



Year-in-Review

National Dam Safety Program Fiscal Year 2022

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FEMA

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Year-in-Review

The National Dam Safety Program is a partnership of public and private sector stakeholders that promotes the establishment and maintenance of effective federal and state dam safety programs to reduce the risks to human life, property, and the environment from dam-related hazards.

The program began to publish this series to showcase essential National Dam Safety Program accomplishments. This document is devoted to accomplishments that occurred during Fiscal Year (FY) 2022. It provides the dam safety community, as well as the public, a heightened understanding of the program's objectives: to reduce the risk associated with dams and promote the benefits of dam safety.

To promote dam safety, FEMA coordinates with federal, state, and private sector partners through:

- The National Dam Safety Review Board, comprised of federal, state, and private sector partners, advises FEMA's administrator in setting dam safety priorities. The board also consults the administrator on the effects of dam safety policy.
- The Interagency Committee on Dam Safety, comprised of federal agencies having an involvement with dams, was founded in 1980 to encourage the establishment and maintenance of effective federal programs, guidelines, and policies to enhance dam safety and security.

Program Highlights	
Total Training/Collaborative Technical Assistance Sessions	20
Training Participants	353
New/Updated Guidance or Tools	7

1. Infrastructure and Investment Jobs Act

On November 2, 2021, President Biden signed the [Infrastructure Investment and Jobs Act \(IIJA\)](#) into law. The Act increased funding for FEMA dam safety with \$585 million for the Rehabilitation of High Hazard Potential Dams (HHPD) Grant, \$148 million for the State Assistance Grant, and \$67 million total for operations and support. This transformation funding will improve the safety of many dams across the country and create stronger state and federal dam safety programs. In FY22, the National Dam Safety Program began developing a program strategy for IIJA funding.

2. National Dam Safety Program Leadership

In FY22, Mr. Kayed Lakhia was appointed Director of the National Dam Safety Program at FEMA. Mr. Lakhia previously served as the Director of FEMA's Hazard Mitigation Assistance program and

managed a national portfolio of about \$10 billion in disaster and non-disaster grants. His leadership saw the creation of FEMA's new Building Resilient Infrastructure and Communities grant program. He has also acted in the position of FEMA's Deputy Assistant Administrator for Recovery.



Figure 1. Director of National Dam Safety Program, Kayed Lakhia

3. Grants

3.1. FY 2022 State Assistance Grants

A total of \$10.9 million was awarded in FY 2022. This year's funding included \$7 million from the [FY22 Consolidated Appropriations Act](#) and \$4 million was allocated from the [Infrastructure Investment and Jobs Act](#). The purpose of the State Assistance Grant is to provide financial assistance to states for strengthening their dam safety programs.

FEMA Region	States	Total Allocation for Region
1	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	\$839,873
2	New Jersey, New York, Puerto Rico,	\$513,451
3	Delaware, Maryland, Pennsylvania, Virginia, West Virginia	\$908,510
4	Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee	\$1,994,967
5	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	\$1,155,739

FEMA Region	States	Total Allocation for Region
6	Arkansas, Louisiana, New Mexico, Oklahoma, Texas	\$1,511,715
7	Iowa, Kansas, Missouri, Nebraska	\$1,434,872
8	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming	\$1,449,742
9	Arizona, California, Hawaii, Nevada	\$537,538
10	Alaska, Idaho, Oregon, Washington	\$507,535

3.2. Rehabilitation of High Hazard Potential Dams (HHPD) Grant

The President signed the “[Water Infrastructure Improvements for the Nation Act](#),” also known as the “WIIN Act,” on Dec. 16, 2016, which added a new grant program under FEMA’s National Dam Safety Program (33 U.S.C. 467f). Section 5006 of the Act, [Rehabilitation of High Hazard Potential Dams](#), provides technical, planning, design, and construction assistance in the form of grants for the rehabilitation of eligible high hazard potential dams.

In Fiscal Year 2022, FEMA allocated \$22 million in grant funding to continue the Rehabilitation of High Hazard Potential Dam program, including nearly \$11 million from the [Bipartisan Infrastructure Law](#). Of the total funding, \$11.64 million was available for planning and design activities and \$10.36 million will be available for construction-ready activities only. This grant provides assistance with planning and other construction activities. There was a total of 19 awardees.

