

# The Montana Department of Natural Resources & Conservation

Introduction to the Montana Dam Safety Program January 2025

Painted Rocks Dam, Ravalli County



Tongue River Dam, Big Horn County

# Dear Montana Residents,

**THE PURPOSE** of this brochure is to provide you an overview of the Montana Dam Safety Program. Outlined in the following pages are the purpose and goals of the program, and the regulations under which we operate.

**THE MONTANA DAM SAFETY PROGRAM** is a unique regulatory program. The program is founded on the concept of dam owner responsibility and partnership. Dam owners and the Dam Safety Program work together to achieve safe dams. This partnership includes:

- · Inspecting dams to identify problems before they become threats
- Attention to regular maintenance
- Help with monitoring reservoir levels and instrumentation
- · Assistance with pursuing funding opportunities
- Help with emergency planning
- Education and information on responsible dam ownership

A DEDICATED TEAM OF DNRC REGIONAL ENGINEERS are located throughout the state and are a valuable local resource for dam owners.

**THE SUCCESS OF THE PROGRAM** is based on this relationship between DNRC Engineers and the dam owners. Read on to learn more.

SINCERELY,

# Montana Dam Safety Program



# **Table of Contents**

Why Dam Safety Regulation?	1
Dam Safety Program Approach to Regulatory Compliance	3
Montana Dam Safety Act • Key Principles •Enforcement • Exemptions • History	7
Key Definitions	10
Dams - State Regulation	11
Program Components	12
Jurisdictional Dams Defined	
<ul> <li>Downstream Hazard Classification</li> <li>High Hazard Dam Requirements</li> <li>Complaints and Emergencies</li> </ul>	
• High Hazard Dam Requirements	20

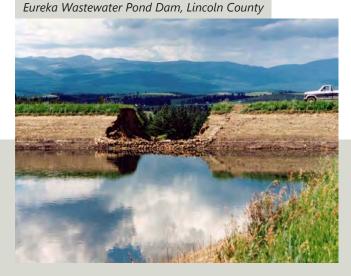


Swift Dam, Pondera County

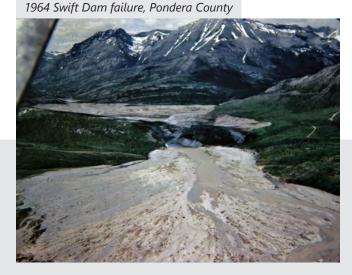
# Why Dam Safety Regulation?



Dams are essential infrastructure to Montana, providing recreation, irrigation, flood control, wildlife habitat, water supply and hydropower.



The potential risks associated with failure of certain dams could result in significant destruction, loss of life, and other long-term consequences.



Swift Dam failed in 1964, as a result of a historic meteorologic event on the Front Range. Many lost their lives and property damage was extensive.

Petroleum County dam in distress



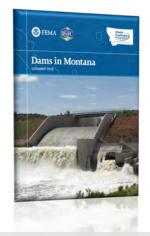
Several more dams have failed since the Swift Dam failure. Fortunately, no lives have been lost. However, the loss of a dam and irrigation water, can be financially devastating for the owner.



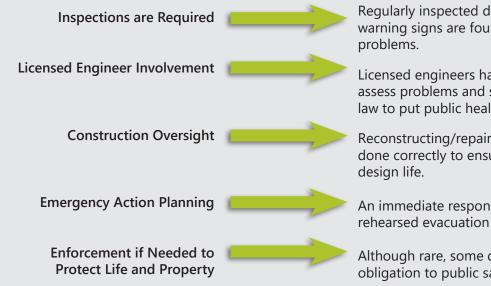
### Dam Safety Regulatory Programs Serve Many Purposes:

- Educate dam owners about responsible dam stewardship.
- Provide engineering design standards that ensure dams are stable and unlikely to fail, even when stressed by an earthquake or extreme flood.
- Help local governments with emergency planning.
- Protect the life and property of those living downstream of dams.
- Prevent the loss of valuable assets that are expensive to replace.

To learn more about Montana dams, including ownership, regulation, types of dams and other fascinating information, please refer to the DNRC publication "Dams in Montana". https://dnrc.mt.gov/Water-Resources/Dam-Safety/ Publications-Videos



### Fundamentals of the Dam Safety Regulatory Program...And Why



Regularly inspected dams are unlikely to fail, because warning signs are found before they become critical problems.

