Dams:
(You can’t be asleep at the switch.)

Threats found in major dams in Tennessee
By Tom Charlier, USA TODAY NETWORK – Tennessee, Feb. 15, 2017 | commercialappeal.com

Seven years after an historic flood underscored threats to dams across Tennessee, three of the state's largest water-control structures face millions of dollars in needed repairs and improvements to deal with hazards ranging from earthquakes to sinkholes. Although none is in as dire shape as the flood-damaged Oroville Dam in California, the federally operated Boone, Center Hill and Pickwick dams are being significantly reinforced through long-term projects, with water levels lowered in two of them. The Tennessee Valley Authority, which runs the Boone and Pickwick dams, and the Corps of Engineers, which operates Center Hill, say they have adopted aggressive safety measures to protect downstream residents. The three dams are among the largest — and potentially most

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dangerous — in Tennessee. But they’re not the only ones that have raised concerns among dam-safety officials. Flash floods that swept across 49 counties in May 2010 led to the failure of seven dams statewide and caused damage at several others. More than a dozen dams in West Tennessee alone required significant repairs.

All told, there are more than 1,200 dams in Tennessee, including 273 rated as "high hazard" because their failure likely would lead to the loss of life. But nearly half of the state’s dams, including 69 rated as high hazard, are exempt from regulation and government inspections because they’re classified as farm ponds. In general terms, "we’re in pretty good shape," with about 98 percent of the state’s dams in compliance with regulations, said Lyle Bentley, lead engineer with the Tennessee Department of Environment and Conservation’s dam-safety program. When a structure is found out of compliance, as the Garner Lake dam in Lakeland was in 2011, TDEC often issues enforcement orders requiring repairs. The 71-foot-tall structure, which impounds the signature lake in the northeast Shelby County suburb, had erosion problems that eventually were repaired.

Federal operators say their dams pose no imminent threats because they are subject to around-the-clock visual and instrument monitoring for vibrations and other problems, as well as rigorous inspections. The corps and TVA work with local emergency management officials in maintaining and updating emergency action plans in the event public alerts or evacuations are needed. “We are constantly looking for ways to do our job better, and we go out annually — no matter if it is high or low risk — on inspections," said Vanessa Bateman, chief of the civil design branch for the corps’ Nashville District. In addition to regular inspections, TVA, which oversees 49 dams and about 100 earthen embankments across its seven-state region, conducts geophysical testing in which technicians drill into the rock and soil of structures to check for problems. "It’s not just the surface of the dams that we’re interested in. We want to know about the underlying geology," TVA spokesman Jim Hopson said.

That's how the problems were found at Boone Dam, located near Johnson City in the northeastern corner of the state. In October 2014, TVA discovered a sinkhole in the base of the dam embankment, with sediment oozing out of the river bank below. Officials later determined that during heavy rains, runoff was seeping underneath the 160-foot-tall dam, a process that eventually could lead to extensive erosion and the breaching of the structure. As part of a project that’s expected to cost $200 million to $300 million and take five to seven years to finish, TVA plans to install a composite seepage barrier made of non-erodible material. In the meantime, the agency adopted safety measures that include lowering the lake to 10 feet below winter pool stage and assigning on-site inspectors. At Center Hill, located between Smithville and Cookeville about 60 miles east of Nashville, the corps discovered what it called "serious foundation seepage" at the dam. The rehabilitation of the structure began in 2008, with completion set for 2019. Lake levels have been drawn down 15-20 feet as an interim safety measure. Center Hill Dam’s work is costing $350 million and includes an already-finished barrier wall extending 330 feet from the top of the structure into the rock formation, construction of a compacted concrete stability berm and safety upgrades near a low topography embankment that wasn’t built to modern standards, Bateman said. At Pickwick, located near Counce, about 100 miles east of Memphis, TVA conducted studies concluding that an earthen embankment next to the concrete portion of the dam could be vulnerable to a major earthquake. The dam lies east of the New Madrid Seismic Zone, a network of faults generally following the Mississippi River from Cairo, Illinois, to eastern Arkansas.

"There’s no problem with the embankment, even during moderate earthquake conditions," Hopson said, adding that only "extreme" events would present a danger. To fix the problem, TVA will build berms upstream and downstream from the toe of the dam, officials said. It also will put stronger material, including rock, on top of the embankment to weigh it down. In addition to the around-the-clock monitoring of all of its dams, the agency has taken additional steps to protect residents living near Pickwick, spokesman Chris Stanley said. As part of an early-warning system developed by TVA and the National Weather Service, weather radios have been distributed to
residents to provide notice of any emergency, he said. The three reinforcement projects in Tennessee follow an ambitious, nearly $600 million rehabilitation effort at Kentucky’s Wolf Creek Dam, a nearly mile-long structure located on the Cumberland River upstream from Nashville. At one time, it was named among the nation’s six most at-risk dams for failure. Construction crews built a barrier wall to keep water from Lake Cumberland from seeping through the earthen dam and weakening its integrity. Nearly 1,200 round concrete piles interlock and extend 275 feet in height to form a nearly 4,000-foot-long wall. The projects underscore the potential danger posed by the nation’s aging inventory of dams, said U.S. Rep. Jim Cooper, D-Nashville. “The Oroville Dam in California is reminding us that tall dams especially can be dangerous, but dams of any size are risky,” he said. The corps has a rating system for all dams in the country. “For many years, two of the most dangerous dams in America have been above Nashville,” Cooper said. “One was reduced in danger recently — the Wolf Creek Dam. The other, the Center Hill Dam, is still in the most dangerous category in America.”

(Where have you been?)

CRACKS IN THE SYSTEM: Oroville crisis highlights risky dams, spotty inspections around U.S.
By Jill Castellano, Tracy Loew and Rosalie Murphy, USA TODAY NETWORK – California, Feb. 15, 2017 | 2/16.17, desertsun.com

For five years, the 10,000 residents of Newport, Oregon, have known the reservoir that stores their drinking water is unsafe. The city built two dams on the Big Creek River in 1951 and 1969, long before Oregonians knew about the high risk of a Cascadia Subduction Zone earthquake. Now the city is racing to perform expensive repairs on the dams. If they fail, flooding could wipe out much of the town and leave residents without a drinking water source. “We’re a little worried,” said Robert Etherington, 70, who lives about 100 feet from the dam. “I go along with the fact that they’re sub-standard (dams). At the time they were built, they were.”

Oregon has one of the nation’s strongest dam oversight programs, and has rated Newport’s two dams “unsatisfactory.”

At the Oroville Dam in California on Feb. 7, officials noticed that part of the dam’s concrete spillway, which carries water from the reservoir to the nearby Feather River to control the lake’s level, had eroded. The lake level continued to rise and overflowed on Feb. 11, sending water cascading down a hillside that served as the lake’s emergency spillway. Then that too began to erode. Officials evacuated about 180,000 people, fearing continued erosion could cause the concrete weir holding the reservoir at bay to give out. Residents were allowed to return Tuesday but warned to stay alert in case of another evacuation, knowing more rain is on the way. Officials said the dam itself remained intact. However, the threat of “catastrophic failure” of the spillways shines a light on the U.S.’s inefficient and incomplete system to keep dams secure and people safe. Dam regulation is spotty at best, experts said, varying widely from state to state and leaving many dams — including those where failure could cost lives — without funding for repairs, up-to-date inspections or plans for emergencies. Information on the safety of particular dams is no longer easily accessible to the public, because of terrorism concerns following 9/11.