HHPD Highlights	
Total Award Recipients	19
Funds Allocated	\$22 million

3.2.1. WELLSVILLE DAM COMPLETES RENOVATIONS USING HHPD GRANT FUNDING

Wellsville Dam in Little Yellow Creek, Ohio was the first reservoir to complete the necessary work required to ensure a safe breach using funds from the HHPD Grant Program. The town was first notified of the need for maintenance in June 2019, and engineers finished renovations in August 2022.

In a letter stating that the operation and maintenance of the dam violated state dam safety laws and put downstream residents’ lives at risk, Wellsville was ordered to take immediate action.

Since the reservoir was no longer being used for water, the town decided removing would be most effective. Removal cost were nearly \$1 million.

According to the Wellsville Reservoir Dam Project proposal, the dam removal consisted of:

- Draining the remaining water within the existing reservoirs
- Removing of a portion of existing earthen dam's embankment
- Temporary erosion control and permanent erosion control including seeding and mulching, rock channel protection and slope erosion protection
- Removing structural components such as the existing gate house structure and walkway bridge and existing valve vaults engineering

With assistance from FEMA and the HHPD grant, the village of Wellsville worked with the Ohio Department of Natural Resources' Division of Water to finish this project. Also, with money from the Ohio Public Works Commission, these awards covered the cost of the project with no out-of-pocket expenses incurred by the village of Wellsville.

4. Partnership Engagements

4.1. HHPD Risk-Informed Approach Task Group

In consultation with members of the National Dam Safety Review Board, the National Dam Safety Program and HHPD Risk-Informed Approach Task Group held bi-weekly meetings in FY22 to develop a risk prioritization methodology to be used by states or territories when selecting dam rehabilitation and dam removal projects for high hazard potential dams. The legislation of the Water Infrastructure Improvements for the Nation Act, which the High Hazard Potential Grant Program falls under, requires that risk prioritization be used by states in the selection of dam rehabilitation and dam removal projects for high hazard potential dams meeting eligibility provisions. The methodology developed by the Task Group will meet the Act requirements for risk prioritization of dams and will be rolled out in the FY23 grant cycle.

5. Trainings

5.1. Emergency Management Institute (EMI): National Dam Safety Program Technical Seminar – Feb. 23-24, 2022

The National Dam Safety Review Board Work Group on Dam Safety Training welcomed all dam and levee safety professionals and those responsible for responding to dam and levee safety incidents to the annual National Dam Safety Program Technical Seminar. The annual technical seminar took place at EMI, Feb. 23-24, 2022. The topic for this year's seminar was Managing Aging Dam and Levee Infrastructure which included presentations that focused on the impact the Infrastructure Investment and Jobs Act will have on dams and levees in the United States. In total, 145 individuals were in attendance.

5.2. Collaborative Technical Assistance

The FEMA Collaborative Technical Assistance series helps communities at risk of dam-related flooding to better understand their risk landscape and the potential consequences of dam-related emergencies. This technical assistance includes planning for emergencies related to operational discharges or dam-related infrastructure failure. In FY 2022, the program worked with two cohorts – Puerto Rico and Maryland/West Virginia. Puerto Rico had nine learning sessions in addition to two virtual office hours with a total of 121 participants. The Maryland/West Virginia cohort held nine sessions with a total of 47 participants, including 21 different organizations, both federal and nonfederal.



Figure 2. Maryland/West Virginia Collaborative Technical Assistance participants on a dam facilities tour

5.3. Community Dam Safety Course – Silverado, California, Apr. 18-19, 2022

Members of the FEMA National Dam Safety Program lead the instruction for the two-day Emergency Management Institute (EMI) Community Dam Safety, Preparedness and Mitigation training course (L2455). The two-day course took place in Silverado, California from April 18-19, 2022.

The course taught attendees how to reduce risks and mitigate the consequences resulting from a dam failure and how to recover more effectively in the event of a failure. There were 40 participants in attendance that included dam owners, emergency service providers, emergency planners and managers, land use and transportation planners, community leaders, and other members of the community.

