

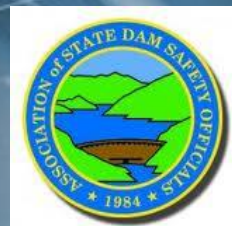
2020
ASDSO Peer Review
Michigan Dam Safety Program

**Presentation of Findings
and Recommendations**

October 1, 2020

EGLE

MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

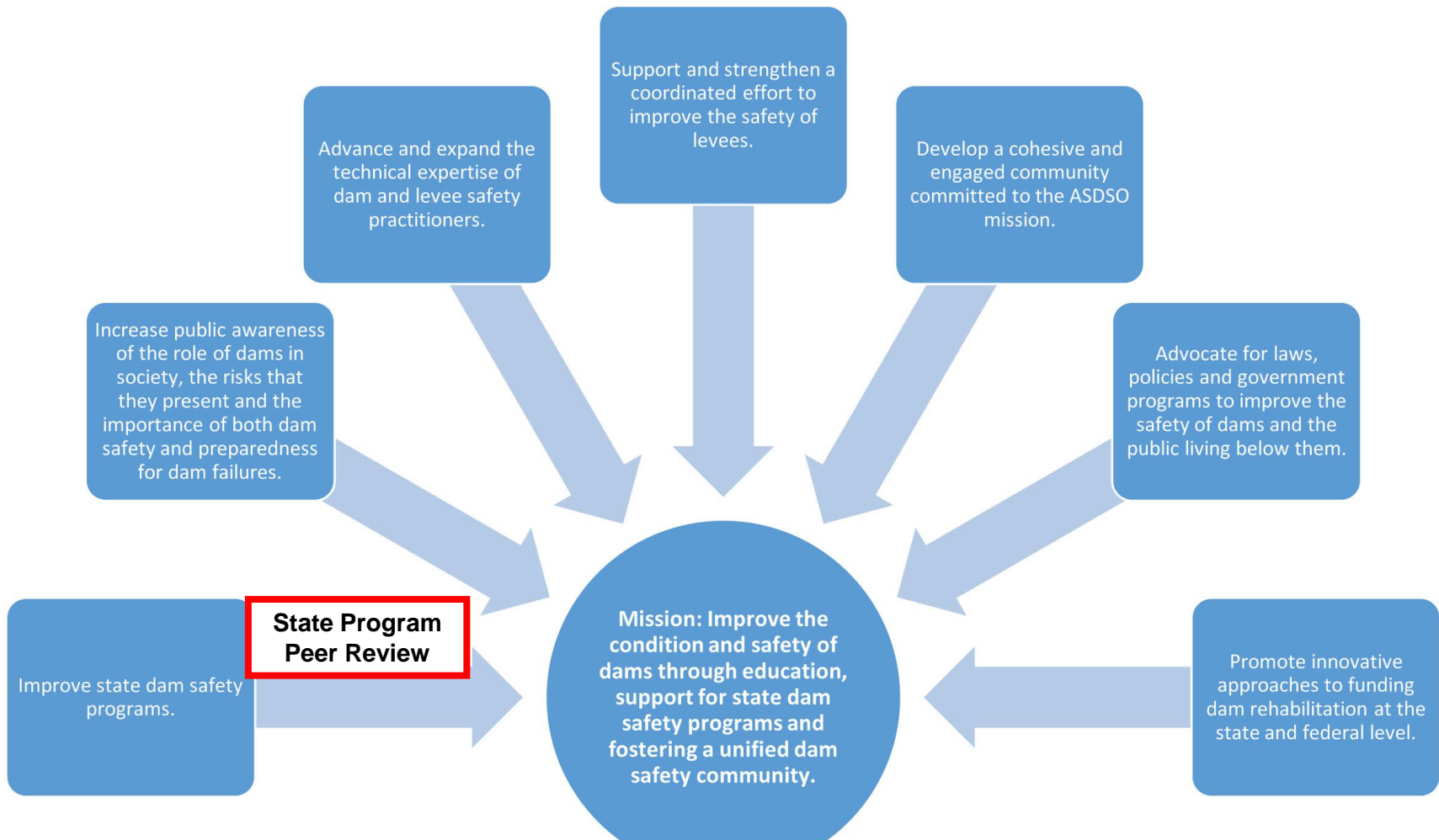


- **IRP Members**
 - **Team Lead**
 - **Bob Dalton, P.E., Veenstra & Kimm, Inc – Consultant (former IL Dam Safety Manager, ASDSO President & National Dam Safety Review Board)**
 - **Additional Team Members**
 - **Bill Bingham, P.E., Retired Dam Practice Leader, Gannett Fleming (former USSD President & 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)**

ASDSO Mission and Vision

Association of State Dam Safety Officials Strategic Plan

2017-2021



Introduction of Peer Review Program



Peer Review for Dam Safety Organizations



Association of State Dam Safety Officials
(ASDSO)

Introduction of Peer Review Program



- **ASDSO maintains a panel of 24 dam safety experts for team reviews.**
- **Peer Review Teams typically consists of:**
 - a state or federal regulator,
 - a consultant, and
 - a dam owner.

Introduction of Peer Review Program



- **The Peer Review Team evaluates the DSP relative to:**
 - **Agency governing regulations.**
 - **The Model Dam Safety Program (MDSP).**
 - **Commonly accepted standards of practice.**

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ENVIRONMENT, GREAT LAKES, AND ENERGY



Michigan Department of
Environment, Great Lakes and
Energy, Dam Safety Program

ASDSO Peer Review Report

September 2020



Association of State
Dam Safety Officials

Executive Summary

- **Current staff are dedicated**, well-educated, experienced engineers
 - Doing the best they can, given the limited time and resources available under current budgeting.
- **DSP is significantly understaffed** to perform the mission of dam safety as mandated by the legislation, rules, and best practice.
 - Recommend staffing to include
 - Manager of a stand-alone Dam Safety Unit
 - Three senior dam safety engineers
 - Three junior dam safety engineers
 - One engineering technician (or an additional junior dam safety engineer)