Faced with little information to fall back on, some neighbors of dams across the country choose to believe their communities are safe, while others have enough doubt to advocate for a better regulation system. “The problem is each state and every state legislative governing body looks at it differently,” said Lori Spragens, executive director of the Association of State Dam Safety.

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Officials. “Some of these states are underfunded, so many dam safety programs in states are underfunded, possibly because government doesn’t care about the issue.” While there are efforts in many states to promote dam safety and inspections, Spragens said, bureaucracy and state politics have left thousands of dams around the U.S. in dire conditions. At least 1,780 “high hazard potential” dams, at which a failure could cause deaths, are at risk of failing and in dire need of repair, according to ASDSO. “I think of it as three steps forward, two steps back,” she said.

Alabama
Twenty-one miles south of Birmingham, AL, Oak Mountain Middle and Elementary schools sit at the bottom of a hill where two dams hold back billions of gallons of water. “I have four grandchildren in those schools, and every time I heard about severe weather, heavy rains or a tornado warning, it took all I could to not go take them out of school," said Indian Springs Mayor Brenda Bell-Guercio, who doesn't know how secure the dams are in her own community. “The state's dam safety is worse than an embarrassment.” Alabama is the last state in the U.S. without a dam safety program. The state does not perform any dam inspections and has no funding program to assist dam owners with repairs or removals. Alabama officials don’t know for sure where all the state’s dams are located – it’s been more than 30 years since they performed a dam inventory, but one is underway now. Bell-Guercio caught the attention of Alabama State Representative Mary Sue McClurkin, prompting House Bill 610 in March 2014, which would have established a state program to regulate and inspect Alabama’s dams. It never left committee.

“I think there are real concerns about private property rights and a lot of that has led to resistance against this type of legislation,” said Mark Ogden, project manager at ASDSO. “I personally feel and our association feels that people who live downstream from these dams have rights as well, and they need to be protected and their interests need to be represented in making sure these dams are safe.” Even with no state regulation, Alabama officials point out that some of their dams do have oversight from federal agencies. The Federal Energy Regulatory Commission performs safety checks on dams in the U.S. that produce hydropower. Other federal agencies, like the U.S. Army Corps of Engineers or the Bureau of Reclamation, own dams and perform their own safety checks.

Status of dams raises concerns nationwide
“Just because the state does not necessarily regulate it, that does not mean there are not safety checks done on our dams,” said Jennifer Ardis-Elmore, spokesperson for the state department operating the Office of Water Resources. Still, without state regulation and with 91 percent of the state’s dams privately owned, many dams receive no inspections at all. And without inspections, residents living near dams can’t be sure their communities are safe. Alabama’s dams are not required to have Emergency Action Plans either, which outline steps to take in the case of an impending dam failure, like evacuation plans. Alabama has 2,241 dams in the national dam inventory from 2013, and 1,762 of them have no recorded inspections. Among their 226 dams with a high hazard potential, only 35 have an Emergency Action Plan. Ogden said that much of Alabama’s dam infrastructure was built using corrugated metal pipes, which are less sturdy than other metal pipes or concrete pipes and can erode and even break within 50 years. He’s working with other groups to reintroduce state legislation for a dam safety program to address problems like these, but until a program is in place, he feels disaster is imminent. “They’re going to fail,” he said. “I really think it’s just a matter of time.”

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Ohio
Over the last century, 370 houses have been built on Buckeye Lake’s dam outside Columbus, OH, some with basements dug into the embankment and docks anchored to its top. The development has weakened the dam structurally, according to the Army Corps of Engineers, which released the findings of a state-requested investigation in 2015. The 180-year-old dam has nearly failed four times in the last 50 years, state officials told the USA TODAY Network's Newark Advocate in 2015. If the dam were to fail now, 3,000 people would be affected by flooding. “Flooding would most probably occur without sufficient warning or evacuation,” triggering “unacceptable life loss and economic consequences,” the report read. “The likelihood of dam failure is high.” A $150 million restoration for the dam is currently underway. Ohio has committed more than $261 million to rehabilitating its 1,500 dams since 2012, according to the state’s Department of Natural Resources. The American Society of Civil Engineers commended Ohio in its 2013 Infrastructure Report Card for a rare investment in dam repairs. “There were no dam safety standards when this was built,” said Matt Eiselstein, a spokesperson for the Ohio Department of Natural Resources. “As we learn more, we need to work to make ourselves more safe. That was something (at Buckeye Lake) that was obviously necessary.” But some homeowners are skeptical of the project. Tim Ryan, president of the Buckeye Lake Chamber of Commerce, said he doesn’t believe that the dam is in dire condition — at least not dangerous enough that the state needs to reduce the water level and remove docks for the five-year restoration. Ryan said the Chamber estimates lakeside towns will lose $784 million in economic activity during restoration. “We’ve never seen any evidence that the dam was going to collapse in any particular place,” said Ryan, who has owned property on the lake for 43 years.

Eiselstein said homeowners will not be allowed to attach docks to the restored dam, and engineers are still determining what types of materials can be attached without affecting dam safety. The restoration is scheduled for completion in 2020, and Eiselstein said the state hopes to finish a year ahead of schedule and with a price tag closer to $120 million. All that funding comes from Ohio taxpayers. Congress created the FEMA-administered National Dam Safety Program in 1996 to help states with training, research and public awareness. None of its $13.4 million budget funds repairs. In Oregon, the city of Newport received $250,000 in state funds in the 2013-15 funding cycle for a dam stability assessment. In the current budget cycle, Oregon gave the city an additional $250,000 to study the feasibility of constructing a new dam to replace the two existing dams. That project would cost an estimated $50 million, more than Newport could afford.

South Carolina
According to the National Inventory of Dams, 64 percent of U.S. dams are privately owned. Those owners are responsible for dams’ upkeep, repairs and upgrades, including complying with the requests of inspectors. In 2015, South Carolina had an average of 6.15 positions to inspect more than 875 dams — though that was an increase from 1.58 positions in 2011. But when South Carolina was hit with a thousand-year flood in October 2015 — as much as 25 inches of rain fell on parts of the state in five days, according to the National Weather Service — 51 dams breached or failed.

“Most of the time maintenance has been a major, major problem,” said Hanif Chaudhry, a professor of civil and environmental engineering at the University of South Carolina who collected data on dam failures after the floods. “The spillway, which has major damage at Oroville — of those structures here, some were totally clogged, others were filled with debris, so when that much flow came in, it just did not handle it the way it should have been handled.” ANALYSIS: U.S. dams are aging, and many don’t have emergency plans. Chaudhry said many dams in South Carolina are owned by homeowners associations who may not know or fully understand the risks dams pose.