6. Outreach and Engagement

6.1. National Dam Safety Awareness Day

On May 31st, FEMA, and other agency partners, including the Interagency Committee on Dam Safety and the National Dam Safety Review Board, honored National Dam Safety Awareness Day. This day commemorates the tragic failure of the South Fork Dam in Johnstown, Pennsylvania on May 31, 1889. This was the worst dam failure in United States history and resulted in the loss of more than 2,200 lives, leaving thousands homeless. This was the worst dam failure in United States history and resulted in the loss of more than 2,200 lives, leaving thousands homeless.

This year's National Dam Safety Awareness Day theme was "Dam Safety is a shared responsibility. Know your risk, know your role, know the benefits of dams, and take action".

National Dam Safety Awareness Day seeks to promote individual and community responsibility and best practices for dam safety, raise awareness of the benefits dams offer, and highlight steps that can be taken to prevent future catastrophic dam failures.

This year, the day coincided with the Puerto Rico Dam Safety Collaborative Technical Assistance Cohort in San Juan, Puerto Rico. Participants honored the day by discussing alerts and warnings and evacuation and shelter-in-place concepts.

Several other federal agencies, organizations, and partners across the country also commemorated National Dam Safety Awareness Day, including:

- A [blog post](#) and [broadcast](#) from the United States Department of Agriculture.
- A [webpage](#) from the Tennessee Valley Authority.
- A [social media post](#) from the Natural Resources Conservation Service.
- A [webpage](#) from the Association of State Dam Safety Officials.



Figure 3. Participants at the Puerto Rico Dam Safety Cohort Meeting

6.2. FEMA National Dam Safety, National Integration Center Receive Floodplain Management Association Award

FEMA's National Dam Safety Program Collaborative Technical Assistance Series along with the San Diego, California cohort were awarded this year's FEMA Award for Excellence Sept. 7, 2022, at the Floodplain Management Association's annual conference in Sacramento, California.

The National Dam Safety Program and National Integration Center along with the city of San Diego, California Governor's Office of Emergency Services and the U.S. Army Corps of Engineers (USACE) California Silver Jackets proudly accepted the award at the Floodplain Management Association Conference. The award selection was based on the collaboration between multiple levels of government throughout San Diego County, as well as the impact the Collaborative Technical Assistance program had on the county.

Members from the city of San Diego and the USACE Silver Jackets coordinated with multiple levels of government to meet the county's goal of increasing state, county, community, and individual preparedness in participating jurisdictions for responding to dam emergencies. The Collaborative Technical Assistance program assisted San Diego County and participating jurisdictions in leveraging and building upon previous and ongoing community resilience to dam and levee risks.



Figure 4. Members of the San Diego Collaborative Technical Assistance cohort receiving award

6.3. Associated Press Analysis on Dams Article

On May 5, 2022, the Associated Press published the [“AP analysis finds growing number of poor, high-hazard dams.”](#) for which Kayed Lakhia was interviewed. The article highlighted the growing number of aging dams throughout the United States, of which 2,200 are considered high-risk and in poor or unsatisfactory condition. Many of these dams are in need of rehabilitation and funding such as the Infrastructure Investment and Jobs act is critical to help state dam safety programs fund dam-related projects and repairs.

7. Publications/Reports/Resources

7.1. FEMA P-2181, Hurricane and Flood Mitigation Handbook for Public Facilities

The *Hurricane and Flood Mitigation Handbook for Public Facilities* presents 30 fact sheets providing technical guidance and recommendations for applying mitigation best practices. The fact sheets contain information aimed at improving public facilities and other infrastructure vulnerable to flood and wind damage. The handbook provides strategies for local governments to reduce these losses.

[*Fact Sheet 2.3: Mitigation of Dams and Reservoirs*](#) aimed to improve safety and resilience by rehabilitating dams and reservoirs to improve stability, water control, and erosion issues. The fact sheet offers mitigation solutions for differing scenarios along with options on how to mitigate the problem and considerations to take. Mitigation solutions within the Dam Fact Sheet of the Handbook include improved stability, increased spillway capacity, temporary storage capacity, control surface erosion, reduce seepage and internal erosion, and address foundation issues.



