

# Dam Safety Task Force Recommendations

## I. Address the Risk of Failure

### Safety and Security at Dams

1. A dam safety culture can only grow if there is an educated and informed public; therefore, it is recommended that a voluntary Safety at Dams Initiative Team (could be part of a [Silver Jackets initiative](#)) be formed with:
  - a. Multidisciplined members who have strong leadership and collaborative talents, public education skills (both youth and adult), graphic design skills, and database skills
  - b. Multiple stakeholder state agencies and divisions, tribal governments, law enforcement, emergency managers, safety incident first responders, watershed and river associations, recreation interest groups, and academia
  - c. 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 geographic information system (GIS) map with dam locations and resources, such as public access points
    - Finding local champions for safety at dams to advance education and voluntary removal initiatives
2. Develop and implement programs related to security, public safety, and public awareness at dams, in accordance with industry standards and available resources. These efforts should be implemented in collaboration with local, state, and federal agencies; tribes; and national organizations. Programs should include provisions for evaluation, identification, prioritization, exercising of plans, and any necessary corrective actions. Requirements for development, implementation, and exercising of security and/or safety plans will require legislative and rule changes, as there are currently no provisions for these activities in the Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994—Part 315 or its administrative rules.<sup>1</sup>

### Surveillance Monitoring

3. Section 324.31518 of NREPA should be amended to require surveillance and monitoring plans for all high and significant hazard dams. Amendments to the statute and rules should include the following:
  - a. On a form or template approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), an owner shall prepare, and keep current, a surveillance and monitoring plan for all high and significant hazard dams.

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<sup>1</sup> Statutory language would need to be developed.

- b. A dam owner shall submit surveillance and monitoring plans to the department.
  - c. Surveillance and monitoring plans shall be based on sound engineering judgement about information needed to evaluate probable failure modes of the dam, as determined by a qualified registered professional engineer hired by the owner, in collaboration with the department.
  - d. Inspection reports should include an assessment of surveillance and monitoring data since the last inspection cycle. Every two inspection cycles, the surveillance and monitoring plans shall be reviewed and commented on.
  - e. Inspection report requirements under Administrative Rule 281.1310 should be updated to require an evaluation of recent surveillance and monitoring data and an evaluation of the surveillance and monitoring plan, as applicable per statute.
  - f. Consistent with Section 324.31520 of NREPA, EGLE should be notified within 24 hours of concerning findings.
4. As part of Operations and Maintenance and Emergency Action Plans (EAPs), in river systems with multiple dams, owners should be required to coordinate to develop system-wide notifications when there are deviations from normal operations or emergency conditions that result in changes in flow.

## **II. Address Financing for and Attention to Dam Maintenance, Repair, and Removal**

### **Dam Financing**

#### **Revolving Loan**

5. Develop a revolving loan program to provide financing and funding that prioritizes portfolio risk reduction. Initial scoring criteria shall prioritize, but not be limited to, rehabilitation of high or significant hazard, publicly owned dams until additional portfolio analysis provides sufficient information for broader application. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) should solicit stakeholder input in establishing scoring criteria and shall reevaluate the scoring criteria based on portfolio risk metrics and stakeholder input at intervals of no less than five years. Establish a revolving fund capable of funding up to \$20M per year over a 20-year period in loans for dam improvements, maintenance, and removals. Include a matching grant program of up to \$80M to incent Dam Safety Program (DSP) priorities for risk reduction.

#### **Emergency Fund**

6. The DSP should have ready access to financial resources to perform emergency response to imminent hazards presented by a dam, should the owner fail to do so in a timely manner. The State of Michigan and its employees should be immune from liability for a failure to mitigate a hazard at a dam, notwithstanding any provision of authority or financial means for it to do so.<sup>2</sup>
7. Create 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 Recommendations 8 and 9.

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<sup>2</sup> Potential legislative language related to Program Management, Funding, and Budgeting has been provided by subgroup members.

8. Create the Dam Safety Emergency Fund (see Recommendation 7) for the purposes of the DSP to mitigate any hazard present during a dam incident or emergency, should the owner fail to do so.<sup>3</sup>
9. Penalties and/or fines collected for dam safety violations should be directed to replenish the Dam Safety Emergency Fund (see Recommendation 7). These funds should not be directed to EGLE staff but should be used to address emergency actions at dams.
10. Allocate \$750,000 in annual matching grants for scoping and or design funding for dam rehabilitation or removal.