 - One full-time administrative support
 - Two full time enforcement officers dedicated to the DSP.
- **Michigan has not invested in safety of its dams** for many decades
 - Needs have accumulated as the dams have aged
 - Unsafe dams pose a risk to the environment and ecology and endanger public safety
 - Found no revolving loan program to fund dam rehabilitations

Executive Summary

- **Rigorous enforcement is seldom used** for Dam Safety violations
 - Minimal enforcement culture commonly accepted practice
 - Dam safety violations without strong enforcement expose those living downstream of non-compliant dams and the environment to the consequences of dam failure
- **Michigan's dam inventory is aging** well beyond their originally intended design life and have never been re-evaluated
 - Common nationally
 - Owners of high hazard dams not required to perform detailed engineering re-evaluations of their dams
 - All federal agencies that own dams are required by the *Federal Guidelines for Dam Safety* (FGDS) to perform periodic detailed re-evaluation of their dams
- **DSP does not seem to be respected** as a vital component of the EGLE
 - Evidenced by its location in the organization and the lack of public safety in the Mission Statement.

Executive Summary

- 92 hydroelectric dams are currently regulated by the Federal Energy Regulatory Commission (FERC) in Michigan
 - Statutes do not create duplicative regulatory authority regarding hydropower dams
 - Michigan has recently experienced one of the negatives of not having duplicative regulatory authority
 - FERC has moved to have a license surrendered (essentially transferring regulatory responsibility to the State program)
 - Transfer of files and detailed historical technical information about the dam to the State program proved to be difficult.
 - Recommending DSP work with ASDSO and leadership of FERC for a system-wide simplification of this information transfer problem



Formal Recommendations of the Michigan DSP Peer Review

Those shown in red and marked with an asterisk ()
may require legislation or rule change.*