Figure 5. FEMA P-2181 Cover and Fact Sheet 2.3

7.2. Dam Safety with Beaverly Coloring Book

The National Dam Safety Program announced the release of [*Dam Safety with Beaverly*](#), a children's coloring book. This coloring book was created to help children, or young students, learn more about dams and safety around them.

The coloring book follows Beaverly the Beaver, who provides information about dams, what they are used for, the hazards surrounding them and how to stay safe near them. It also includes several pages for coloring and two activity sheets that will help children learn about dams.

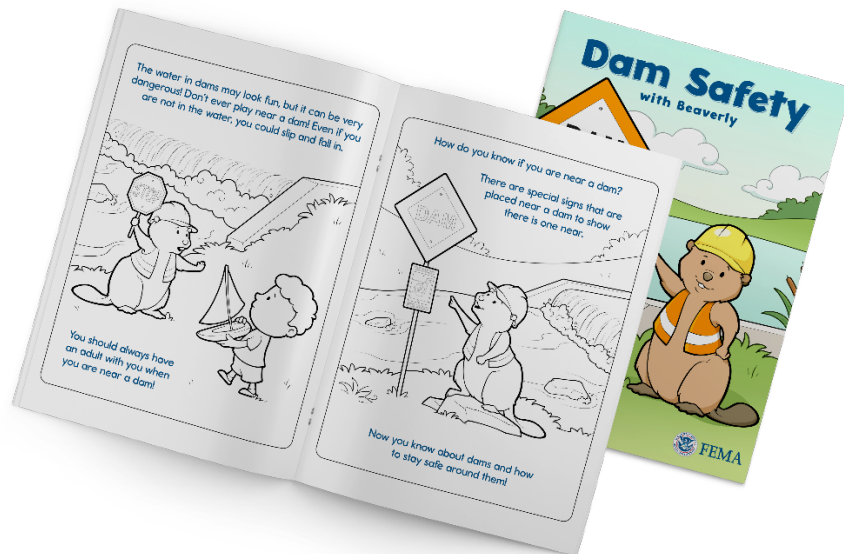


Figure 6. Dam Safety with Beaverly Coloring Book

7.3. FEMA P-2188, Dam Safety Warning Signs Best Practices

FEMA's Dam Safety Warning Signs Best Practices is a compilation of existing leading practices from industry leaders including the United States Society on Dams, Association of State Dam Safety Officials, U.S. Army Corps of Engineers, U.S. Coast Guard, Federal Energy Regulatory Commission, Federal Highway Administration, Bureau of Reclamation, Canadian Dam Association, American International Standards Institute and more.

One common control measure used to increase safety around dams is the use of safety signage to warn the public of potential hazards associated with the dam site. The FEMA Dam Safety Warning Signs Best Practices was created to encourage using proven and researched safety signage practices from industry leaders to promote stronger public safety practices nationally.

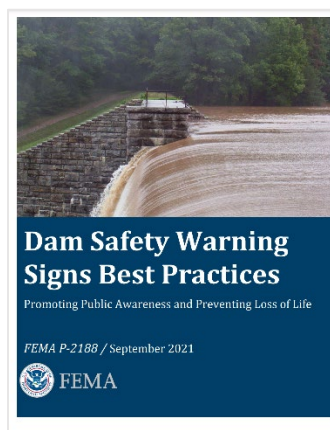


Figure 7. Dam Safety Warning Signs Best Practices Publication

The *Dam Warning Signs Best Practices* aimed to accomplish the following:

- Provide guidance on proven and practiced dam warning sign design, messaging, and monitoring best practices.
- Promote consistent and recognizable safety signage nationally.
- Reduce the risk of injury or death resulting from dam operations.

7.4. Michigan Dam Incident Response Review – An Analysis of the 2020 Edenville and Sanford Dam Failure Response

In April 2022, the National Dam Safety Program released the Michigan Dam Incident Response Review publication, which examined the causes for Edenville and Sanford dam failures and identified the actions the dam owners and emergency managers took as the situation developed. Examining this event highlighted the causes behind these dam failures, but also provided key insights and lessons for other jurisdictions with dams. The cascading impact of the Edenville dam failure causing the Sanford dam failure shows the dependencies within a water management system and the importance of collaborating across watershed areas.