## **Dam Removal**

11. Determine additional funding and financing amounts and mechanisms to substantially enhance dam removal. EGLE should solicit stakeholder input in establishing scoring criteria that consider both portfolio risk and benefits to the public trust and shall reevaluate the scoring criteria based on portfolio risk metrics, benefits to the public trust, and stakeholder input at intervals of no less than five years.

## **Design Review**

12. Consider periodically (e.g., every four years) awarding an engineering services contract to a qualified consulting firm to be readily available to augment DSP staff when needed. The engineering services contract could be used for:
  - a. A sudden increase in staff workload due to an event or program need
  - b. A complex design review in connection with a new dam or major rehabilitation project
  - c. Assistance in accomplishing dam inspections in a timely and efficient manner
  - d. Assistance in performing construction assurance reviews for complex projects or dam removal projects
  - e. Assistance in performing detailed ten-year reviews of dam reevaluations
13. Require the owner of proposed complex projects to provide an independent, DSP-approved expert(s) to affirm the owner's design.<sup>4</sup>
14. 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

## **Licensing and Ownership**

15. Require licenses of finite term for dams to operate and maintain these dams in a safe condition and to report on maintenance, operation, and engineering investigations in the regular Inspection Report submitted at the interval specified per hazard potential classification (compared with the current requirements of Section 324.31518 of NREPA).<sup>5</sup> A dam must be removed, and the site restored, at the end of the license term unless the dam is issued a new license.
16. Require owners of all dams to provide proof of financial responsibility or security to ensure the continued safe operation and maintenance of their dam, and removal and site restoration at the end

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<sup>3</sup> Potential legislative language related to Program Management, Funding, and Budgeting has been provided by subgroup members.

<sup>4</sup> Statutory language would need to be developed.

<sup>5</sup> Potential legislative language related to Legislation and Authority has been provided by subgroup members.

of the current license term unless the dam is issued a new license. This would also ensure 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.<sup>6</sup>

17. Require all dam owners to maintain insurance sufficient to cover any and all liabilities that would result from catastrophic failure of the dam.

## Permitting

18. Develop a more inclusive list of the analyses 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.
19. Develop requirements for the dam owner of significant or low hazard dams to evaluate changes in risk and 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 Recommendation 77).<sup>7</sup>
20. Provide statutory requirements for operation and maintenance manuals.<sup>8</sup>

## Reevaluation and Inspections

21. Consider 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 probable failure modes of the assets under consideration for all features of their dam. These requirements should be developed in detail with relevant stakeholders and weigh the burden placed on the regulated community in tandem with public safety. Inspections should be done on a frequency that aligns with other reporting and inspection requirements. A maximum ten-year periodic cycle should be considered. Reporting requirements for specific dams should be evenly distributed over the cycle to properly allocate the workload for the total portfolio of dams.
22. Amend inspection frequencies to "annual" for high hazard dams and "biennial" for significant-hazard dams.
23. Establish a construction inspection requirement for the design engineer and for DSP staff.
24. Develop an inspection checklist and/or standard inspection report form to assist dam owners in providing consistent inspection documentation.
25. DSP staff should conduct frequent inspections during dam construction, alteration, repair, and the first filling.

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<sup>6</sup> Potential legislative language related to Legislation and Authority has been provided by subgroup members.

<sup>7</sup> Potential legislative language relating to Permitting has been provided by subgroup members.

<sup>8</sup> Potential legislative language relating to Permitting has been provided by subgroup members.

### III. Address Adequate Authority and Resources for the State Dam Safety Program

#### Legislation and Authority

26. Revise or adopt laws and/or rules to:

- a. Provide a limited liability disclaimer statement for the state agencies' personnel
- b. Require owners to maintain dam operation, monitoring, and maintenance records
- c. Require construction inspection, at any point during construction, by DSP staff and the owner's design engineer
- d. Require the owner to submit a first-filling plan, including a monitoring schedule developed by the design engineer, for DSP review and approval
- e. Require periodic exercising of EAPs as discussed further in Recommendation 80
- f. Meet Federal Emergency Management Administration (FEMA)'s Model Dam Safety Program (MDSP) recommendations for design floods
- g. Meet MDSP recommendations for inspection frequency as discussed further in Recommendation 22

27. Engage with the Federal Energy Regulatory Commission (FERC), Association of State Dam Safety Officials (ASDSO), and other stakeholder groups to further explore the benefits and drawbacks of co-regulating hydropower dams compared with other options for information sharing related to hydropower dams<sup>9</sup>

28. To provide for future inflation, the value of any fees, fines, and penalties related to dam safety should be established in the regulations with the concurrence of the proper EGLE oversight entity.