Recommendations MI DSP 2020-01: Legislation and Authority

- **MI DSP 2020-01-a*:** The Revision or adoption of laws and/or rules to:
 - Provide **liability disclaimer** statement for the state agencies' personnel.
 - Require **permits for existing unpermitted dams** to operate and maintain these dams in a safe condition and to annually report on maintenance, operation, and engineering investigations.
 - Require owners to maintain dam operation, monitoring, and maintenance **records**.
 - Require owners of high and significant hazard dams which present a substantial potential risk to life or property to provide **proof of financial responsibility or security** to assure for the continued safe operation and maintenance of their dam and to assure that funding is available for the DSP to mitigate any hazard presented during a dam incident or emergency, should the Owner fail to do so.
 - Require **inspection of construction** by DSP staff and the Owner's design engineer.
 - Require the Owner to submit a **first-filling plan**, including a monitoring schedule, developed by the design engineer, for DSP review and approval.
 - Require periodic **exercising of EAPs** as discussed further in **MI DSP 2020-15-e**.
 - Meet MDSP recommendations for **design floods**.
 - Meet MDSP recommendations for **inspection frequency** as discussed further in **MI DSP 2020-12-a**.

Recommendations MI DSP 2020-01: Legislation and Authority (cont.)

- **MI DSP 2020-01-b***: Creation of a dedicated **Dam Safety Emergency Fund** that does not revert to the General Fund at the end of budget cycles. This fund would be utilized by the DSP to mitigate any hazard present during a dam incident or emergency, should the Owner fail to do so. Michigan should provide an initial allocation to establish this fund. Replenishment of this fund is addressed in **MI DSP 2020-05-d** and **MI DSP 2020-14-h**.
- **MI DSP 2020-01-c***: The DSP closely consider the substantial increases in program costs (beyond those already detailed in this report), compared to possible benefits and drawbacks of **duplicative regulatory authority for hydropower dams**. While that change is being considered, it is further recommended that the DSP seek to work with ASDSO and the leadership of FERC to see if a system-wide simplification of this problem of information transfer can be developed and implemented.
- **MI DSP 2020-01-d***: To provide for **future inflation**, it is recommended that the value of any dam safety related fees, fines, and penalties be established in the regulations, with the concurrence of the proper EGLE oversight entity.

Recommendations MI DSP 2020-03: Program Management

- **MI DSP 2020-03-a:** The DSP manager position description should be revised to include:
 - **Technical experience** in the design, construction, operation, and maintenance of dams.
 - **Overall program management.**
 - **Mentoring** subordinate staff.
 - Developing a **portfolio risk assessment** of regulated dams to determine the DSPs priorities.
 - Prepare a DSP **Annual Report** for Executive Management.
 - Perform **performance reviews** of staff.
 - Administer a **Dam Safety Awareness** within the Department and for outside stakeholders. See MI DSP 2020-17b and MI DSP 2020-17c.
 - Develop an **annual budget** request for the DSP.
 - **Track** required inspections.

Recommendations MI DSP 2020-03: Program Management

- **MI DSP 2020-03-a:** The DSP manager position description should be revised to include (cont.):
 - Planning and tracking **training** for staff.
 - Ensuring **enforcement actions** are performed for DSP compliance.
 - Performing **QA** and assuring QC is practiced.
 - Developing relationships with **dam safety champions** within EGLE and with outside stakeholders (Owners, Consultants, Emergency Management Officials, County Drain Commissions, Floodplain Managers, Legislators or Legislative Committees). See MI DSP 2020-17c.
 - Developing Dam Safety **Policies and Procedures** Manual.
 - Leading Dam Safety **Initiatives** to enhance the protection of the public, the environment, and property.

Recommendations MI DSP 2020-03: Program Management

- **MI DSP 2020-03-a:** The DSP manager position description should be revised to include (cont.):
 - Participating in professional societies such as ASDSO, to remain current, and maintain professional development credits.
 - Developing a recommendation for a **revolving loan program** to provide funding for rehabilitation of high hazard, publicly owned dams.
- **MI DSP 2020-03-b:** Scheduling routinely scheduled **periodic DSP** meetings to discuss program issues.
- **MI DSP 2020-03-c:** Providing a **DSP Annual Report** to convey the importance and benefits of the program to executive management.
- **MI DSP 2020-03-d:** **Adopting a risk-based approach** to manage the DSP using a portfolio risk assessment program (i.e., one available from ASDSO) of the inventory of regulated dams, beginning with high hazard dams, to allocate human and financial resources for the greatest dam safety return.