Licensed engineers have the knowledge and skills needed to assess problems and suggest solutions. They are required by law to put public health and safety foremost.

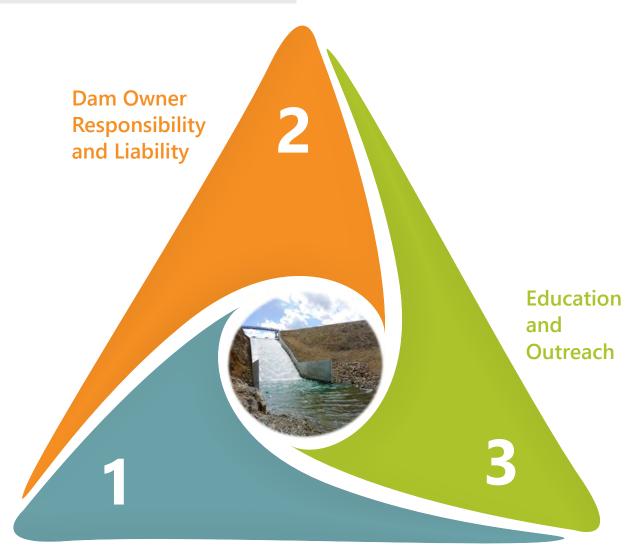
Reconstructing/repairing a dam is complicated and must be done correctly to ensure the dam will not fail during its design life.

An immediate response to developing problems, including a rehearsed evacuation plan, is critical to preventing fatalities.

Although rare, some dam owners may not understand their obligation to public safety.

# Dam Safety Program Approach to Regulatory Compliance

**Cornerstones to Regulatory Compliance** 



# Build Relationships With Dam Owners

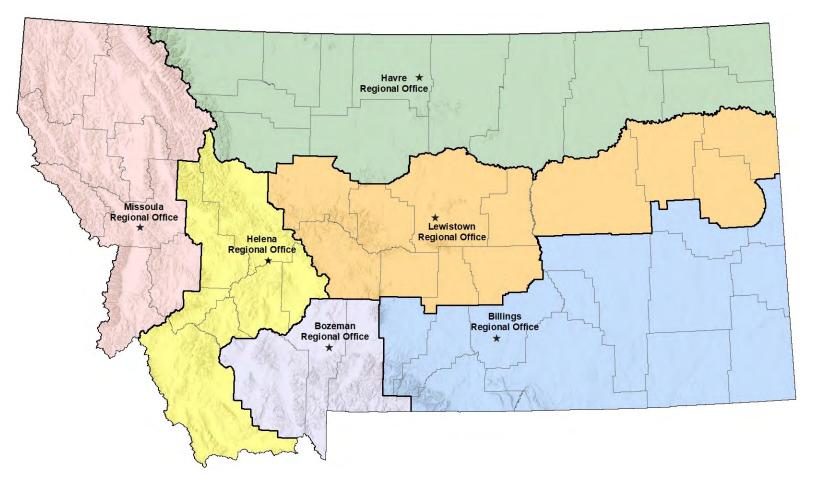
The Montana Dam Safety Program uses a three point approach to help dam owners stay in compliance with Montana dam safety laws and rules. *Read on to learn more about each point*.



### **Build Relationships with Dam Owners**

The Dam Safety Program utilizes six regional engineers who work with dam owners in their assigned counties. The regional Engineer's responsibilities include:

- Assist dam owners with their annual inspections
- Provide training and advice
- Work with the dam owners to identify developing problems
- · Conduct site visits during construction and repairs
- Aid with emergency response
- Help dam owners navigate the permitting process
- Respond to complaints
- Provide guidance on responsible dam ownership
- Discussing appropriate standards of care



### Dam Safety Program Approach to Regulatory Compliance



### Dam Owner Responsibility and Liability

Dam owners are responsible for maintaining their dams in a safe operating condition.

The laws protect dam owners from liability, so it is in owners' best interest to comply with the Dam Safety Act, i.e., properly inspecting and maintaining their dams.