And if one dam is not properly operated or maintained, it puts the next dam downstream at risk. Lexington Mill Pond was the third in a series of three dams on Twelvemile Creek in Lexington. When two dams upstream failed, it too gave out, Chaudhry said. State inspection records show

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that in 2015, Lexington Mill Pond Dam did not have an emergency action plan in place. Inspectors had twice asked its owners, a real estate development company, to consider removing trees and hiring engineers, at their own expense, to investigate abnormalities. But in 2015, inspectors found a fast-growing sinkhole near a building on the side of the dam and ordered owners to make repairs. On Sept. 2, the owners received a permit to repair the dam. A month later, it washed away. Chaudhry said he hoped to see more funding for dam safety after the failures — after all, it was a deadly dam failure that moved President Jimmy Carter to create FEMA in 1979 — but he was disappointed. "After these failures, there was a fair amount of work done (by the legislature) to tighten things," Chaudhry said. "But as time went by ... bills were introduced, none of them were passed, and we are back to exactly what it was before 2015." Jill Castellano and Rosalie Murphy reported from The Desert Sun in Palm Springs, California, and Tracy Loew reported from The Statesman-Journal in Salem, Oregon. Reach them at jill.castellano@desertsun.com, rosalie.murphy@desertsun.com and tloew@Salem.gannett.com, respectively.

(All of a sudden, you noticed.)

**Michigan has thousands of crumbling dams, pose dangers**

DETROIT (AP) - Michigan has thousands of aging and under-maintained dams that could pose localized risks. The Michigan Department of Environmental Quality tells the Detroit Free Press that all but six of the state's 88 potential high-hazard dams are approaching 50 years old, the average engineered life span for a dam.

The American Society of Civil Engineers gave Michigan a D grade on the condition of its dams in 2009, saying more than 90 percent of the state's nearly 2,600 dams would reach or exceed their design life by 2020. A new report card is in the works for this spring, but report card co-author Jeff Krusinga says the grade "won't be getting any better." Krusinga says any dam collapses in Michigan wouldn't be as bad as the possible Oroville Dam collapse.

(This is no surprise.)

**Dozens of risky Kentucky dams in poor condition**
By James Bruggers, Feb. 15, 2017, courier-journal.com

Kentucky since 2010 has more than tripled the number of emergency action plans for high-hazard dams in the state to help in a crisis like the one playing out in California, but state regulators still have 45 more to go. And a report submitted last year to a national dam inventory counted as many as 79 high-hazard Kentucky dams in poor condition, and another 65 in fair condition, according to information obtained by the Courier-Journal. The report doesn't single out or name those dams. Despite the assuring and scary numbers, Kentucky regulators said there's no need for alarm - they've been moving quickly to use new technology to help dam owners fully understand the risks and to take steps to manage them. Their comments came after nearly 200,000 people were evacuated from below a Northern California dam that has been at risk of failing because of too much water and spillway damage, raising questions about dam safety nationwide. The state's Energy and Environment Cabinet runs Kentucky's dam safety program out of its Division of Water. "The division ... has had a consistent commitment to the dam safety program to ensure Kentucky's dams are properly maintained, regularly inspected, and meet risk-based design specifications," agency spokesman John Mura said in a written statement. "The division regularly inspects dams, assesses their condition and risk classification and identifies needs and deficiencies to dam owners for remediation." Dams are categorized by their potential to cause death or destruction in the event of a failure, not their physical condition. A high hazard

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dam, for example, gets that label because its failure could cause a loss of life. The physical condition rankings are separate and are part of the federal government's national dam inventory program.

New technology
Kentucky's dam safety program "is up and down, like a lot of states," said Lori Spragens, executive director of the Lexington-based Association of State Dam Officials. A decade ago, her group counted as many as 14 employees in Kentucky's dam safety office; her group identified only four in 2015. State officials said that stands at five now, but doesn't include others within the agency who also assist the program.

"Kentucky is in the middle" but has a lot of dams in poor condition, she said. Kentucky has also been working hard, she said, to get as many as 75 percent of the 180 high-hazard dams it regulates to have emergency action plans, even though there's no state law mandating them. Kentucky is one of only eight states that do not require the emergency plans for that category, according to the Association of State Dam Officials. Those plans "are there to help people get out of the way" in advance of a catastrophe, and include flood inundation maps so officials know who needs to evacuate, and standard procedures such as a list of which agencies to alert, she said. There are 275 high-hazard dams in Kentucky. Besides those regulated by the state, the others include federal dams run by Tennessee Valley Authority, the U.S. Army Corps of Engineers, according to division of water. Kentucky is also exceeding its inspection goal of checking on all high- or significant-hazard dams every two years, Spragens said. Even though the state doesn't have a law specifically requiring certain dams have emergency plans, the Division of Water's Peter Goodmann said Kentucky can require a dam owner draw up an emergency plan if needed. Typically, however, he said dam owners that are asked comply on their own. Goodmann, the division's director, said a $2.1 million federal grant obtained in 2011 gave the state's dam safety program a big boost.

It allowed consultants to check on nearly 200 of 240 state-owned or local government-owned dams and to develop a template for new emergency action plans. Kentucky has also begun using new radar and imaging tools to help dam owners more easily and accurately determine the flood zones needed to form evacuation plans, he said. "The nation's dams are aging, and the number of high-hazard dams is on the rise," according to a 2013 report from the American Society of Civil Engineers. "Many of these dams were built as low-hazard dams protecting undeveloped agricultural land. However, with an increasing population and greater development below dams, the overall number of high-hazard dams continues to increase."

Hazard creep
That kind of "hazard creep" is what Goodmann said also has been happening in Kentucky. A dam constructed decades ago in a rural area for a fishing lake later gets homes built in its inundation zone, so its classification changes from low hazard to high hazard, he said. As an example, he cited the Bullock Pen Lake in northern Kentucky - a lake originally intended just for recreation that's also now a water supply and has become the highest-risk dam in Kentucky. He said state officials have begun a $12 million upgrade and are taking steps including buying out homes in risky areas at other state dams. The condition ratings, Goodman said, are "conservatively" defined and range from satisfactory to unsatisfactory, with an additional "not rating" classification. The state has none in the unsatisfactory category, which would include any deemed unsafe. A dam in poor condition may have multiple maintenance deficiencies, structural issues, or seepage, but conditions do not warrant lowering water levels, according to guidelines used by the state. A dam in fair condition has no known structural issues but may have seepage or leakage not deemed to be an immediate threat, for example. Goodmann said a dam's ability to handle a worst-case storm also factors into the mix.

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"We have a lot of dams in this state that predate standards for construction and they have since had significant hazard creep from low- to moderate-, or moderate- to high-hazard dam" classification, he said. "That's a big challenge." But he said that "when you say fair or poor, those dams don’t necessarily have structural problems," he added. It's hard for people to learn about the status of dams in their areas. Security concerns following the Sept. 11, 2001, terrorist attacks prompted restrictions on the availability of hazard ratings and conditions for specific dams. The average age of the 84,000 dams in the country is 52 years old, the American Society of Civil Engineers concluded in 2013, giving the nation an overall grade of D for maintaining them. As much as $21 billion was said to be needed to repair them.