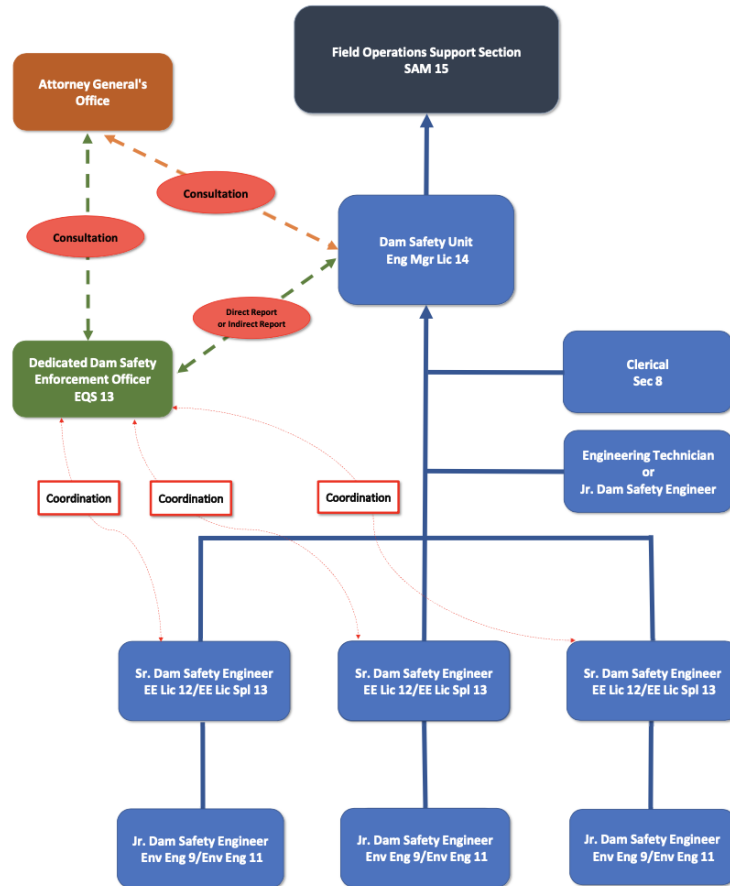
Recommendations MI DSP 2020-03: Program Management

- **MI DSP 2020-03-e: Developing a formal QA/QC program to document QA/QC practice for all work products prepared by the DSP such as inspection reports; design reviews; and engineering studies, calculations, and reports.** For permit application reviews, a checklist should be developed to assure consistency in the reviews conducted by various staff.
- **MI DSP 2020-03-f: Developing a DSP policy and procedures manual to provide for consistent quality of performance.**
- **MI DSP 2020-03-g: Developing a recommendation for a revolving loan program to provide funding for rehabilitation of high hazard, publicly owned dams.**

Recommendations MI DSP 2020-04: Resources Allocation

- **MI DSP 2020-04-a:** Obtain proprietary software in specific engineering fields such as hydraulics, geotechnical and structural and Computer Aided Design (CAD) as the dam engineering staff identify the specific need.
- **MI DSP 2020-04-b:** Establishing the **DSP in a stand-alone Unit** under the Field Operations Section.
- **MI DSP 2020-04-c:** Based on ASDSO findings regarding comparable DSPs, the Michigan DSP staffing should consist of a dedicated DSP unit manager, three senior dam safety engineers, three junior dam safety engineers, one engineering technician (alternatively an additional junior dam safety engineer), and a clerical support person. **A proposed organization chart reflecting this recommendation is contained in Appendix K of the Michigan DSP Peer Review Report.**
- **MI DSP 2020-04-d:** Dedicating **two qualified Dam Safety Enforcement Officers** for the DSP.