MCA 85-15-305 notes that the owner of a dam, that is permitted according to the Dam Safety Act or constructed under the supervision of an engineer and properly maintained, in the absence of negligence, is not liable for damages from dam failure.

Tongue River Dam, Big Horn County

Note: Responsibilities vary according to what is located downstream of a dam.

### Dam Owner Reponsibilies Include:

- Regular maintenance
- Operating the dam in accordance with design
- Conducting frequent inspections
- Maintaining an Emergency Action Plan
- Consulting with a licensed Engineer to perform the obligatory inspections, and provide other professional guidance as needed.

For more information on liability, please refer to DNRC publication Legal Liability of Dam Ownership in Montana

https://dnrc.mt.gov/Water-Resources/ Dam-Safety/Publications-Videos





### Dam Safety Program Approach to Regulatory Compliance



# Education and Outreach to Dam Owners and Engineers

Dam Safety Program Education for Dam Owners Includes:

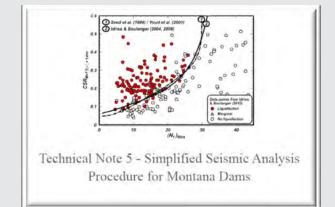
- Support to the Montana Association of Dam and Canal Systems (presentations and assistance)
- Dam owner training workshops
- Training on how to conduct annual owner Inspections
- Tools and training for emergencies
- Information and lessons learned from other owners and engineers.



### **Engineer Specific Educational Publications include:**

- Technical guidance
- Engineering tools to assist with common calculations
- Engineering newsletters





# Montana Dam Safety Act (MCA 85-15) Summary

Six Key Principles of the Montana Dam Safety Act	Reference
<ol> <li>Acknowledges dams are important to Montana and the state has a compelling interest in encouraging the construction of dams.</li> <li>Acknowledges certain dams pose inherent risks to public safety, as well as liability concerns for dam owners. However, owner compliance with the Dam Safety Act reduces risks to an acceptable level and provides protections for owners.</li> </ol>	MCA 85-15-115 MCA 85-15-115
<ol> <li>Requires that <u>all</u> dams be substantially built so they can safely and securely impound water.</li> </ol>	MCA 85-15-207, 85-15-208
<ol> <li>Requires owners of dams with potential loss of life downstream to obtain an operation permit and to utilize services of a licensed professional engineer. Requires dams to be constructed, repaired, inspected, operated and maintained to minimize the risk of failure.</li> </ol>	MCA 85-15 Part 2
<ul><li>5. Dam owners are responsible:</li><li>To hire an engineer for required inspections</li><li>Pay emergency response expenses</li></ul>	MCA 85-15-213 (3) MCA 85-15-215
6. Liability: Owners, whose dams are permitted, constructed, operated and maintained in accordance with Dam Safety Act have liability protection. Any owner whose dam is constructed under an engineer's supervision, and are properly maintained, have a level of liability protection.	MCA 85-15-305
The Montana Dam Safety Act's Objectives	
Sets forth requirements for identifying <i>High Hazard Dams</i> (See definition on page 10).	MCA 85-15-209
<ul> <li>Sets forth rigorous requirements for High Hazard Dams, including:</li> <li>Construction permitting</li> <li>Operation permitting</li> <li>Inspections</li> </ul>	MCA 85-15-210, 85-15-211 MCA 85-15-212 MCA 85-15-207-208, 85-15-213
Enforcement	
<ul> <li>Provides DNRC authority to utilize the Attorney General or county attorneys for legal services.</li> </ul>	MCA 85-15-109
<ul> <li>Provides DNRC authority to cancel operating permits.</li> <li>Provides DNRC authority to set conditions on operating permits, to ensure the safe operation of dams.</li> </ul>	MCA 85-15-216 MCA 85-15-212
• Provides DNRC authority to issue a \$1000/day civil penalty for violations for dams with normal capacity greater than 50-acre feet.	MCA 85-15-503
<ul> <li>Provides DNRC authority to respond to problems and emergencies on all dams, regardless of size.</li> </ul>	MCA 85-15-214, 85-15-215



# Montana Dam Safety Act (MCA 85-15)

# **Exemptions**

Some dams are exempt from general provisions, permitting and inspection requirements, liability statement, and penalties (MCA 85-15-107 (a) thru (d) and (2)).