29. Refine current Michigan statute definition of high hazard dam classification to include "significant natural resource damage"

30. Provide the ability to initiate an emergency order to draw down dangerous dams (Part 307). Allow for an emergency order by the dam operator or EGLE to allow variance from a court-ordered lake level, in effect until the safety risk stated in the order is addressed (or remediated or ameliorated).

31. Provide the ability to initiate an emergency order to draw down an impoundment that has a court-ordered lake level as needed to preempt or otherwise mitigate flooding, heavy flows, or other causes of existing or anticipated high water. Allow for an emergency order by the dam operator to be declared and in effect for up to 14 days to allow variance from a court-ordered lake level.

32. Propose three amendments related to zoning act and governing law for real estate transactions to address land-use issues:

- a. The local entity with zoning approval authority should be required to formally request comment from the dam owner related to hazard risk for all proposed development or redevelopment in the inundation zone.
- b. The local entity with zoning approval authority must receive a statement from the owner of all proposed development or redevelopment in the inundation zone. The statement must

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<sup>9</sup> Co-regulation or requiring FERC dam owners to provide information to EGLE would require legislative change. ASDSO is hearing the same concern from other states, is willing to take on the issue, and may even develop standards for states to adopt.

- acknowledge that the owner has reviewed the EAP and inundation zone and understands the added risk to the subject parcel.
- c. All real estate transactions within an inundation zone must include the purchaser's written acknowledgement that they are aware the property is in an inundation zone and that they have reviewed a map showing the parcel's location in the inundation zone.
33. EGLE should work with ASDSO on the FERC transfer issue to identify other states interested in formalizing an information transfer process, then work (as needed) with Michigan's executive and/or legislative branches and with other states to seek federal legislation to address:
    - a. Any transfer of FERC's regulatory authority shall require written agreement from the receiving regulatory agency. Such agreement shall include full disclosure of any outstanding deficiencies or regulatory concerns that FERC has identified.
    - b. For any and all pending transfers of regulatory authority for any dam, FERC shall furnish all requested and/or relevant information to the receiving agency before seeking written agreement for regulatory transfer.
  34. Michigan law should be amended to require that an inventory of information provided to FERC be provided to the state's DSP by dam owners. In addition, any specific information that is provided to the federal government under a FERC license should also be provided to the state's DSP upon request. Finally, EGLE should work with ASDSO and other states to develop a model memorandum of understanding (MOU) between states and the federal government. Establishing an MOU protects the integrity of sensitive information while providing state dam safety programs with the information necessary to carry out their responsibilities to protect public safety and welfare.
  35. Modify the definition of "dam" in Part 315 to also include dams that are six feet or higher and that have, or are proposed to have, an impounding capacity at design flood elevation of 15 acre-feet or more
  36. Modify the definition of "abandonment" of a dam in Part 315 to clarify that the dam owner has to permanently eliminate all hazards or potential hazards associated with a dam before discontinuing maintenance or operation of a dam
    - a. Require dam owners to submit a decommissioning/abandonment plan, to be submitted for review and approval by EGLE.

## **Program Management, Funding, and Budgeting**

37. Adopt a risk-based approach to manage the DSP using a portfolio risk assessment program (e.g., 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
38. Encourage Michigan dam-owner agencies to lead by example regarding responsible dam ownership. For example:
  - a. Conduct an inventory-wide assessment of state-owned dams
  - b. Set financial and project goals to providing adequate yearly routine budget resources and yearly lifecycle budget resources
  - c. Use budget resources to perform deferred maintenance and rehabilitate any safety deficiencies.

39. Develop a state dams database and inventory framework that links to the Michigan Inventory of Dams (MID); allows all Michigan dams to be identified and entered; and is capable of housing additional data needed to evaluate, assess, prioritize, and facilitate actions for all dams in the state

### **Recommendations to Be Addressed by EGLE**

All members of the Program Management, Funding, and Budgeting subgroup support and recommend the below list of actions be considered by EGLE staff and adopted and/or revised as necessary.