Aging infrastructure
In Kentucky, its more than 1,000 dams range in use from major flood control, water supply or recreational dams to coal waste impoundments. The state regulates 963 of them. Kentucky’s most recent major dam emergency occurred in 2007, when Army Corps of Engineers began lowering the water level in Lake Cumberland, citing fears that a weakened Wolf Creek Dam could break, raising fears of flooding and possibly deaths as far away as Nashville. The nearly mile-long, earthen dam, built atop cavern- and fissure-riddled limestone, was shored up without incident during seven years of construction. Before that, there was the Martin County coal disaster. On Oct. 11, 2000, the 72-acre Big Branch Impoundment failed, sending a black mass of coal slurry pouring out of underground mine works, fouling streams, polluting water supplies, killing fish and wildlife and damaging property in Eastern Kentucky and West Virginia for 75 miles of the Big Sandy River. The U.S. Environmental Protection Agency called the 300-million gallon spill near Inez one of the South’s worst environmental disasters. Most of the state’s dams were built between 1950 and 1980, with some much older. That aging infrastructure needs attention, but all-too-often, slips under the public radar, Spragens said. Until there’s an emergency, like the one in California at the Oroville Dam. Now is a good time, she said, for all states to “take a good hard look at their programs.”

(Mossyrock Dam Precautions
16th February 2017, klog.com

Tacoma Power is announcing that Riffe Lake behind Mossyrock Dam will be drawn down, as the utility announces precautions in the event of seismic damage to the dam. Tacoma Power announced the drawdown on Tuesday, saying that they have received new information from the U. S. Geological Survey. They say that the probability of an earthquake that could damage the 606-foot dam is “very low,” but these revised predictions show that an earthquake could damage the spillways on Mossyrock Dam. As a precaution, Tacoma Power plans to keep the level of Riffe Lake at 30 feet lower than full, a level they plan to maintain at least into the next decade. Utility officials say that it’s the shape of the dam that is the biggest issue; because of the dam design, specific seismic events could render the spillways useless, which could lead to major flooding downstream. They are exploring some seismic retrofits, but that’s a long and arduous process, which would also involve several federal agencies. Boating, swimming and fishing will still be available on Riffe Lake, but boat launches and swimming areas at parks along the lake will be affected. Additional information is available on the Tacoma Public Utilities web page.

(There’s always a risk, especially if they’re not maintained.)

Expert: "significant risk" of dam issues in east Idaho
IDAHO FALLS, Idaho (KIFI/KIDK) - The state of Idaho's Dam Safety Program, run by the Idaho Department of Water Resources, is responsible for the inspection of nearly 450 dams across the state. Many of the dams across the Gem State are extremely old, which plays a factor into its stability. "The older the dam, the more problems it experiences based on age," Dam Safety Program Manager John Falk said. The age of the dams holding back thousands of gallons of water in east Idaho is a concern for those responsible for making sure they are up to code. Falk says that a number of the dams in east Idaho are seeing problems and are at risk of failure. "Earthen dams require a lot closer scrutiny," Falk said. "They are less resistant to over-topping. Once they start to erode, and water starts to pass through them or over them, they can disappear pretty quickly."

The dam of biggest concern for Falk and his team is upstream from the town of Mackay. Falk says the dam, last inspected in 2014, is leaking near the toe. "It leaks more than you might expect from an earthen dam," said Falk. While there is no deterioration at the Mackay dam, Falk worries that a quick snow melt could cause the water to rise face, causing the dam to give way, recreating a scene like we saw 41 years ago when the Teton Dam broke. "If it were to fail quickly, similar to what Teton Dam experienced, there would be loss of life," said Falk. The Teton Dam failed on June 5, 1976. It sent a wall of water into the Teton River Canyon. It flooded Rexburg, Sugar City and many of the smaller towns throughout the area. In the end, 11 people died and it cost millions of dollars in property damage. Another dam of concern is the Oakley dam in Cassia County, which was inspected in 2013. Falk says there is a significant risk of flooding from the dam. Falk says the channel that takes water out of the Oakley dam has been farmed over. "If the dam had to release a lot of water in a hurry, there is no place for the water to go except through people's farms, homes and well, wherever it may end up," said Falk. The Mackay and Oakley dams are both consider "high hazard" dams. A high hazard dam gives the dam the most attention. If a failure of the dam were to occur, the consequences likely would mean a direct loss of human life.

Dams with significant hazard levels are inspected every four years, while low hazard levels are looked at every five years. Every dam is split into a different classification: low, significant, or high hazard. Each classification has a different timeline on when they must be inspected. Two other major dams across east Idaho protect us from the risk of flooding. All of them are owned by the federal government. The Palisades dam was last inspected in 2013 and is considered to be satisfactory. It will be inspected again this year. Further downstream is the Rire dam. Also classified as satisfactory, it was last inspected in 2013 and will also be inspected again this year.

In the event of a dam failure or emergency situation, the state says there is a response plan in place. Each dam operator in the state is recommended to have an emergency action plan on file. Falk says every operator of dams in east Idaho has a plan on file.

Everybody is thinking about dam safety. Yeah!

Connecticut Dams in Good Condition Amid California Dam Crisis: Officials
By Todd Piro, Feb 15, 2017, nbcconnecticut.com

Frightening images out of California amid the Oroville Dam crisis has Connecticut officials reassuring the public that our dam system is in good condition and that the state is at low-risk for that type of scenario. Nearly 200,000 people were forced to evacuate their homes after the Oroville Dam approached capacity and the spillway designed to deal with that developed a 200-foot sinkhole. Now, to prevent an even bigger catastrophe, officials are releasing water at a rate of nearly 750,000 gallons a second, which is more water than an Olympic size swimming pool.

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Those people have now been allowed back to their homes, but have been warned they could be evacuated again.

According to Jennifer Perry, from Connecticut's Department of Energy and Environmental Protection, "Connecticut has nothing of that scale. We're talking about orders of magnitude smaller than what's out there." We believe our dams are in good condition. We know what the condition of those dams are. We are able to direct where the resources need to go in order to keep those dams in good condition," she added. There are 4,500 dams in Connecticut, all regulated by the state. But following state legislation in 2013, all of those dams are now required to be inspected on a regular schedule and assessed a hazard level. "About 550 of them are considered to be a higher significant hazard, which means if the dam were to fail, then there is a potential for loss of life downstream," Perry said. That's concerning to those who live and work downstream in areas throughout the state, like near the Rainbow Dam in Windsor. "It's concerning because it really can affect us downstream here. It's a lot of water that can be released all at once if there is any kind of catastrophic failure," said Donald Trinks, owner of Bart's Drive In in Windsor. While Perry said the state isn't in danger of an Oroville situation, we could be in jeopardy if Connecticut doesn’t keep up with our dam infrastructure. "Knowing that there is an enormous need for an investment in our own infrastructure to keep people safe, yeah it can make it tough to sleep sometimes," she said.

(Oroville: How California narrowly avoided disaster, and what Virginia can learn from it)

By Lee Carter, February 19, 2017, bluevirginia.us

We all saw the headlines last week, as the tallest dam in the United States threatened to breach catastrophically. Nearly a quarter of a million California residents were forced to evacuate at a moment's notice, to be safe from the possibility of a 30 foot wall of water rushing down the Feather River. How did a failure of this magnitude happen in the wealthiest nation the world has ever seen? To put it simply, it was the product of complacency and neglect. Twelve years ago, a number of groups including the Sierra Club requested that the Federal Government reinforce the dam’s emergency spillway with concrete. This request was rejected, with an internal memo stating “[t]he guidelines specify that during a rare flood event, it is acceptable for the emergency spillway to sustain significant damage.”