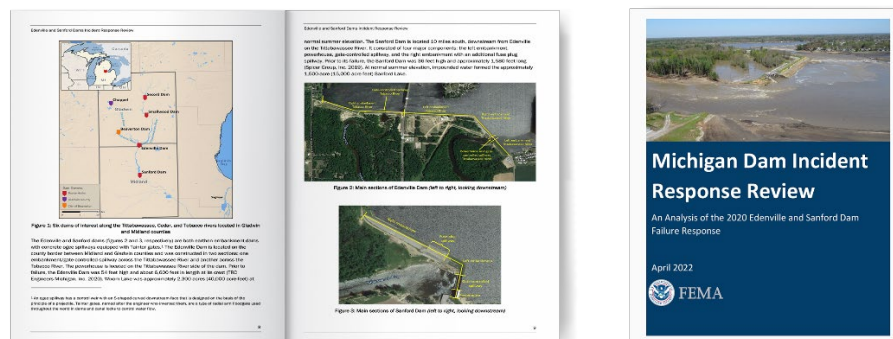


Figure 8. Michigan Dam Incident Response Review Publication

On July 19, 2022, FEMA hosted a webinar on the Michigan Dam Incident Response Review to go over the findings of the report. Over 250 participants attended the webinar. The review of this event provided key insights and lessons for other jurisdictions with dams that included examining risk and coordinated planning on a watershed to ensure awareness of systemic risk both upstream and downstream. In addition to that, participation from emergency management and dam owners/operators provided a valuable opportunity to test plans, confirm roles and responsibilities, and identify areas for improvement.

The webinar showed inundation modeling and community data, which are critical for effective planning and conducting realistic exercises. Pre-incident relationships between emergency managers and dam owners/operators greatly improves communication, coordination, and response during an emergency incident. Detailing that open communications with the community is essential

to explain risk and create more effective alerts and warnings for evacuations and shelter-in-place guidance.

7.5. Federal Guidelines Updates

The FEMA National Dam Safety Program, in coordination with ICODS and NDSRB, formed four task/work groups and continued to work on updating the following Federal Guideline documents:

- FEMA P-64 – *Emergency Action Planning for Dam Owners*
- FEMA P-65 – *Earthquake Analyses and Design of Dams*
- FEMA 93 – *Federal Guidelines for Dam Safety*
- FEMA P-148 – *Glossary of Terms*

8. Conferences and Webinars

8.1. Conferences

In FY22, the FEMA National Dam Safety Program was in attendance the International Association of Emergency Managers, United States Society on Dams, Association of State Floodplain Managers and Association of State Dam Safety Officials (ASDSO) annual conferences. While in attendance at the conferences, members of the National Dam Safety Program gave several presentations on the following:

- *Assessing dam risk consequences for incidents and failures: Integrating Decision Support System for Water Infrastructure Security Lite and the Resilience Analysis and Planning Tool*
- *CTA – Collaborative Approach to Understanding and Planning for Dam Risk on a Watershed Level*
- *Leveraging Federal Funding and Partnerships to Support Community Resilience*
- *Shifting the Focus to Proactive Community Investments through Collaborative Technical Assistance: A Western Maryland Case Study*

Kayed Lakhia also participated in a plenary session with ASDSO State Representatives where he offered questions and provided answers related to FEMA Infrastructure Investment and Jobs Act funding.

At each of the conferences the National Dam Safety Program had a booth where they engaged with stakeholders and provided updates on continued guidance, new funding, and upcoming training.

8.2. Webinars

The FEMA National Dam Safety Program participated in the “Keeping Water Where it Belongs – Can Our Dams, Levees, and Storm Water Ponds Handle Change?” webinar on Dec. 9, 2021. In 2020, the United States experienced the most active Atlantic hurricane season on record and destructive flooding due to heavy rainfall. This webinar focused on how disasters can damage community dams, ponds, and everything downstream and detailed how communities can prepare for natural hazards and mitigate their impacts.