Golden Sunlight tailings impoundment, Jefferson County



Dams with an active hard rock mining permit from the Department of Environmental Quality



Federally owned dams

Toston Dam, Broadwater County



Dams licensed by the Federal Energy Regulatory Commission (Hydropower dams)



Non-federal dams on federal property with federal agency dam safety oversight



Dams with Major Facilities siting Act Certificate MCA 75-20-201 (Colstrip dams)



Dams located on Superfund sites are a special case and are exempt from liability statements in MCA 85-15-305, MCA 85-15-107 (3)

### There Are No Exemptions to Safe Dam Requirement in Montana

All dams, regardless of ownership, regulatory agency or size must be substantially constructed in a secure and safe manner. MCA-85-15-207 "No person may fill or procure to be filled with water any dam or reservoir that is not so thoroughly and substantially constructed as to safely hold any water that may be turned therein." MCA 85-15-208 "No person may construct or cause to be constructed a dam or reservoir for the purpose of accumulating, storing, appropriating or diverting any of the waters of this state, except in a thorough, secure and substantial manner."

### Montana Dam Safety Act (MCA 85-15)

# History

<1975

1975

1985

1993

1979-1982

### Dam Safety Enforcement Responsibility of County Attorneys

### The Failure of Teton Dam (Idaho)

The newly constructed Teton Dam failed within hours of first filling.



### Corp of Civil Engineers Inspects and Inventories Montana Dams

The failure of Teton dam was a call to action. The President ordered the Corp of Engineers to inspect and inventory the nation's dams. Many Montana dams were found to have deficiencies.

### Montana Dam Safety Act Passed

The Montana Water Resource Association with support from Montana's engineering community proposed the Montana Dam Safety Act to the 1985 legislature.

### **Dam Safety Act Modified**

The original act measured reservoir capacity to the top of the dam. Reservoirs don't operate full to the top of the dam. The act was modified to measure capacity to normal reservoir level instead.

The original act only applied to dams with capacities over 50 acre-feet, which left out most Montana dams. These smaller dams still need to be constructed and operated in a safe and secure manner including actions taken to prevent dam failures when necessary. The act was modified to apply to <u>all</u> dams in the state.

The original act included privately owned dams constructed federal property, which are often also regulated by the federal agency that owns the property under the dam. The act was modified to removed overlapping jurisdiction with federal agencies, when the federal agency already provides dam safety oversight.



# Montana Dam Safety Program Jurisdictional Dams

### **High Hazard Dam**

DNRC regulated dam with an impounding capacity of 50 acre-feet or more measured at the normal operating pool, where loss of life upon dam failure is <u>likely</u>.

• Permits, inspections and emergency planning are required.

Note: Other state and federal agencies have different definitions for high hazard dams.

#### Not High Hazard Dam

DNRC regulated dam with an impounding capacity of 50 acrefeet or more measured at the normal operating pool, where loss of life upon dam failure is unlikely.

- Permits, inspections and emergency planning are not required.
- DNRC has enforcement authority with complaint or existence of emergency condition.
   Not High-Hazard dams must be reclassified for downstream hazards before repairs can be initiated.

### **Small Dam**

DNRC regulated dam with an impounding capacity less than 50 acre-feet measured at the normal operating capacity.

- Small dams are not required to have a hazard classification.
- DNRC has enforcement authority with complaint or existence of emergency condition.

#### Normal Operating Pool

The maximum normal operating pool is the reservoir pool elevation typically controlled by an overflow spillway. The purpose of the spillway is to evacuate excess water and prevent the dam from overtopping.

This elevation is used to define the capacity of the reservoir when determining the dam's downstream hazard potential.