(1) Before the emergency spillway became a problem, the main spillway had to fail. Again, there were warnings that this would happen. Six months ago, California authorities noticed cracks in the main spillway, which they patched with concrete. There was no investigation of the underlying cause, and no attempt to make a full repair. One civil engineering expert referred to this repair as "patch and pray."

(2) This should have been even more worrisome considering that this is the third time such repairs have been necessary in just eight years. Before the main spillway became a problem, the river outflow valve had to be compromised. This valve was in limited use.

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following an incident in 2009 in which a test of the valve’s operation destroyed a breakaway wall and nearly killed several dam workers.

(3) All of these failures and weaknesses were known. All of these problems could have been prevented by proper maintenance, but that proper maintenance was not performed because maintaining a dam is expensive. Unfortunately, as we learned last week, failing to maintain a dam is even more expensive than just fixing the problems when they arise. So what can Virginia do to ensure we’re not the next ones to face catastrophe?

**Simply, we must inspect our 2,919 dams more frequently and more thoroughly.** We must make the results of those inspections available to the public. And perhaps most crucially, when the need for repair or modification is discovered, that work must be done with no excuses and no delay. It won’t be cheap. It will require a massive increase to Virginia’s dam safety budget – the agency currently has just ten full time employees who each oversee nearly 200 state-regulated dams. **This lack of funding to our dam safety agencies has led Virginia to get a “C” or “Mediocre” rating from the American Society of Civil Engineers.**

(4) Anyone who follows politics in any capacity knows that politicians hate telling people that costs are going to go up. They hate explaining to people where their tax dollars are going, and why it’s important that those dollars keep going there. But I, for one, would much rather explain to a taxpayer today that their money went to dam safety than explain to everyone tomorrow why a dam failed.

**Because the cost of today’s maintenance prevents the cost of tomorrow’s disaster.** Lee Carter is a Democratic candidate for the Virginia House of Delegates in the 50th district in Manassas and Bristow.

(Nevertheless, dam removal rolls on.)

**Pigg River dam removal project part of national trend**

By Casey Fabris, roanoke.com, February 16, 2017

When crews demolished the power dam on the Pigg River in Rocky Mount during the fall, it became one of 72 outdated dams removed in 21 states in 2016, landing on a list released Thursday by the conservation group American Rivers, which tracks such efforts to restore flow to the nation’s rivers. The dam, which was only partially removed, was more than 100 years old and the last remaining on the Pigg River, said Bill Tanger, chairman of Friends of the Rivers of Virginia. It now flows freely. **It opens up over 70 miles of the Pigg River to its natural flows and natural habitat,” Tanger said.** The project has numerous positive environmental impacts, the most significant being the restoration of 2.2 miles of aquatic instream habitat for the endangered Roanoke logperch, a fish native to the Roanoke River watershed. David Byrd, with the U.S. Fish and Wildlife Service, said the fish landed on the federal endangered species list in the 1990s. The warm water fish is small, 6 inches in length at maximum, he said. The Roanoke logperch has unusual feeding habits, Byrd explained: The fish uses its snout to flip pebbles over and scours for its food — small invertebrates — underneath. “It’s a pretty interesting and unique fish species that we’re lucky to have primarily in the state of Virginia,” he said.

In addition to the environmental benefits, Tanger said, the breach of the dam provides additional recreational opportunities and protection of nearby infrastructure, such as the main sewer line for the town of Rocky Mount. It will also eliminate the safety issue posed by individuals going over the
dam during a high water event, he said. Though the demolition of the dam was completed by the end of 2016, the project isn’t finished. For five years, the river’s response to the demolition will be monitored. Crews have had to go in to remove trees that have fallen into the river as a result of the release of sediment, Tanger said. There are plans to restore an old powerhouse at the site for historic preservation. Tanger said there’s a possibility for FORVA to build a greenway along the edge of the river, and for Franklin County to extend its existing blueway on the Pigg River. Duke Energy provided $1 million for the project. Tanger said the company got involved in the removal project as a result of the 2014 coal ash spill in the Dan River, which is in the same watershed as the Pigg River. The Roanoke logperch was one of two endangered species living in the watershed affected by the spill, according to the U.S. Fish and Wildlife Service. Tanger said the demolition itself cost around $500,000, but there are many other costs associated with the project, like the numerous studies done in advance of the removal and the five years of monitoring to come after. Others, such as the U.S. Fish and Wildlife Service, AEP, the National Fish and Wildlife Foundation and the Friends group have contributed to the project as well. The 2016 project is the latest dam removal in the Roanoke Valley, but not the first. In 2013, another dam on the Pigg River located next to Rocky Mount’s Veterans’ Memorial Park was removed, as was the Wasena dam in 2009.

Kinnickinnic River Dams: Should they stay or should they go?
February 17, 2017 02:49 PM
The city of River Falls launched its Kinni Corridor Project to improve the prized Kinnickinnic River and its surroundings, but it’s also sparked a debate about the future of two dams. The dams produce just a fraction of the city’s electricity, but the license expires in 2023. Some say that’s reason enough to keep the dams in place, but others say now is the time to return the river to its free-flowing state by removing them. "This is an investment in the Kinnickinnic River and in the city of River Falls," Page said. "Not just for us, but for our children and our children's children."

The Kinni Corridor Project is only in its public engagement phase; but in two years, the committee will be putting together a plan that will include either keeping or getting rid of the dams. Project manager Buddy Lucero said the impact of that decision could be far-reaching. "You're talking Lake George, Lake Louise - Do we lose those lakes?" Lucero asked. "How do we impact the silt that comes out of these dams? What's the cost of doing that? Do we just need to turn off the hydros and keep the dams?" The hydropowered dams now produce less than 2 percent of River Falls' electricity. Supporters of the dams argue renewable energy and costs are fiscally and environmentally beneficial. "Why change it?" Carsen Halverson said. "It's been that way how many years. Why change it now?" That answer is simple to the folks hoping to "Free the Kinni" of its dams. "We should have removed these dams and restored this river long ago," Page said. "There hasn't been a large return on the investment." The American Society of Civil Engineers estimates the country's aging dams need $21 billion worth of repairs. Lucero said that's why so many cities around the country are closely watching what River Falls does with its pair of dams.

Newport Residents Worry About Local Dam Failure
By Tracy Loew, Jill Castellano and Rosalie Murphy, Statesman Journal | Feb. 19, 2017, opb.org
For five years, the 10,000 residents of Newport, OR have known the reservoir that stores their drinking water could fail. The city built two dams on the Big Creek River in 1951 and 1969, long
before Oregonians knew about the high risk of a Cascadia Subduction Zone earthquake. Now, city officials are racing to repair or rebuild the dams. If they fail, flooding could wipe out much of the town and leave residents without a drinking-water source.

“We’re a little worried,” said Robert Etherington, 70, who lives about 100 feet from the dam. “I go along with the fact that they’re sub-standard (dams). At the time they were built, they were.”

