MONITORING AND DETECTION OF DAM SAFETY INCIDENTS

Bureau of Indian Affairs
1. BIA Overview
2. Dam Safety
3. Learning from the Past
4. EWS Program
Welcome to the EWS Newsletter

Fiscal Year 2017 was a busy and productive year for the EWS Program with new project installs, system retrofits, a training workshop, system-wide website enhancements, moving to a new EWS facility, and of course, maintaining the extensive network of over 350 sites at 120 program dams across the U.S. The EWS Program was even featured this year in the National Hydrologic Warning Council Newsletter (www.hydrologicwarning.org).

With everything that’s happening, it is hard to keep up with all of the program news. So, welcome to the all new EWS newsletter. Each quarter we will feature new projects, success stories, updates, and announcements from across the national EWS Program.

Photo of the Day

Every quarter the newsletter will feature a ‘Photo of the Day’ submitted from the readers. This quarter’s photo is a before and after comparison of the EWS at Happy Valley Dam at Warm Springs, Oregon. In August, the Nena Springs Wildfire burnt the downstream EWS to a crisp. Amazingly, the site is still transmitting despite all of the sensors being destroyed. The EWS Program is in the process of repairing the site.

Please send interesting EWS photos with a short description to lee.mauney@bia.gov.
America's Infrastructure Scores a D+
“By 2020, 70 percent of the dams in the US will be more than 50 years old” [NYT, FEB 2017]
Dams are a significant part of the water resources infrastructure and trust assets of many Reservations and Tribes.
03. LEARNING FROM THE PAST

Damfailures.org

"Without changing our patterns of thought, we will not be able to solve the problems we created with our current pattern of thought." - Albert Einstein
<table>
<thead>
<tr>
<th>Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of day</td>
<td>Dam failure occurred just after midnight</td>
</tr>
<tr>
<td>Failure scenario</td>
<td>Sudden failure</td>
</tr>
<tr>
<td>PAR</td>
<td>3,000</td>
</tr>
<tr>
<td>Fatalities</td>
<td>420 – 600+</td>
</tr>
<tr>
<td>Warning Time</td>
<td>No warning at Powerhouse No. 2 and the Edison Construction Camp</td>
</tr>
<tr>
<td>Fatality Rate</td>
<td>&gt; 90% at Powerhouse No.2, 56% at Edison Camp</td>
</tr>
<tr>
<td>Dam Height</td>
<td>188 feet</td>
</tr>
<tr>
<td>Reservoir Storage</td>
<td>38,000 acre-feet</td>
</tr>
</tbody>
</table>
### Baldwin Hills Dam Incident

<table>
<thead>
<tr>
<th>Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of day</td>
<td>Daytime</td>
</tr>
<tr>
<td>Failure scenario</td>
<td>Subsidence leading to internal erosion</td>
</tr>
<tr>
<td>PAR</td>
<td>16,500</td>
</tr>
<tr>
<td>Fatalities</td>
<td>5</td>
</tr>
<tr>
<td>Warning Time</td>
<td>Almost 2 hours</td>
</tr>
<tr>
<td>Fatality Rate</td>
<td>0.0003</td>
</tr>
<tr>
<td>Dam Height</td>
<td>65.5 feet</td>
</tr>
<tr>
<td>Reservoir Storage</td>
<td>738 acre-feet</td>
</tr>
</tbody>
</table>

**Location:** Baldwin Hills Dam, Los Angeles, California
03. LEARNING FROM THE PAST

Oroville Crisis Drives Harder Look at Aging US Dams

One year after the worst structural failure at a major U.S. dam in a generation, federal regulators who oversee California’s tallest went back to reviewing Oroville Dam. They’re looking hard at how they overlooked its built-in vulnerabilities for decades.

Thu. 11, 2019, at 11:19 am.
03. LEARNING FROM THE PAST

Oroville Dam service spillway
Ultimate damage at the service spillway (from DWR)
- The dam safety culture and program within DWR, although maturing rapidly and on the right path, was still relatively immature at the time of the incident and has been too reliant on regulators and the regulatory process.

- Like many other large dam owners, DWR has been somewhat overconfident and complacent regarding the integrity of its civil infrastructure and has tended to emphasize shorter-term operational considerations. Combined with cost pressures, this resulted in strained internal relationships and inadequate priority for dam safety.

- DWR has been a somewhat insular organization, which inhibited accessing industry knowledge and developing needed technical expertise.

- DWR’s ability to build the appropriate size, composition, and expertise of its technical staff involved in dam engineering and safety has been limited by bureaucratic constraints.

03. LEARNING FROM THE PAST

Warning Time
- Fatalities very low \( \geq 90 \text{ Min} \)

Warning Message
- Detailed Information
- Precise Details
- Good Understanding of the Flood Severity
379 Sites (EWS, HADS, USGS, and Snotel)

3512 Sensors (PTs, Rain Gauges, Floats)

3670 Rules (Res. level, 100-year rainfall, etc.)

The image on the left shows the national map from the website with all 350+ EWS sites shown. Here, Hurricane Irma is visible as it approaches Pushmataha Dam, Choctaw, Mississippi in September of this year.

Link to website: https://nmc.onerain.com
Pushmataha, MS
Pushmataha, MS
Pushmataha, MS
Pushmataha, MS

Downstream EWS Site

Black Jack Road Bridge

Pressure Transducer

Float Switch

Tipping Bucket

Jones Creek
NATIONAL MONITORING CENTER

The NMC is located on the Flathead Indian Reservation in Ronan, Montana.

The NMC is staffed 24 hours per day, seven days a week, by personnel from the Confederated Salish and Kootenai Tribes of the Flathead Nation.
A Recent Success Story

Over time, the outlet works at Bottle Hollow downstream Dam (Uintah and Ouray, Utah) became plugged, which caused the reservoir to fill. The EWS alarmed when the low float switch was triggered and notified personal to inspect the drop inlet. Ken Asay, Uintah Irrigation Project Manager, was able to get a crew out to the dam to clear debris before the facility was in danger of overtopping.
Oglala Dam Spillway
QUIZ: What happened here?
A) Flood event overtopped spillway
B) Evaporation
C) Sinkhole in embankment
D) Vandalism
CONCLUSION

THANK YOU FOR YOUR TIME

Hope you enjoyed the presentation.