**RECOMMENDED DAM SAFETY UNIT
ORGANIZATION CHART**



Recommendations MI DSP 2020-05: Funding and Budgeting

- **MI DSP 2020-05-a: Restricting the use of FEMA Dam Safety Grant funds solely for DSP enhancements, not DSP salaries.**
- **MI DSP 2020-05-b:** Considering detailed input from the DSP Manager when establishing the budget.
- **MI DSP 2020-05-c: Michigan dam-owner agencies should strive to lead by example,** regarding responsible dam ownership. This could start with an inventory-wide assessment of State-owned dams, and then setting financial and project goals to providing adequate yearly routine budget resources and yearly life-cycle budget resources to perform deferred maintenance and rehabilitate any safety deficiencies.

Recommendations MI DSP 2020-05: Funding and Budgeting (cont.)

- **MI DSP 2020-05-d***: Require a designated **portion of dam permit application fees** and/or annual dam permit registration or renewal fees to be used for the replenishment of the **Dam Safety Emergency Fund** (see MI DSP 2020-01-b) for the purposes of the DSP to mitigate any hazard present during a dam incident or emergency, should the Owner fail to do so. When the total value of the Dam Safety Emergency Fund has reached a sufficient amount, as determined by the department, it may be possible to commit all dam permit application fees to the funding of an Engineering Services Contract (see MI DSP 2020-10-a) or towards DSP budget.

Recommendations MI DSP 2020-07: Human Resources

- **MI DSP 2020-07-a:** Executive management develop a DSP Succession Plan to provide for continuity of practice.
- **MI DSP 2020-07-b:** Development of an **annual training plan** and budget to ensure technical and professional growth of staff.
- **MI DSP 2020-07-c:** Development of a **technical engineering career path** for several technical/engineering positions.
- **MI DSP 2020-07-d:** Revising the qualifications of the **DSP Manager to include significant experience in the design, construction, operation, and maintenance of dams.**
- **MIDSP 2020-07-e:** Developing a practice to plan and track professional development training and continuing education of staff. The plan should provide for education to fill gaps in expertise and enhance the overall capabilities of the DSP.

Recommendations MI DSP 2020-09: Permitting

- **MI DSP 2020-09-a***: Development of a more **inclusive list of the calculations and documents to be provided by the dam owner**, regardless of who the applicant is, or the dam owner's engineer to assure the dam will be designed, operated, and maintained in a safe manner.
- **MI DSP 2020-09-b***: Development of requirements for the dam owner of significant or low hazard dams to **address the potential change in hazard classification** and the related changes to the dam that will be required as a result of the change in hazard classification. (Related to **MI DSP 2020-15-b***.)
- **MI DSP 2020-09-c***: Development of a permit period for the Dam Construction Permit that notes a time period for construction and also provides for the ongoing operation and maintenance of the dam or development of a permit to be issued following DSP acceptance of work completed under the Dam Construction Permit for the on-going operation and maintenance of the dam for the lifetime of the facility.

Recommendations MI DSP 2020-10: Design Reviews

- **MI DSP 2020-10-a:** Consider periodically (i.e., every 4 years) awarding an **Engineering Services Contract** to a qualified consulting firm to be readily available to augment the DSP staff when needed. The Engineering Services Contract could be used for:
 - A sudden increase in staff workload due to an event or program need.
 - A complex design review in connection with a new dam or major rehabilitation project.
 - Assistance in accomplishing dam inspections in a timely and efficient manner.
 - Assistance in performing construction assurance reviews for complex projects or dam removal projects.
 - Assistance in performing reviews of periodic (10-year) detailed dam re-evaluations.

Recommendations MI DSP 2020-10: Design Reviews

- **MI DSP 2020-10-b***: Require the Owner of proposed complex projects to provide an **independent Board of Review** to affirm the Owner's design.
- **MI DSP 2020-10-c**: Develop a **standard format DSP Engineering Report** for the construction, modification, rehabilitation, operation, and maintenance of dams in Michigan to be completed by the reviewing Dam Safety Engineer.