40. EGLE adds “public safety” to its mission statement.
41. The DSP manager position description should be revised to include:
  - a. Technical experience in the design, construction, operation, and maintenance of dams
  - b. Overall program management
  - c. Mentoring subordinate staff
  - d. Developing a portfolio risk assessment of regulated dams to determine the DSP’s priorities
  - e. Prepare a DSP Annual Report for executive management
  - f. Conduct staff performance reviews
  - g. Administer a Dam Safety Awareness Program within the Department and for outside stakeholders (see Recommendations 84 and 85)
  - h. Develop an annual budget request for the DSP
  - i. Track required inspections
  - j. Plan and track training for staff
  - k. Ensure enforcement actions are performed for DSP compliance
  - l. Perform quality assurance (QA) and assure quality control (QC) is practiced
  - m. Develop relationships with dam safety champions within EGLE and with outside stakeholders such as owners, consultants, emergency management officials, county drain commissions, floodplain managers, legislators or legislative committees (see Recommendation 84)
  - n. Develop Dam Safety Policies and Procedures Manual
  - o. Lead Dam Safety Initiatives to enhance the protection of the public, the environment, and property
  - p. Participate in professional societies such as ASDSO to remain current and maintain professional development credits
  - q. Develop a recommendation for a revolving loan program to provide funding for rehabilitation of high hazard, publicly owned dams
42. Schedule routine, periodic DSP meetings to discuss program issues
43. Provide a DSP Annual Report to convey the importance and benefits of the program to executive management
44. Develop 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.
  - a. For permit application reviews, a checklist should be developed to assure consistency in the reviews conducted by various staff.
45. Develop a DSP policy and procedures manual to provide for consistent quality of performance. This recommendation should include creation of an objective, clear-cut process for prioritizing dam

- safety/infrastructure risks, as well as a consistent, acceptable timeline for addressing potential issues, including progressive compliance and enforcement procedures for noncompliant dam owners.
46. Obtain proprietary software in specific engineering fields such as hydraulics, geotechnical, structural, and computer-aided design (CAD) as the dam engineering staff identify the specific need
  47. Establish the DSP in a standalone unit under the Field Operations Support Section
  48. 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 one clerical support person. A proposed organization chart reflecting this recommendation is contained in Appendix K of the ASDSO's Michigan DSP Peer Review Report.
  49. Dedicate two qualified Dam Safety Enforcement Officers for the DSP
  50. Restrict the use of FEMA Dam Safety Grant funds solely for DSP enhancements, not DSP salaries
  51. Consider detailed input from DSP when establishing the budget
  52. The DSP should consider developing its own typical permit review documents and procedures, which can reference federal documents. The dam owner's engineer can then determine the design method for the dam and will know the project review process so they can coordinate with the DSP prior to application submission to achieve the most expeditious review.
  53. The DSP should consider developing its own set of safety policies for work in the field and establish the minimum number of people and the equipment associated with various tasks. Walking on riprap and some portions of spillways can easily lead to falls that may be in remote locations. Confined space locations and poorly maintained steps in drop spillways may require additional equipment and personnel for access.
  54. Executive management should develop a DSP succession plan to provide for continuity of practice.
  55. Develop an annual training plan and budget to ensure technical and professional growth of staff
  56. Develop a technical engineering career path for several technical/engineering positions
  57. Revise the qualifications of the DSP Manager to include significant experience in design, construction, operation, and maintenance of dams
  58. Develop 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.
  59. Follow reorganization as recommended in Recommendations 47, 48, and 49 to develop work plans to assign staff to the most appropriate projects and provide varied opportunities for staff
  60. Develop a professional development structure for the DSP that provides a defined career path and opportunity for advancement without leaving the DSP for professional advancement (Recommendation 48). A defined career path would also reduce staff turnover.
  61. Develop a mentoring program for all staff within the DSP
  62. Encourage employees to volunteer for technical committees and organizations and participate in professional organizations and technical conferences. Such participation should be considered when developing staff workload planning.
  63. Add missing parameters from the National Inventory of Dams (NID) to the MID
  64. Add tracking capability to the MID for such things as due dates for inspection reports, responses to notices of violation/orders to comply and EAP updates, and to generate reminders of these due dates for staff
  65. The DSP should determine the most efficient method of storing electronic files (cloud-based versus department server) and provide funds to scan pre-2014 documents for each dam.

