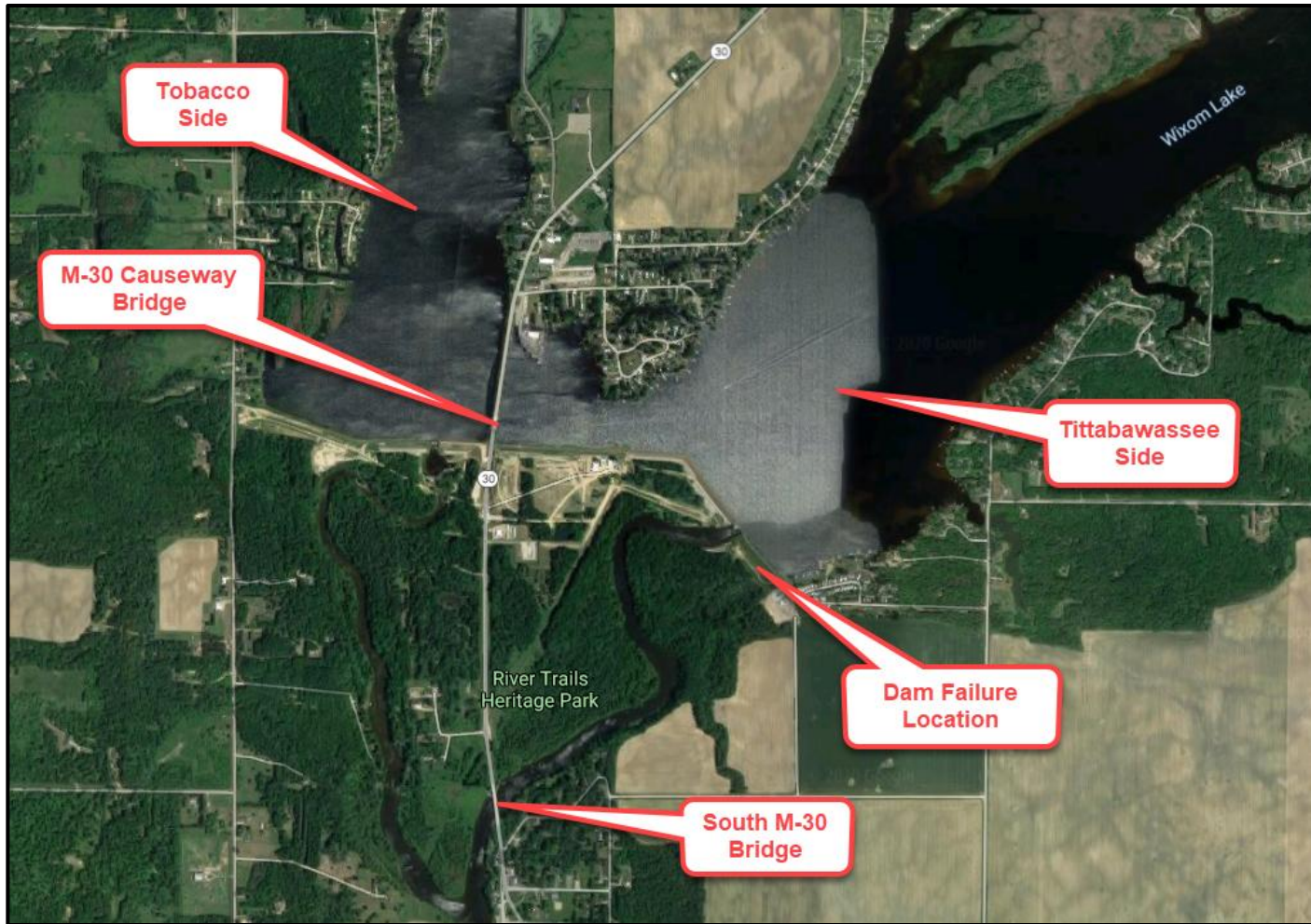
# Condition Assessments

- Satisfactory
  - No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions.
- Fair
  - No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency.
- Poor
  - A dam safety deficiency is recognized for loading conditions that may realistically occur. Remedial action or further investigations and studies are necessary to determine risk.
- Unsatisfactory
  - A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.
- Not rated
  - The dam has not been inspected, is not under State jurisdiction, or has been inspected but, for whatever reason, has not been rated.