(Can’t hold all of it.)

Don Pedro Dam gates open for first time since 1997
Flooding possible on Tuolumne River
KCRA Staff, Feb 20, 2017, kcra.com

TUOLUMNE COUNTY, Calif. (KCRA) — For the first time in 20 years, the controlled spillway gates at the Don Pedro Reservoir opened Monday afternoon. The outflows from Don Pedro Reservoir were between 18,000 and 20,000 cubic feet per second (cfs), as of 3 p.m. Monday, according to the Stanislaus Consolidated Fire Protection District. The Turlock Irrigation District said the spillway will be open for at least four days. It takes approximately 23 hours for the releases from Don Pedro to reach the Ninth Street Bridge at Modesto. The Tuolumne River is expected to peak at 62.9 feet late Tuesday.

When the releases began, the reservoir was at 825 feet in elevation, 5 feet below maximum capacity, according to the California Department of Water Resources. After flowing from the reservoir, the water will go down the spillway, take a hard left and follow a channel that was cut out in 1997. It will then rejoin the Tuolumne River about a mile downstream. The controlled spillway hasn’t been used since 1997. The structural integrity of Don Pedro Dam and its controlled spillways aren’t in question and aren’t a factor in the early release, according to TID. Residents living downstream of the Don Pedro Reservoir are preparing for flooding as water levels on the Tuolumne River are expected to rise. Mandatory evacuations haven’t been issued, but authorities are starting to advise some people to seek shelter and move to higher ground.

Stanislaus County Road Closures
• Eastin Road (since January 2017)
• Jorgenson Road (since January 2017)
• Grayson Road from Cox Road to Shiloh Road
• Oak Flat Road between Ward Avenue and Diablo Grande Parkway
• Orestimba Creek at Bell Road (since January 2017)
• Pelican Road between River Road and Center Road
• River Road from Hills Ferry Road to Villa Manucha Road
• Vivian Road between Keyes Road and Monte Vista Avenue

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
Residents in Stanislaus and Merced counties are encouraged to register for emergency notifications from their respective county.

(Some want to blame everything on climate change.)

More Near-Disasters Like Oroville Are Very Likely in the Future, Say Experts

BY MAUREEN NANDINI MITRA – FEBRUARY 21, 2017, earthisland.org

Despite increasing evidence of climate impacts, state isn’t considering climate change for new dams and water storage projects that are in the works. As the skies continued to open up over the past few days and evacuations were being ordered in many parts of Northern California, like many others in this state, I couldn’t but wonder if other dams in California could run into the same kind of problems as Oroville dam in Butte County, where heavy rainfall during what’s turning out to be California’s wettest season on record, surpassed the dam’s capacity.

To recap: The 770-foot-tall dam, the nation’s tallest, ran into problems with both its main and emergency spillways, prompting the evacuation of nearly 200,000 people living in low-lying communities downstream on February 12. The dam’s water level has dropped since then and most people have returned home. But they have been told to remain vigilant given more rains are predicted for California this winter. Meanwhile, as of yesterday, numerous other reservoirs across the state are almost at capacity.

California has always alternated between periods of drought and extreme precipitation that can lead to massive flooding. But the key difference now is that climate change is intensifying the risk of floods and mudslides by inducing even more erratic and intense precipitation events. Can our state’s more than 1,400 dams withstand the pressure of these changing climate patterns? What needs to be done to ensure there aren’t similar problems as Oroville’s with other dams? What about the new dam projects or reservoir expansion projects that are being planned? Are they going to be climate ready? To help shed some light on these questions I recently spoke with water experts Deborah Moore and Eric Wesselman. More was a commissioner with the World Commission on Dams, an international body that investigated the performance of dam projects across the world. She’s also a board member of International Rivers, an organization that works to protect rivers and the rights of communities that depend on them. Wesselman is executive director of Friends of the River, which works to protect and restore California Rivers by influencing public policy and inspiring citizen action. The main takeaway from our multiple conversations — over the phone and during Terra Verde, a radio show I co-host once a month — near-disasters (or worse) like Oroville are very likely in the future because most of our aging dams and reservoirs aren’t ready to handle the kind of deluge that’s going to be the new normal. On the positive side, we have the knowledge and the tools to build more climate resilient water infrastructure. Here’s a brief excerpt from our conversations.

Maureen: Deborah, you mentioned that what happened up at Oroville was a manmade disaster. Could you elaborate on that?

People are referring to this as a natural disaster because of the floods and heavy rainfall that we are having, that’s the nature part, but really the dam and what’s happening with it is human-made. How the dams are interacting with our changing precipitation patterns is really a human caused problem. And on top of that you also figure that the change climate change is causing is also largely due to humans. We have this idea that we can control nature and control rivers, and dams are part of this idea. But as we are seeing with more extreme weather patterns due to climate change, we have to question what our ability to control these are and how we can better collaborate with nature.

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Eric, do you think California’s network of more than 1,400 dams is in good shape? Can they withstand the kind of weather onslaught that put Oroville at risk? I believe some of them are more than 40 to 50 years old?

Clearly we need to be doing an assessment of the current water infrastructure in the state and find those where improvements do need to be made to make them for downstream communities. At the same time we have dams and levees that just aren’t meeting the need any more, that aren’t in the public interest and should be decommissioned. Like the dams on the Klamath and on the Yuba rivers, and the Searsville dam on San Francisquito Creek in Palo Alto. There are a number of dams with similar spillway problems [as Oroville], or where the inflow can exceed what you can release as outflow out of the dam and that puts them in a dangerous situation. There’s some water purveyors that are looking at new water projects that would make it even worse, like the Merced Irrigation District, which wants to raise the emergency spillway at Exchequer Dam on the Merced River so that it could store more water, but that would further reduce their ability to manage the reservoir during a flood event like this. We really need to start taking stock of the situation. Now is the time to be preparing for a future when climate change is taking hold, we need to start addressing it in new and creative 21st century ways and working with nature – looking and flood control and water storage solutions that help us meet our water needs in a sustainable fashion that reduces our risks and makes us more resilient in the face of climate change.

But we are still planning to build more dams or expand existing water storage facilities, right? The $7.5 billion water bond that voters approved in 2014 sets aside $2.7 billion in building or expanding water storage structures. It’s my understanding that the designing and building of these new, public-funded projects don’t require an analysis of more extreme weather events. Is that right, Deborah?

These new water projects are not going to require the proposals include future climate scenarios. The California Water Commission has received numerous technical comments and expert advice that they should do so, but as of December 2016 the Commission decided to not require that. However, I think the water community and people who have been tracking this topic have heard some noises from the department of water resources just in the last couple of weeks since this crisis started, saying, oh, maybe we need to rethink that.

Could you give an example of what they should be looking at in terms of incorporating climate science in engineering design?

