Dams:
(This would not be good!)

Oroville Dam: DWR could have lost control of spillway gates during crisis
By Risa Johnson, Chico Enterprise Record | January 24, 2018, mercurynews.com

Oroville, CA – The state Department of Water Resources could have lost control of the spillway radial gates for days during the Oroville Dam crisis if crucial power lines had gone down, according to department officials. DWR leaders Cindy Messer and Joel Ledesma stated this Jan. 10 during a legislative oversight hearing on the dam at the State Capitol. This has since led some local groups to wonder why there was no backup power supply. Representatives of Friends of the River, the Sierra Club, South Yuba River Citizens League, California Sportfishing Protection Alliance and American Whitewater filed a letter with the Federal Energy Regulatory Commission, or FERC, dated Jan. 16 addressing their concerns. There should be a backup generator that could allow for operation of the gates in case its power lines are compromised, according to DWR’s Bulletin 200,
published in 1974. A standby power source is described as “a 55-kW generator operated by a liquid-propane-gas-fueled engine” in the document. The groups cited this, requesting that the commission ask the department to explain why the backup energy source was unavailable during the crisis last February and whether there was still a problem. The commission should also require that DWR have an accessible electrical supply for the radial gates, they said.

HOW IT HAPPENED

Chris Shutes, FERC projects director for the California Sportfishing Protection Alliance, said in an interview Tuesday that this issue is pressing because it could lead to use of the emergency spillway again, which no one wants to happen, including DWR. Like our Facebook page for more conversation and news coverage from San Jose, the Bay Area and beyond. The emergency spillway is a concrete weir with an unlined hillside below that eroded in February when water ran down it for the first time in history. When erosion from the overflow created a deepening chasm that worked its way toward the concrete lip, fear the structure could be compromised led to evacuation orders on Feb. 12 for more than 180,000 people downstream. “It needs to be resolved as soon as possible,” Shutes said. The independent forensic team report released Jan. 5 found that department officials were weighing several risks before they decided to use the emergency spillway. Some scary possibilities included continuing erosion of the main spillway leading to the loss of a transmission tower nearby and also water heading toward the headgate structure because of erosion. However, the forensic team report did not discuss the lack of a fallback power source for the radial gates, the group’s letter states. Shutes described the radial gates as similar to guillotines, hoisted up to allow water releases down the nation’s tallest spillway. “The farther you raise it up, the more water escapes,” he said. “If you can’t raise them, (the gates) can’t allow water to go out at the same rate it’s going in (the reservoir).” If the department had lost control of the gates and was therefore unable to crank up releases, more water would have backed up in the reservoir and streamed down the emergency spillway, he said.

‘KIND OF A BIG DEAL’

Dave Steindorf, special projects director for American Whitewater, said that in his mind, this highlighted a need for more transparency about issues relating to the spillway failures. It is puzzling that transmission lines were placed in the area to begin with, he said. “It’s rather astounding that (below the emergency spillway) there was a set of power lines in the path of water coming down,” Steindorf said. If backup electricity was accessible, upping releases when the reservoir was getting dangerously full should not have been such a dilemma, he said. “The question becomes, ‘were those generators not working?’ which is kind of a big deal,” Steindorf said. Transmission lines around the emergency spillway were turned off Feb. 10 and eventually rerouted away from the area. Ron Stork, senior policy advocate for Friends of the River, was taken aback when he heard at the oversight hearing that the department could have lost control of the gates. “I was floored,” Stork said on Tuesday. “We know power lines are now out of harm’s way. But regardless, it’s a simple matter to make sure you’ve got backup power, because you don’t want to lose control of those gates.” He said the group was very careful in the letter not to assume anything it didn’t know. He hopes discussion about radial gate power routing can come before the public.

HYATT POWERPLANT

The department also could have lost access to the Hyatt Powerplant for months because of downed transmission lines, department officials said in their testimony at the Jan. 10 oversight hearing. This was addressed in the forensic report. “This would result in significant long-term water management issues, mainly in view of environmental effects and water deliveries,” the forensic report stated. “It would also affect the logistics in water management during repairs to the damaged service (main) spillway. However, the unknown risks of using the emergency spillway were also a major concern, in view of the major unexpected erosion of the service spillway foundation.” A DWR spokesperson did not respond to a request for comment before the deadline for this story.

(What went wrong?)
What went wrong at Oroville?