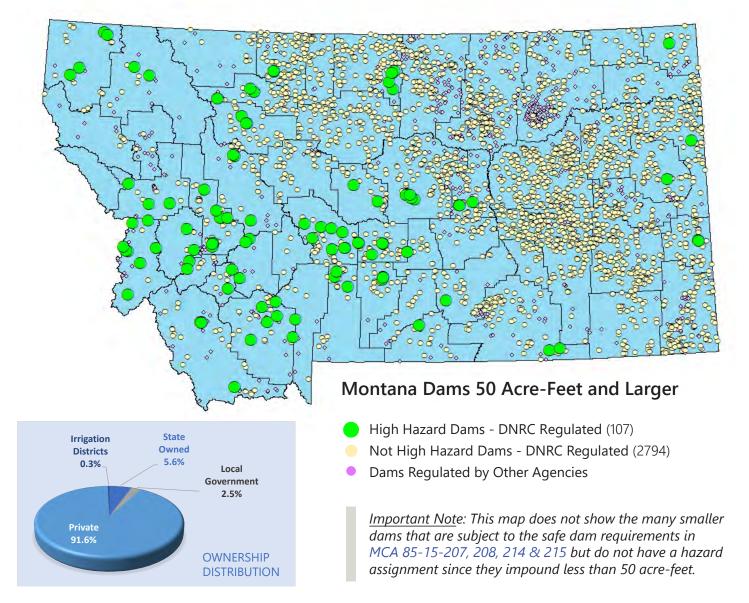
TN 6 https://dnrc.mt.gov/Water-Resources/Dam-Safety/Technical-Notes

Nevada Creek Dam, Powell County





# Dams and the Montana Dam Safety Act



### Interested in Knowing More About Montana's Dams?

Regulation of dams in Montana is explained in a clear, straightforward manner, along with other pertinent information in the DNRC publication Dams in Montana.



Additional information on Montana's High Hazard Dams can be found on the map.



https://dnrc.mt.gov/Water-Resources/Dam-Safety/Publications-Videos



# **Program Components** Downstream Hazard Classification

### Montana Dam Safety Act

MCA 85-15-209 dictates that a person proposing to construct a dam or reservoir with 50 acre-feet capacity must apply to the department for a hazard determination.

### Montana Dam Safety Rules

ARM 36.14.2 provides specifics:

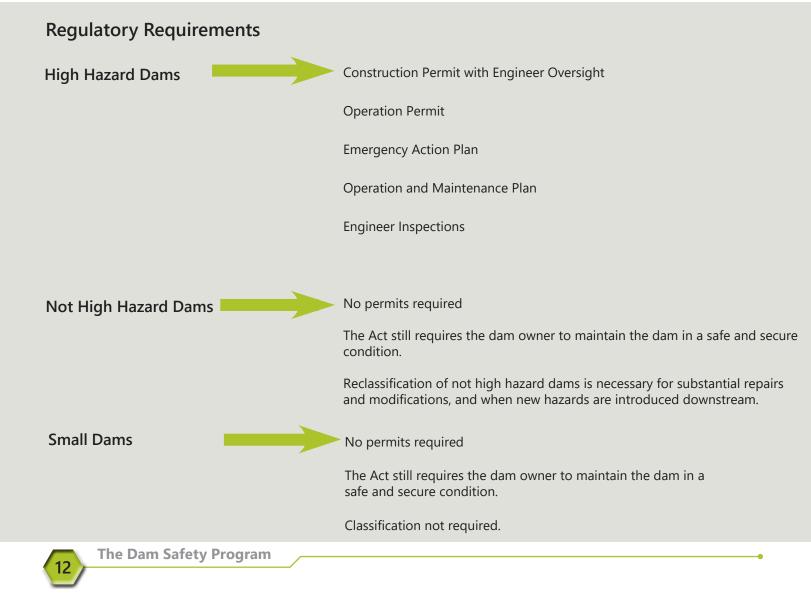
- Application processing
   procedures
- Fee for application (\$125)
- Criteria for determination
- Special circumstances

#### Montana Dam Safety Guidance

#### Technical Note 6 - Downstream Hazard Classification Procedures for Montana Dams

Provides step by step instructions for engineers conducting hazard determinations for dams. The document also provides guidance for special situations.

dnrc.mt.gov/divisions/water/ operations/dam-safety/technical-notes



# Hazard Classification Steps

1

2

Dam owner's engineer takes measurements of dam, reservoir, downstream topography and potential hazards.

The measurements are entered into a computer program that simulates failure of the dam during normal operating conditions (no influence from storms).

13
----

The flood simulation is followed downstream until it matches the 100-year floodplain.

4 The analysis is submited to DNRC for classification. If an occupied dwelling, building, paved road, or campground is in the dam failure inundation area, the dam is classified as *high hazard*.