Recommendations MI DSP 2020-11: Re-Evaluations

- **MI DSP 2020-11-a***: Considering adopting a requirement that high and significant hazard dam owners be required to have **periodic independent comprehensive reviews** conducted by a qualified team of people with appropriate technical expertise, experience, and qualifications to cover all aspects of original design, construction, maintenance, repair, and failure modes of the assets under consideration for all features of their dam. A **maximum ten-year periodic cycle** should be considered. Reporting requirements for specific dams should be evenly distributed over the cycle to distribute the workload for the total portfolio of dams.

Recommendations MI DSP 2020-12: Inspections

- **MI DSP 2020-12-a***: Amending inspection frequencies to annual for high hazard dams and to biennial for significant hazard dams.
- **MI DSP 2020-12-b***: Establishing a construction inspection requirement for the design engineer and for DSP staff.
- **MI DSP 2020-12-c**: Developing an **inspection checklist and/or standard inspection report** form to assist dam owners in providing inspection documentation in a consistent manner.
- **MI DSP 2020-12-d**: Frequent inspections by DSP staff during dam **construction**, alteration, repair, and the first filling.

Recommendations MI DSP 2020-13: Surveillance Monitoring

- **MI DSP 2020-13-a***: Consider, as appropriate, requiring the installation of **surveillance monitoring equipment** (piezometers, inclinometers, settlement monuments, etc.) and the regular submittal of monitoring analyses to the DSP at regulated high and significant hazard dams.

Recommendations MI DSP 2020-14: Compliance and Enforcement

- **MI DSP 2020-14-a:** Establishing a **senior management led priority for portfolio-wide compliance enforcement.**
- **MI DSP 2020-14-b:** **Development of a compliance and enforcement priority list**, with 10 or 20 of the most problematic dams initially identified for focused follow up.
- **MI DSP 2020-14-c:** **Conducting a monthly Compliance and Enforcement Triage Meeting** focused specifically on dams, including senior management, DSP staff, a dedicated Dam Safety Enforcement Officer (see MI DSP 2020-04-d), and legal counsel, for the purpose of creating, following up on, and tracking dam specific strategies, for the above chosen most problematic structures.
- **MI DSP 2020-14-d:** Development, or adaptation, of a written policy for violation management and a standardized pathway for progressive enforcement, to apply to dams.
- **MI DSP 2020-14-e:** **Utilization of water level lowering orders** as a compliance tool to reduce the safety risks posed by long unmaintained, deteriorating dams and unresponsive dam owners.

Recommendations MI DSP 2020-14: Compliance and Enforcement (cont.)

- **MI DSP 2020-14-g:** Creation and implementation of Dam Safety 101 and Enforcement Cross Training.
- **MI DSP 2020-14-h*:** Penalties and/or fines collected for Dam Safety violations should be directed to replenish the **Dam Safety Emergency Fund** (see **MI DSP 2020-01-b**).

Recommendations MI DSP 2020-15: Emergency Response/ Emergency Action Plans

- **MI DSP 2020-15-a: Development of a General Dam Emergency Response Plan** designed specifically for dam hazard emergencies, coordinated with the EGLE Emergency Response Manager, the DSP, representatives of state, county, and local emergency response offices. This plan should clearly identify the responsibilities of each entity should a dam emergency occur. This plan should also refer to the utilization of the Dam Safety Emergency Fund (see **MI DSP 2020-01-b**) to finance any construction activity necessary by the DSP to mitigate any hazard presented by a dam, should the Owner fail to do so.
- **MI DSP 2020-15-b***: **EAPs should be annually checked:**
 - for accurate contact information in the notification chart, and
 - for changes in population and facilities at risk as a result of Hazard Creep.
- **MI DSP 2020-15-c***: EAPs should also be **updated annually** to include a description of circumstances which would require activation of the EAP. This update should also reflect any significant change in the condition of the dam and/or threshold readings of monitoring equipment requiring activation.