Dam experts release a report on the California dam's spillway vulnerabilities.

By Emily Benson, Jan. 25, 2018, hcn.org

After intense rainstorms in February 2017, two spillways at Northern California’s Oroville Dam began to disintegrate under the force of the water rushing down them. Officials, concerned that erosion might undermine the side of the reservoir itself, evacuated more than 180,000 people. The reservoir ultimately held, but the spillways required extensive, ongoing reconstruction.

In early January, an independent group of dam experts tasked with determining what went wrong released its final report. It describes the physical factors that caused the spillways to crumble, problems like unstable rock foundations and cracked concrete that allowed water beneath the main spillway.

The report also highlighted human and organizational errors, including faulty design details, shortsighted inspections and “overconfident and complacent” management by the California Department of Water Resources. The department “take(s) the findings very seriously,” said then-director Grant Davis in a statement. "We will … incorporate the lessons learned going forward.”

So what can Western dam owners and regulators learn from Oroville? One lesson, according to the report, is simply to pay more attention to the dangers of deteriorating spillways, which can be overlooked during dam-centric safety assessments. Dam failures are clearly catastrophic, but other emergencies — like a spillway collapse — can also be dangerous and expensive.

Another lesson is the need for inspections that go beyond mere physical checkups. For example, reviews of original design records are necessary to help inspectors determine whether spillways are too outdated to be safe. And those reviews should be independent, not cut-and-paste insertions from previous reports. That could help prevent errors from propagating, an issue at Oroville that led officials to underestimate the risks of spillway erosion.

Oroville’s spillways failed despite state oversight, regulation by a federal agency and repeated evaluations by outside inspectors. That, the report notes, "is a wake-up call for everyone involved in dam safety."

Go to the explanations below according to the numbers in the photo below to see some of the report’s conclusions.
SAN FRANCISCO, CA — The costs of dealing with last year’s near-disaster at the nation’s tallest dam have reached $870 million, California officials said Friday. The figure for emergency response and repairs following the crisis at Northern California’s Oroville Dam should stand, said Erin Mellon, spokeswoman for the state Department of Water Resources. The total was pegged at $660 million in October. Both spillways at the 770-foot earthen dam collapsed in February, forcing evacuation orders for nearly 200,000 people downstream. Fears of massive, uncontrolled releases of water did not happen, and residents were allowed to return to their homes within days.

A report by independent dam-safety experts blamed the crisis on state operators’ and regulators’ "long-term systemic failure" to recognize built-in design and construction flaws in the half-century-old dam. Mellon says California still hopes federal emergency funds will cover three-fourths of...
the cost, which includes about a half-billion dollars the state is spending to repair and improve both spillways. Friday's jump in the overall price tag comes from expenses that include the removal of massive amounts of debris left by the torrents of water released from Oroville's reservoir during the crisis, Mellon said. Other new costs in the total include moving power lines connected to the dam's hydroelectric system and building access roads for repair crews. The price tag does not include more than $1 billion in legal claims filed by property owners downstream, Mellon said. The water behind Oroville Dam is part of a complex north-south delivery system that serves millions in central and Southern California. The state still intends for water contractors who draw supplies from that system to pay any emergency costs refused by the Federal Emergency Management Agency, Mellon said.

(Good question. DWR has been stung by a Beal)
To Fix or Replace? That Is the Question.
By Glen Martin, alumni.berkeley.edu, 2/1/18

What to fix, and what to replace? That's the big question for Orville Dam. It has been almost a year since water brimmed to the top of Oroville reservoir and the tallest dam in the United States suddenly showed signs of possible, even imminent failure. Emergency releases eroded both the primary and secondary spillways with horrifying rapidity, and evacuations were ordered for 200 thousand downstream residents.

Catastrophe ultimately was averted, and crews have since worked furiously to repair the damage. But the problem is unlikely to be remedied by any patch job, warns UC Berkeley professor emeritus of engineering and renowned forensic engineer Robert Bea. Oroville's problems are so deep and structural that "fixing" it is not realistic. That's especially the case at the "headworks" for the primary spillway, the structure that controls releases from the reservoir. "DWR [the State Department of Water Resources] is currently replacing [the eroded] primary spillway, but has tried to ignore the headworks," Bea says. "They recently realized they only have one power supply to open and close the gates. They need to have an emergency power supply installed." The dam is emblematic of a larger institutional dilemma: a basic misunderstanding of the word "safe." Indeed, says Bea, "the jury is still out" on the dam itself, the massive plug of earthen fill that backs up the Feather River. There is leakage at some places on the dam's face, suggesting that the structure itself may be unsound. "Maybe the dam needs rebuilding, maybe not," says Bea. "We simply don't know, but we need to know. FERC [the Federal Energy Regulatory Commission] thinks there should be additional instrumentation on the dam to survey the situation, and I agree. But DWR hasn't supported that option."