Note: A dam owner has the option to ask DNRC to complete the evaluation instead of hiring their own engineer. The DNRC's evaluation is conservative and based on google earth maps. This is acceptable for dams with little downstream development.

For more information: https://dnrc.mt.gov/Water-Resources/Dam-Safety/Hazard-Classifications Hazard Classification Applications are not required for the following:

- Diversion dams
- Naturally occurring reservoirs
- Wastewater pond dams that are regulated by the Department of Environmental Quality
- Levees or canals



13

# High Hazard Dam Requirements: Construction Permits

### Montana Dam Safety Act

MCA 85-15-210 dictates that a person planning to construct a high hazard dam must first obtain a construction permit from the DNRC. The application must contain construction plans and specifications, prepared by or under the supervision of a licensed engineer, who is experienced with dam design and construction.

The DNRC must issue the permit or deny the application within 60 calendar days of receiving a complete application.

### Montana Dam Safety Rules

#### ARM 36.14.3 provides specifics:

- Application processing procedures
- Requirements for engineering design report that provides technical details of proposed construction
- Requirements for construction plans and specifications that are used by a contractor to do the work
- DNRC actions to be taken for noncompliance with Dam Safety rules
- Special circumstances

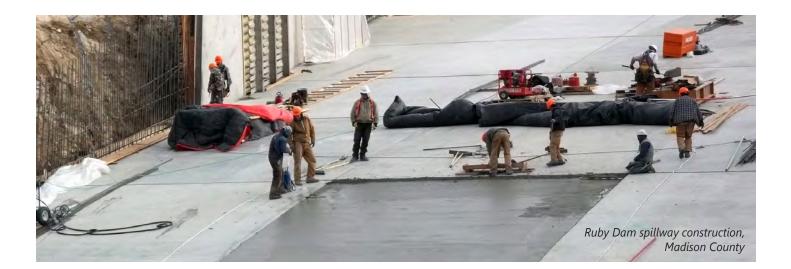
### Montana Dam Safety Guidance

Design Guidance for Engineers:

- Technical Note 8 Specifications Requirements for Dams
- Technical Note 1 Analysis of Spillway Capacity in Montana
- Technical Note 2 Loss of Life Determination for Spillway Capacity Analysis
- Technical Note 5 Simpified Seismic Analysis Procedures
- Technical Note 9 Design Review Process Manual for Dam Projects

See dnrc.mt.gov/water-resources/dam-safety/technical-notes

Construction projects that keep the DNRC involved throughout all stages of the project are more successful. DNRC's experienced engineers work hand and hand with the dam owner's engineer to assure designs are adequate and comply with current industry practice.



### **Construction Permits are Required For:**

- New construction of high hazard dams
- Rehabilitation and repairs to high hazard dams
- Removal and/or decommission of a high hazard dam

### **Construction Permits are NOT Required For:**

• Maintenance and routine repairs that do not impact dam safety

Examples of ordinary repairs/maintenance include vegetation control, gate lubrication, addition of rip rap on upstream face of dam, and re-grading the dam crest to remove potholes. <u>However</u>, sometimes these activities can be harmful to the dam, depending on the situation. Dam owners should contact their Regional Engineer before starting a maintenance project.



Ruby Dam spillway under construction, Madison County

# A Special Note About Dam Safety Design Standards

Nationwide, there are two approaches to standards: *Prescriptive and Industry Practice*.

*Prescriptive* standards are generally strict requirements that are contained in administrative rules or the law.

*Industry Practice* standards depend on the current state of practice in the industry and allow the engineer to use a variety of federally published standards that best fit the situation.

In general, the Montana Dam Safety Administrative Rules follow industry practice standards, recommending Natural Resources Conservation Service (NRCS) standards for smaller dams and U.S. Bureau of Reclamation standards for larger dams. Spillway standards are an exception; a prescriptive spillway standard is in the Montana rules.

Most state and federal agencies require dams to pass the Probable Maximum Flood (PMF), the most extreme flood event. However, soon after passage of the Dam Safety Act, it became clear that this standard was an impediment to the rehabilitation of Montana dams, due to the high cost to meet this standard. The legislature approved funding for the DNRC to research extreme storms in Montana and develop a spillway standard that is based on the estimated loss of life downstream. (ARM 36.14.502).