Moore: What civil engineers typically do when planning for dams, is they use historic data on river flows and precipitation patterns to try to predict how much water is anticipated in a typical year. In addition they plan for what they consider certain kinds of extreme events, like one in a 100-years-flood or one in 500-years-flood. They design infrastructure using this historic data, and they call this “stationarity.” Now you can Google “stationarity” and there are numerous academic papers saying, “stationarity is dead.” We can no longer use historic data in order to plan these projects because it’s no longer relevant. The state of California has invested quite a lot in developing climate change scenarios all the way out to 2100, so we do have a sense of how precipitation is expected to change. It can be hard for people to get their minds around the idea that we could have more droughts and more floods, but we are going to have more extreme events. As temperatures rise, we are going to have less precipitation as snow and less precipitation as rain. So because California has these good climate projections, the proposal to the California Water Commission is that engineers planning for these dam projects should be using these future climate scenarios in their planning, not only historic data.

Eric, in terms of the new projects that are in the works to increase California’s water storage capacity, I’m wondering, this winter’s heavy rain aside, do we actually produce as much water as these expanded storage facilities plan to hold? Would building more help reduce flood risk?

The issue is the case of diminishing returns. Since we’ve already built this network of more than 1,400 dams and reservoirs in the state, all the economical sites have been taken. So with

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additional surface storage, you don’t get the bang for the buck. There are six big surface projects under serious consideration right now in the state [These include the Sites reservoir to hold water diverted from the Sacramento River, the Temperance Flat Dam on the San Joaquin River, expanding Los Vaqueros Reservoir in Contra Costa to hold water diverted from the San Francisco Bay-Delta, and raising the height of Shasta Dam on the Sacramento River.] But if you look at the yield of even the six big ones, the cost of [building them] would be over $10 billion and the yield is less than 2 percent of our total statewide water use per year. It’s hard to imagine that we can’t come up with more creative and innovative ways to spend that kind of money on smarter water solutions.

**Can you explain how come the storage capacity will increase by only that little bit?**

It’s the yield figure. People ask how much a new reservoir will hold, but the real figure to look at is the yield. As in what’s the [water] yield on an average year? It’s not going to fill every year, and you also have to maintain flood capacity in a reservoir, so you can’t just fill it to the brim and have it sit there, as we have just learned very vividly with the Oroville situation. So what planners look at is the yield. And we just took the numbers from their analyses, from the bureau of reclamation and the department of water resources and whoever it is that’s putting forward the project, and used their numbers and added up the yield numbers for these facilities, and it’s just really pathetic.

**There have been several reports that show cost effective and environmentally sensitive solutions that would yield much more water for California than all of the proposed new and expanded dam projects combined. Deborah, could you elaborate on that?**

Yes. The additional water supply from new projects is quite small and as we have seen in the drought of the last five years, is that the way we are making up for that is using groundwater. Groundwater is a huge resource in California but we are also mining that water. But another way of capturing precipitation is groundwater recharge. So rather than building storage on rivers, we can store it underground, and there are ways we can then manage surface and groundwater together – that’s called “conjunctive use”. We also have tremendous opportunities still for water conservation in the state. During the drought years we really focused a lot on urban water conservation because people could adapt quickly – you know, they can choose to stop watering their lawns, but irrigated agriculture still uses the huge majority of the water in California and there’s tremendous opportunity for water conservation in the agriculture sector. Conservation can yield more than 2 percent of our water supply.

**Could you elaborate a little bit on how we could reduce water use in agriculture?**

Moore: It’s a huge topic but I can give some details. There’s everything from simple measures like leveling the land so that when you flood it – which is a very low tech way of irrigating — the water can easily spread and not pool and puddle; there are areas where we can line canals so that there’s not as much seepage; there’s timing of when you water so that you, just like when you are thinking of watering your lawn, you’re only doing it when the soil needs it; there’s all kinds of new information coming out about how to better use compost and soil amendments to hold more soil moisture, also helps the carbon sink (that’s another whole topic); there’s drip irrigation; there are choices we can make to lower high water using crops – California still grows a lot of alfalfa hay, for example, which is water-intense crop. So there’s a huge array of cost effective measures that agriculture can use to reduce overall water use, and often it’s good for the farmers as well.

**Given climate science, given that it seems to be pretty common knowledge that there are many other low-cost effective ways to save and store water, why is California still focused on building more dams? Eric, could you talk about who is really benefitting from these projects?**
We use a term called “OPM,” it stands for “Other People’s Money.” If a water purveyor or irrigation district can get a new reservoir built with other people’s money or taxpayer’s dollars, why not? Even if the extra water they get is a small amount. Another reason is there’s a lack of imagination and innovative thinking, and sort of going to a just knee-jerk twentieth-century reaction, which is: Oh we are having a drought? We are having severe floods? What do you do, you build something. So we build something without looking under the hood and figuring out what’s really going on here and how to fix it better. And then there’s money in politics. The Ag industry lobby is very powerful in local state and federal levels and so we are dealing with that too. And finally, it’s [lack of] education. A lot of people don’t know where their water comes from. Knowing where your water comes from, knowing how water is used in California, Deborah said, more than 80 percent of our water goes to agriculture. So yes, we need to take personal action in our homes and businesses but we also really need to ensure that we, as a state, are doing all we can to use water more efficiently. I think knowing that and people calling for reform and action is going to be critical. We need the public voice to be in this debate, calling on state and federal regulators to invest in these innovative water solutions. And when they hear from people that’s going to help a lot. I’d love to point out the difference that we are not talking about taking water away from agriculture, what we are really talking about is focusing on efficiency.

Eric, I believe Friends of the River has put out a call for action for our legislators and water management agencies. Do you want to briefly outline these for us?
We have asked them to identify unsafe dams and levees and shore them up or tear them down; Invest in flood-control projects that work with nature to maximize public safety, as the Yolo Bypass does — it is the only reason Sacramento wasn’t evacuated on Sunday night; use sustainable water supply and efficiency solutions that reduce risks associated with over-relying on dams for both flood control and water supply. Research by the Pacific Institute has shown that California could save up to 14 million acre-feet a year of untapped water through water saving practices, recycling and storm water capture. Realizing just 10 percent of this potential would increase our water supply by twice as much as the proposed new dams.

Moore: I would like to add that when we are considering infrastructure investments, we make sure that climate projections and climate science are included in that. Last year, California passed a new law, AB 2800, that established a climate-safe infrastructure working group comprising engineers, architects and climate scientists to develop recommendations for best practices to integrate the effects of climate change into all future state infrastructure design and construction. We hope that the working group will help bridge the gap between climate science and engineering design.

(Oy, what to do?)

Oroville Dam caught in dilemma
By Nicholas Feeley, February 21, 2017, theorion.com

California’s reservoirs are caught in a conflict: water storage or flood prevention. “They are trying to keep the water as high as possible while still doing flood control,” Steven Mehl said, department chair of civil engineering. “It depends on how we want to operate our reservoirs,” Mehl said. “If the reservoirs are operated purely for flood control, then keep it down to its dead pool.” This is not the case though and until recently California has been experiencing very dry years. The drought has put pressure on the state to store more water, Mehl said.

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
According to hydrology and environmental science professor David Brown, California's water infrastructure is built to collect water that comes down from the snow packs, not heavy rainfall. The emergency in Oroville started because of erosion to the main spillway. Brown said erosion is a constant threat to dams as water slowly damages the rock and concrete. Oroville Dam is the largest water storage facility controlled by the state government. These dams allocate a certain amount of water to be released in order to prevent flooding. The federal government controls the amount allocated. The dams currently use regulations on how much water to release to prevent flooding that are out of date, Brown said. Brown also said Oroville Dam was built to withstand flows to its best ability at the time it was built. With the erosion in the main spillway the emergency spillway had to be used for the first time.