66. The DSP should consider storing all paper copies of EAPs in one area to avoid confusion during emergency events.
67. The DSP is encouraged to continue their efforts towards moving their inventory to a GIS-based data system.
68. Maintain competitive compensation and benefits to sustain the quality of staff in the DSP
69. Require qualification-based selection of design engineering services for permit applications for construction of a new dam, enlargement or impoundment of a dam, major repair or rehabilitation of an existing dam, removal of a dam, or reconstruction of a failed dam

## **IV. Address Emergency Preparedness in Case of Failure**

### **Compliance and Enforcement**

70. Require senior management to prioritize portfolio-wide compliance and enforcement
71. Develop a compliance and enforcement priority list that utilizes a risk-based approach that takes into consideration hazard potential and the conditions of dams to rank the most problematic dams initially identified for focused follow up
72. Conduct a monthly Compliance and Enforcement Triage Meeting that focuses specifically on dams, including senior management, DSP staff, a dedicated dam safety enforcement officer (see Recommendation 49), and legal counsel, for the purpose of creating, following up on, and tracking dam-specific strategies for the above chosen most problematic structures. Include key performance metrics to benchmark, set goals, and measure performance toward compliance and enforcement goals.
73. Recognizing that EGLE is currently in the process of updating policies for violation management, including standardized pathways for progressive enforcement, EGLE should develop or adapt these policies to apply to dams. For dams, such policies should establish clear timelines for actions to alleviate significant risks posed for high and significant hazard dams.
74. Utilize water-level lowering orders as a compliance tool, as well as in dam hazard incidents, to reduce the safety risks posed by long unmaintained, deteriorating dams and unresponsive dam owners. Provide authority to EGLE to issue water-level lowering order under Part 307.
75. Create and implement Dam Safety 101 Enforcement Cross Training. This should include training new DSP staff within a reasonable time upon hiring and annual refresher courses.

### **Emergency Response**

76. A general statewide dam EAP should be developed that is designed specifically for dam hazard emergencies, coordinated with the EGLE emergency response manager; the DSP; and representatives of state, county, and local emergency response offices. This plan should clearly identify the responsibilities of each entity should a dam emergency occur. The plan should clarify roles and responsibilities, and the legal authorities of all parties, especially in instances when there is an absentee dam owner, when dam owners lack the resources to act, or when there are immediate risks. These elements should be clarified in consultation with relevant stakeholders.
77. EAPs should be annually checked for accurate information in the notification chart and the chart should be updated as necessary. The dam owner should provide updated information to the DSP and

the local emergency management agency in a timely manner or should notify these agencies that no changes have been made.

78. EAPs should be substantively reviewed as part of every dam safety inspection and updated as required. Recent EAP updates and new recommendations should be identified in the Safety Inspection Report, and the updated EAP should be provided to the DSP and to the local emergency management agency in a timely manner following submission of the Report.
79. The State should develop a standardized EAP format that includes, but is not limited to:
  - a. Description of circumstances that would require activation of the EAP
  - b. Significant changes to the condition of a dam, particularly modification that could change hazard potential
  - c. Threshold readings of monitoring equipment requiring EAP activation
  - d. Population and facilities at risk
  - e. Inundation maps

As an alternative, the State of Michigan could require the use of an existing widely accepted standardized EAP format to ensure consistency from one EAP to another.

80. Require testing (e.g., 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 safety inspection.
81. The DSP should implement all recommendations from the Dam Safety Task Force (DSTF) in consultation and partnership with stakeholders.
82. Consider having available emergency response kits, owned and managed by EGLE, to draw down impoundments without a bottom drain by siphoning water over the dam.

## **V. Address Public Awareness**

### **Outreach, Safety, and Security at Dams**

83. Add a clear icon link to the DSP (from the EGLE's main website page)
84. Provide Dam Safety 101 Awareness Seminars every two years and as needed to other appropriate EGLE support staff, public information officers, attorneys, or specific units and include sections outlining the DSP's mission to protect the environment and public safety. Such groups may include Water Resources Division (WRD) District Office resource staff; other WRD resource programs; and Remediation and Development Division, Materials Management Division, and Oil, Gas and Minerals Division programs that may be involved with dam related projects as well as any EGLE staff looking for cross-training opportunities.
85. Develop a proactive written outreach and awareness plan to provide periodic external dam safety awareness seminars and outreach for a broad range of stakeholders to develop advocates and grow a dam safety culture in Michigan, possibly including:
  - a. County drain commissioners
  - b. County emergency management officials
  - c. Dam owners
  - d. Floodplain managers and residents
  - e. Legislators or legislative committees

- f. Consulting firms
- g. Michigan Department of Natural Resources (and other state agencies, as appropriate)
- h. Tribal leaders

86. Engage consulting firms with voluntary professional development opportunities, such as serving on event planning teams and as speakers for locally delivered dam safety awareness seminars