The Dam Safety Program

# High Hazard Dam Requirements: Operation Permits

### Montana Dam Safety Act

MCA 85-15-212 dictates that a high hazard dam owner must develop an operation plan for approval by the DNRC. The operation plan must contain reservoir operation procedures, maintenance procedures and an emergency action plan. The DNRC will then issue a permit to operate the dam, *containing conditions if necessary*.

MCA 85-15-213 dictates that a high hazard dam, whether or not previously permitted by the DNRC, must be inspected by a qualified engineer at least once every five years. Upon receipt of a report of this inspection, the DNRC shall issue or renew a permit to continue operating the high hazard dam, *containing conditions as necessary*.

#### Montana Dam Safety Rules

ARM 36.14.4 provides specifics:

- Permit requirements and application processing procedures
- Contents of the operation plan
- Special circumstances
- Approval or denial of permit within 90 days of receipt of a *complete application*

ARM 36.14.6 provides specifics on the engineer's inspection:

- General requirements of inspection
- Contents of inspection report

### Montana Dam Safety Guidance

- Operation and maintenance manual templates & guidance
- Emergency action plan templates & guidance
- Engineer's inspection & evaluation templates

dnrc.mt.gov/water-resources/dam-safety/permitting-your-existing-dam

Dam owners have several responsibilities, including an annual update of their emergency action plan and an annual owner's inspection of the dam.

#### Dam Owner Tools and Information

dnrc.mt.gov/water-resources/damsafety/for-dam-owners



Important Note: When the DNRC issues an operation permit, it is an assurance to the public that the dam poses an acceptable level of risk. All dams pose some risk, even empty ones! However, dams that are regularly inspected, have adequate maintenance, meet current industry practice are unlikely to fail. This is a fundamental premise of the Dam Safety Act.



Eureka Dam, Teton County

### **Frequently Asked Questions About Operation Permits**

What if a dam has some problems that the owner is working to fix, does the DNRC revoke the operation permit and therefore the reservoir must be drained?

No, unless the dam poses an immediate threat of failure, the DNRC works with the owner and the owner's engineer to develop a plan for repairs while continuing to operate safely.

Sometimes the reservoir level must be restricted; sometimes increased monitoring may be required. There rarely is a need to completely drain the reservoir. Temporarily lowering the reservoir usually affords an acceptable risk until the problem is remedied.

### What are typical DNRC enforcement actions that could be taken against dam owners that do not conform to operation permit requirements?

There are no typical enforcement actions as the vast majority of dam owners are responsible and the DNRC rarely needs to take enforcement. If needed, enforcement can include a mandatory reservoir level restriction, notifying the downstream public and county officials and in the worst case situation, a civil penalty.

### What are operation permit conditions?

The DNRC may issue an operation permit with conditions. Permit conditions are directives to be undertaken by owners in order to keep their dams in good safety standing, and must be completed within a specified deadline.

Failure to meet permit conditions results in unacceptable risks, where DNRC cannot reasonably assure public safety.

Common permit conditions include repairing a failed spillway, adding a toe berm, investigating the seepage through a dam, or evaluating a dam for compliance with program standards.

The Dam Safety Program

# **Types of Dam Safety Inspections**

### **Engineer's Inspection**

- Conducted by owner's qualified licensed engineer, at least once every five years
- Thorough physical inspection of the dam, including hard to access components (like outlet conduit)
- Includes an analysis of dam and compliance with current standards
- Recommend a safe operating level
- Recommendations for repair, monitoring, and/or investigation
- Review of past inspections and analysis
- Comprehensive report required
- Can be costly \$5000 to \$10,000 (average)



### **Owner's Inspection**

- Conducted by dam owner annually
- Engineer not required (although some owners use an engineer)
- Visual inspection of dam
- Review of seepage monitoring records collected over past year
- Special attention to items noted in past engineer's inspection
- A checklist is adequate for reporting

### **DNRC Site Visit**

- Visit to dam by DNRC engineers
- Assist/train dam owners on how to do owner's inspection
- Evaluate problems identified in engineer's report
- · Confirm dam is functioning safely

DNRC engineers do not conduct "inspections". Per MCA 85-15-213, inspections are the responsibility of the dam owner.