To Bea, the dam is emblematic of a larger institutional dilemma, one he has pounded on for decades: a basic misunderstanding of the word "safe." A founder of UC Berkeley's Center for Catastrophic Risk Management, Bea says many large American infrastructure projects are inadequately designed for safety, the result of a skewed engineering ethos and government agencies that are ignorant of the problem. Bea and his colleague Tony Johnson produced a
report on the root causes of Oroville’s spillway failures five months after the incident. Earlier this month, an independent team of forensic investigators released their own analysis.

“There are some differences, of course, but we both align on the fundamental conclusion that the event was the result of a long-term history of mismanagement and poor decisions,” Bea says. “These culminated in two sets of failures—the first was on February 7, with the failure of the primary spillway, and the second was on February 12, with the erosion of the emergency spillway.” Their report is unspiring in its criticism of the design and construction of the dam and DWR’s culture. It noted that the dam had poor foundation conditions that were noted in multiple geology reports, but that these deficiencies were “…not properly addressed in the original design and construction, and all subsequent reviews mischaracterized the foundation as good quality rock. As a result, the significant erosion of the service spillway foundation was also not anticipated.” The report added that DWR’s commitment to dam safety, “…although maturing rapidly and on the right path, was still relatively immature at the time of the incident….” The report further characterized the agency as “somewhat overconfident and complacent…and insular, which inhibited accessing industry knowledge and developing needed technical expertise.” Bea is even more pointed in his criticism of DWR, maintaining that it’s not just a matter of what the agency ignored or scamped during the decades since Oroville was built. He’s worried about what the agency is doing—and not doing—now. Specifically, he cites testimony given by DWR staffers at a January 10 hearing of the California State Assembly standing committees on water, parks, and wildlife.

“They asked [DWR deputy director] Cindy Messer if DWR agreed with the forensic team’s report, and it was really interesting to watch her facial expressions,” says Bea. “She said she didn’t agree with all of them. Then she [and deputy director Joel Ledesma] were asked how long it will take DWR to implement the recommendations, and they said four to six months. But there’s no way in hell they can do that. It’s clear to me that the leadership at DWR still doesn’t get it. They’re ignorant, not evil, but it’s unfortunate that they get very, very defensive under intense scrutiny.” During the hearing, Messer maintained that DWR had repaired the main spillway, “bringing it to today’s standard…” But that’s not true, says Bea, especially if “today’s standard” reflects any real commitment to public safety.

“They’ve poured 500 million dollars into the two main sections of that spillway,” says Bea. “They had to excavate 100 feet of rotten rock and then refill it with compacted concrete. Well, not long ago the media reported that there were alarming new cracks in the concrete. And it was only then that DWR addressed the issue, maintaining such cracks are to be expected. I was queried about this, and I said cracks in concrete should never be expected or tolerated in important structures. Would we tolerate them in nuclear power plants? But DWR insists they’re small, they’re not critical. And in my mind, that puts us right back on the road that led to February 7, 2017.” “Oroville is closer to the standard than an anomaly based on inspection reports I’ve received on [California] dams.” Bea has a long history of working on offshore oil production projects, and he says that oil companies tend to respond with alacrity to safety concerns, especially when they make a big splash in the media. There is a simple reason for that, he observes: safety mishaps cause intensely negative PR and production breakdowns which, in turn, reduce company revenues and dividends, ultimately enraging shareholders. “Company executives don’t want to confront angry shareholders, so they typically deal with safety problems quickly and proactively,” Bea says. “They learn what ‘safe’ really means from experience, and if they ignore those lessons, their shareholders will remind them. The problem is that DWR doesn’t have any shareholders. So they haven’t been forced to learn what ‘safe’ means for Oroville.”