“A spillway is only used in an emergency and an emergency spillway is only used in a really big emergency,” Mehl said. Mehl and Brown both explained that in a flooding incident in 1997 the dam withstood much greater flow rates. In the current incident the erosion hit the dam at a considerably lower flow rate than what the main spillway can normally handle. With the increased climate extremes and possibility of increased rainfall over snowfall threatening the dam there are greater consequences to inaction, Mehl said. While the spillway is being repaired in order to balance the competing functions of the dam Mehl says “Probably what they are going to have to do is reevaluate what are some of those operational rules for those reservoirs.”

Hydro:
(And now for some hydro news. It sounds like pumped storage.)

Plans for new hydroelectric plants on Oahu move forward

By Rick Daysog, 02/20/2017, hawaiinewsnow.com

WAHIAWA, OAHU (HawaiiNewsNow) - Plans to spend tens of millions of dollars to build hydroelectric power plants in Nuuanu and Wahiawa are now moving through the state legislature. The facilities would be Oahu’s only hydroelectric plants, using new technology to ensure that the water that generates power does not go to eventually go to waste. "It's pretty exciting. It's using the existing reservoir to capture water and run a turbine to generate power when we need it most, at night and at a time when the demand for power is really high," said State Rep. Chris Lee.

Last week, Lee's Energy and Environmental Protection Committee was one of two house committees that approved measures to provide funding to the Honolulu Board of Water Supply's pumped storage hydroelectric project, located at its Nuuanu reservoirs. Separately, three other state Senate committees have approved funding for a study evaluating a possible purchase of the Wahiawa Dam from the Dole Food Company. The state would then upgrade it by building a hydroelectric power plant there. The Nuuanu plan could cost up to $51 million. The Wahiawa system would cost much more. Hydroelectric power generation has been used on Kauai and the Big Island for decades. On the Garden Isle, hydroelectric power provides about 9 percent of the island's demand. Unlike these plantation-era power plants, though, the Wahiawa and Nuuanu proposals would use technology that recycles the water. Water that's used to turn the turbines at the Wahiawa Dam would eventually flow back into Kaukonahua Stream. It would then be pumped.
back to the reservoir through a massive pipeline using solar power during the day, when it's cheapest; or wind power during the late night, when much of that wind energy is not being used. "Solar and wind that you could not use would no longer be wasted," said Henry Curtis, executive director of the Life of the Land, an environmental group. The Water Board's Nuuanu plan relies on low-cost, off-peak electrical power to pump water from one reservoir to another, two miles away, in upper Nuuanu. That reservoir is at an elevation nearly 600 feet higher than the first. During peak hours, water stored in the upper reservoir would be released to turn turbines that produce electricity. According to the Water Board, a similar system was used in the late 1880's to light electric street lamps in Downtown Honolulu. The remains of that old pipeline can still be seen near Reservoir No. 1, along the Pali Highway.

**Water:**
(Need more storage capacity.)

**Officials continue push for reservoir enlargement**
By RICK ELKINS. recorderonline.com, February 17, 2017

Recent storms show need for dam project

The bountiful rain and snow of the past six weeks has not been lost on Congressman Kevin McCarthy (R-Bakersfield, CA) or Dan Vink, watermaster of Success Lake. Both are pointing to the rush of water coming out of the mountains as a reason to get funding approved to increase the storage of Success Lake. "With all of the recent rain, this is another example of why raising the Success Dam spillway is so important — a project I have been fighting for," noted McCarthy, the majority leader in the House of Representatives. "Raising the spillway increases the capacity at Success Lake in a safe manner and would enable us to capture more water, like from the current storms, to hold for future use." Vink, manager of the Lower Tule Irrigation District, was in Washington DC last week lobbying for the project that will raise the spillway at the lake which will add about 28,000 acre feet (af) to what the dam can hold. The lake is full now at 82,500 af, but with the spillway raised, that would increase to 110,000 af. "It was very timely when we were back there," he said as he related to officials the up-to-the-minute status of the lake as it filled. He met with Army Corps people and with those connected with the Trump Administration. McCarthy, who represents Porterville along with the rest of 23rd District in Congress, toured the dam in the fall and committed his full support for the project which has been in the works since 1999. Some work actually began in 2003, but was halted over concerns about the dam's safety. Those concerns have been addressed, although another safety study is being conducted right now to ensure the enlargement can move forward.

"Success Lake is important to our community's wellbeing, providing recreational opportunities for tourists while also ensuring important water supplies to Porterville and the surrounding area, which has suffered during the recent drought," said McCarthy. "This weekend's emergency at Oroville Dam has caused some concern within our community about the status of Success Lake. I have spoken with U.S. Army Corps of Engineers Sacramento District Commander Colonel David Ray about Success Lake and he has assured me that Success Lake is safe and the reservoir remains well below the spillway," he said on Monday. As of 3 p.m. Thursday, the lake held 57,961 af. The release had been increased to 2,300 cubic feet per second. "That's kind of the max we can let out through the system," said Vink of the release, although they could release up to 6,000 cfs in an emergency, but Vink is concerned as to what the channel can handle.

Copy obtained from the National Performance of Dams Program: [http://npdp.stanford.edu](http://npdp.stanford.edu)
Vink’s goal is to bring the reservoir down and hold it at 50,000 af until the end of the month. However, Mother Nature will have to cooperate and Vink said the word right now is another series of storms is following this weekend’s series of storms.

He said this year is topping the record rain year of 1969-70. In January alone, 88,000 af of runoff came out of the mountains. As of Monday, roughly 6 feet of snow was at Quaking Aspen containing 31 inches of water, both near record totals. The project to enlarge the dam’s capacity is the same as it was nearly 20 years ago. It will raise the height of the spillway 10 feet. The new plan may widen the spillway another 165 feet (to 365 feet wide). Vink said the original cost was put at $19 million, but today that is closer to $35 million. He is hoping it will come in under that because if it is higher, the project will have to go back to Congress for funding. He said the updated safety study will be finished this spring and then they will re-evaluate the enlargement. That study is slated to be completed by March of 2018. Vink said the best timetable is to begin construction in 2022, with the work taking two years to complete.

Other Stuff:

Yosemite’s 'Firefall' Appears for Only a Few Minutes Every February

The phenomenon is like catnip for photographers

By Newser Editors and Wire Services, Feb 15, 2017, newser.com

(NEWSER) – Mother Nature is again putting on a show at California’s Yosemite National Park, where every February the setting sun draws a narrow sliver of light on a waterfall to make it glow like a cascade of molten lava, the AP reports. The phenomenon known as "firefall" draws scores of photographers to a spot near Horsetail Fall, which flows down the granite face of the park's famed rock formation, El Capitan.

Capturing the sight is a challenge. Horsetail Falls only flows in the winter or spring, when there is enough rain and snow. The sun lights up the fall for only about two minutes at dusk for a few days in February. Some photographers have had success this year as pictures of the glowing falls are showing up on social media.

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