# Edenville Dam

- Failed on 5/19/20
  - Impacted over 2,500 homes and businesses
  - Forced evacuation of 11,000 people
  - Contributed to the failure of the downstream Sanford Dam
- EGLE's Response
  - Onsite during and following failure
  - Emergency Response and Assessment
  - Safety concerns with remaining dam
  - Governor Whitmer's Directive
    - Investigate the causes of the dam failures
    - Perform in-depth evaluation of Dam Safety Program, laws, rules, policies, and procedures

# Pre-Failure Event





# 5/19/20 Failure Event





# Safety Concerns

- EGLE contracted with AECOM to develop the following alternatives:

*Alternative A* – Full breach of the dam embankment and demolition of the existing concrete spillway.

*Alternative B* – Construction of a concrete ogee spillway at the current location of the existing spillway using the existing spillway

*Alternative C* – Full breach of the dam embankment to the left of the spillway

*Alternative D* – Full rehabilitation of the dam embankment to meet current dam safety standards and reestablish flow in both downstream reaches of the Tobacco and Tittabawassee Rivers.

# Next Steps

- AECOM to complete design and permitting of selected alternative.
  - To be completed in fall 2020
    - Emergency Permit Application Currently with EGLE
  - Lower the water level by 10-15 feet on Tobacco Side
  - Will include stabilization measures at Tittabawassee side
- Construction of Alternative B to begin.
  - Anticipated start date in November 2020
  - Anticipated completion date in February 2021

# Failure Investigation

- FERC and EGLE team up for a single, independent investigation
  - Team Members:
    - **John W. France**, President, JWF Consulting, who will serve as team leader.
    - **Irfan A. Alvi**, President and Chief Engineer, Alvi Associates.
    - **Steve Higinbotham**, Hydraulic structures engineer consultant.
    - **Arthur C. Miller**, Technical Advisor, AECOM.
    - **Jennifer Williams**, Geotechnical engineer and consultant.
  - FERC contracted with investigation team
    - Must form their own scope
    - Must work outside any influence from the dam owner, FERC, or EGLE
  - Work began in late August 2020
    - To be completed in 12-18 months

# Dam Safety Program Review

- EGLE contracted with the Association of State Dam Safety Officials, Peer Review Program, to perform an independent audit of the Dam Safety Program.
- EGLE formed the Michigan Dam Safety Task Force to build upon the recommendations of the ASDSO peer review and make final recommendations to the Governor's office.

# ASDSO Peer Review Program

- The objective of an ASDSO Peer Review is to provide professional guidance to improve the performance and management of dam safety programs. A Peer Review evaluates the mission, objectives, policies and procedures of a dam safety agency or company/organization. The program is evaluated relative to the organization's own governing regulations, and other guidelines such as the Model State Dam Safety Program (FEMA 316), the FERC dam safety program guidelines for licensees, or the Federal Guidelines for Dam Safety (FEMA 2004), as well as commonly accepted standards of practice.
- <https://damsafety.org/resource-center/peer-review-program>



# ASDSO Peer Review Program

- Completed 49 peer reviews of state dam safety programs.
  - Including Michigan in 2006 and 2020.
  - Final report to MI on September 4, 2020.
- Completed 4 peer reviews of private owner dam safety programs.
- Completed 18 reviews of federal dam safety programs.

# Michigan's Peer Review Team

- Team Lead
  - Bob Dalton, P.E., Veenstra & Kimm, Inc – Consultant (former IL Dam Safety Manager, ASDSO President & National Dam Safety Review Board)
- Additional Team Members
  - Bill Bingham, P.E., Retired Dam Practice Leader, Gannett Fleming (former USSD President & National Dam Safety Review Board)
  - Ken Smith, P.E., Assistant Director, Division of Water, Indiana Department of Natural Resources (former ASDSO President & National Dam Safety Review Board)
  - Denny Dickey, P.E., Consultant (also former PA Dam Safety Manager, California DWR ODSP Audit Team Lead & DHS Dams Sector Government Coordinating Council)
- **Over 140 years of combined dam safety experience!**

# Next Steps

- MI Dam Safety Task Force to continue to meet, with a final report to the Governor in early 2021.
- EGLE to complete emergency work at Edenville Dam with Phase I completion in February 2021, and Phase II completion in Summer 2021.
- Independent Forensic Investigation Team to complete investigation and submit final report in Fall 2021 to Spring 2022.
- More changes TBD.

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