Recommendations MI DSP 2020-15: Emergency Response/ Emergency Action Plans

MI DSP 2020-15-d: Consider, for best practice, the development of a **standardized EAP format** or requiring the use of an existing, widely accepted standardized EAP format to ensure consistency from one EAP to another.

MI DSP 2020-15-e*: **Require testing** (i.e., Orientation Seminar, Drill, Tabletop Exercise, Functional Exercise, or Full-Scale Exercise) as agreed upon by the county or local emergency management office, on a frequency concurrent with every other required dam inspection.

Recommendations MI DSP 2020-16: Files and Records

- **MI DSP 2020-16-a:** The DSP should determine the most efficient method of storing electronic files (cloud-based vs department server) and provide funds to scan pre-2014 documents for each dam.
- **MI DSP 2020-16-b:** The DSP should consider storing all paper copies of EAPs in one area to avoid confusion during emergency events.
- **MI DSP 2020-16-c:** The DSP is encouraged to **continue their efforts towards moving their inventory to a GIS-based data system.**

Recommendations MI DSP 2020-17: Outreach and Awareness

- **MI DSP 2020-17a:** Adding a **clear icon link to the DSP.**
- **MI DSP 2020-17b: Providing periodic Dam Safety 101 Awareness Seminars** to other appropriate EGLE support staff, PIOs, attorneys, or specific Units and Sections outlining the DSP's mission to protect the environment and public safety.
- **MI DSP 2020-17c: Developing a proactive written Outreach and Awareness Plan** to provide periodic external Dam Safety Awareness seminars and outreach for a broad range of stakeholders, in order to develop advocates and grow a Dam Safety culture in Michigan. Such groups may include:
 - County Drain Commissions
 - County Emergency Management Officials
 - Dam Owners
 - Floodplain managers and residents
 - Legislators or Legislative Committees
 - Consulting firms

Recommendations MI DSP 2020-18: Safety at Dams

- **MI DSP 2020-18a:** As a **safety at dams culture** can only grow if there is an educated and informed public, it is recommended that a voluntary **Safety at Dams Initiative Team** (this team could be part of a Silver Jackets initiative) be formed with:
 - Multi-disciplined members that have strong leadership and collaborative talents, public education skills (both youth and adult), graphic information, and database skills.
 - Members should include multiple stakeholder State Agencies and Divisions, the law enforcement community, emergency managers, safety incident first responders, recreation interest groups, and academia.

Recommendations MI DSP 2020-18: Safety at Dams

- **MI DSP 2020-18a (cont.):**

The team should first focus on:

- Developing and providing outreach and education initiatives,
- Developing recommended uniform and standardized voluntary signage templates,
- Conducting field verified inventory and ownership research, and risk prioritization, in partnership with conservation officers and county surveyors,
- Enhancing the online interactive GIS map with dam locations, and resources such as public access points, and
- Finding local champions for safety at dams to advance education and voluntary removal initiatives.

Categorization of Recommendations

The categorization is not necessarily related to the importance the Team may have assigned to various findings and recommendations.

Recommendations were **categorized based upon** various factors:

- Current staff size and their anticipated **ability to address the recommendation**
- **Relation** of some recommendations to others that would require proper **sequencing** to complete
- **Potential for an immediate impact** on the program
- **Ease** with which some recommendations could be accomplished.

Categorization of Recommendations

- **Appendix N-2** of the Report contains the categorization of recommendations
- **Category 1 Recommendations**
 - Those for immediate action (**0 to 2 years to complete**)
 - Should be relatively easy to meet with current staff
 - Should not require legislation or rule changes.
 - Most critical unless it requires legislation or rule change.
- **Category 2 Recommendations**
 - Immediate action but require more time to accomplish (**1 to 3 years**)
 - Require legislation or rule changes
- **Category 3 Recommendations**
 - Still important but require long-term action (**3 to 4 years**)
 - May be dependent on prior completion of other recommendations
- Recommendations are ranked within each Category
- The Team considers all recommendations essential to improve the Michigan Dam Safety Program

Questions?



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