Ruby Dam, Madison County

### **Emergency Action Plan**

All high hazard dams are required to have an Emergency Action Plan; written instructions and information that are readily available for emergencies. The Emergency Action Plan must contain a map of the area that could be flooded during a dam failure, contact information for local emergency managers, and instructions on how to respond to a developing emergency. The Emergency Action Plan must be reviewed and updated annually, with copies provided to emergency responders.

# **Complaints and Emergencies**

### Montana Dam Safety Act

MCA 85-15-214 provides the DNRC authority to respond to complaints from people who claim in writing they or their properties are endangered by <u>any</u> dam (not just high hazard dams). The DNRC can order an inspection of the dam, order the draining of the reservoir or any other steps that the DNRC determines to be necessary to eliminate the hazard.

MCA 85-15-215 provides the DNRC authority to order an emergency repair or breach of a dam, if necessary, to safeguard life and property. If the owner fails to act, the DNRC can take action to eliminate the hazard and charge the owner for expenses incurred by the DNRC.

### Montana Dam Safety Rules

ARM 36.14.8 provides details on how the DNRC responds to complaints:

- Complaint processing procedures
- Procedures for investigating if a complaint has merit
- Actions that can be taken by the DNRC

ARM 36.14.7 provides more details on emergency response actions:

- What constitutes an emergency condition
- Actions that must be taken by a dam owner
- Actions that shall and may be taken by the DNRC



Chouteau County dam that failed in 2011

### Montana Dam Safety Guidance

Complaint forms and information to help the public navigate the complaint process.

dnrc.mt.gov/divisions/water/operations/dam-safety/filing-a-complaint

A dam safety complaint is a legal process. Complaints are a written and signed request for the DNRC to take enforcement action. A complainant <u>must</u> be impacted by the failure of the dam. Anonymous complaints are not allowed.

DNRC engineers work with potential complainants and dam owners to resolve concerns without going into the formal complaint process.



# Dams Safety Program Funding

# Dam Funding Resources

### Need help finding funding information for a repair, investigation or rehabilitation?

A variety of resources are available here: https://dnrc.mt.gov/Water-Resources/Dam-Safety/Dam-Funding-Resources/

# 2024 Funding

### FEMA Funds – Operation

The National Dam Safety Act provides financial assistance to enhance Montana's Dam Safety Program. The funding is used to assist dam owners with emergency action planning, developing engineering design manuals and tools, and conducting instructional workshops.

### FEMA Funds – Indirect

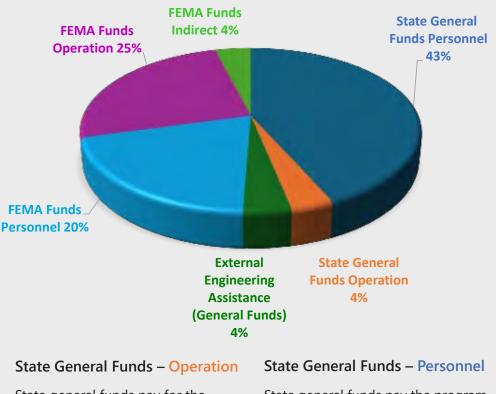
Indirect costs are charged on federal funds according to a negotiated rate, similar to overhead.

### FEMA Funds – Personnel

The National Dam Safety Act pays for one staff engineer in the Helena central office. This engineer is responsible for maintaining databases and assisting dam owners with monitoring and outlet inspections.

### State General Funds – External Engineering Assistance

The state often needs to consult with experts in the review of complicated construction projects and rehabilitation designs.



State general funds pay for the Helena central office's operation expenses. State general funds pay the program manager's salary and the salary of six regional engineers (25% of their time dedicated to dam safety).

Regional Office operating expenses and state-owned dam inspector expenses also contribute to DNRC's safety of dams programs. These expenses are not included in the pie chart.



ake Dam, Deer Lodge County

The Montana Department of Natural Resources & Conservation

For additional information on the Dam Safety Program or to contact a Dam Safety Program engineer, please refer to : DNRC.MT.GOV/WATER-RESOURCES/DAM-SAFETY