And it’s not just Oroville, says Bea. California’s water storage and delivery system as a whole is in a sorry state. And that isn’t just his opinion. “Oroville is closer to the standard than an anomaly, based on inspection reports I’ve received on [California] dams,” Bea says. “The American Society of Civil Engineers has been worried about California’s dams for years. They released an annual report card on national infrastructure, and their 2017 grade for state dams was D-.” The reasons for such an abysmal evaluation are predictable, says Bea: the system is more than 50 years old,
it was designed imperfectly, and these shortcomings were never remedied. That means there is no easy fix. It doesn’t do any good to just throw money at the problem. That was done following Hurricane Katrina, says Bea, when more than $100 billion poured into New Orleans but little if anything was accomplished to protect the city from similar storms. To effectively address the risks beleaguering California’s dams, Bea insists, we have to abandon the “paste and patch” approach and start from the beginning.

“That means we have to do quantitative assessments for each of these dams,” Bea says. “That’s quantitative in terms of both cost and safety. How much money will it cost to get a degree of safety that is precisely defined, that meets a specific and rigorous standard? It’s obvious DWR doesn’t know how to fix Oroville. [Portions or all of it] could be rebuilt completely so that it does meet a necessary safety standard once one it is defined. And it’s also clear that it won’t be cheap. But even a complete fix of Oroville would cost less than a complete failure of Oroville.”

Calls to DWR Director Grant Davis for response to Bea’s comments were not returned.

(Dam removal not far away.)

Hamilton Dam in downtown Flint only weeks away from demolition
By ABC12 News Team | Jan 26, 2018, abc12.com

FLINT, MI (WJRT) (1/26/2018) - Demolition of a downtown Flint landmark appears to be only weeks away. The final permits have been issued to remove the 95-year-old Hamilton Dam in the Flint River. Demolition work should begin sometime in February, according to the University Avenue Corridor. The project required permits from the state of Michigan and approval from Consumers Energy, which also had to complete a remediation project first. A $3 million DNR grant will pay for removing the Hamilton Dam, another small dam downstream and completing beautification projects upstream. A Lansing-area contractor has been hired to demolish the structure. Removing the dam and surrounding concrete is an important step to opening up a 1.5-mile stretch of the Flint River. Genesee County Parks Director Amy McMillan expects improved fishing and kayak or canoe opportunities.

(The Lower Snake River dilemma.)

Kris Johnson: Washington’s dams balance clean energy needs, fish protections
By Kris Johnson, Jan. 27, 2018, spokesman.com

Construction of the four Lower Snake River dams – Ice Harbor, Lower Monumental, Little Goose and Lower Granite – began in 1962. Back then, the focus was on the efficient production of energy, transporting goods and supplying water to Washington’s vibrant agricultural sector. Today, the dams produce 40 percent of the region’s energy through clean hydropower generation, support agricultural production and transportation, and improve our quality of life by lifting the economy and supporting recreation. They are also integral to flood control. Equally critical, they support healthy fish and wildlife populations and their complex life cycles, thanks to a series of improvements to the dams set out in Federal Columbia River Power System’s (FCRPS) 2014 biological opinion, or BiOp.

This BiOp’s success is due in part to a strong partnership with the National Oceanic and Atmospheric Administration (NOAA), outlining a salmon management plan for the 13 stocks of Columbia and Snake river salmon and steelhead protected under the Endangered Species Act. In a supplemental BiOp in January 2014, NOAA confirmed that improvements at federal dams on the Columbia and Snake rivers, rehabilitation of habitat, and other actions are benefiting federally protected salmon and steelhead as much as, or more than, anticipated five years before when
the plan was put in place and before court orders were put in place in 2011 to re-examine the two previous BiOps. Proper fish ladders have been installed to ensure healthy migration of salmon and other fish to spawning grounds up river and the Army Corps of Engineers’ Walla Walla division has been instrumental in controlling river temperatures through release of reservoir water during the hot summer days. That’s great news and a testament to how we all have the same goals – clean energy, a healthy environment and a sustainable future – and that when we work together good solutions and outcomes follow.

Noting the successful efforts, last fall U.S. Rep. Cathy McMorris Rodgers (R-Wash.) introduced HR 3144 to keep the 2014 BiOp in place until 2022 – a move that would build on the successful and steady fish migration and habitat restoration gains. However, on Dec. 5, Gov. Jay Inslee wrote a letter to several high-ranking members of U.S. House committees expressing concerns with HR 3144. Inslee wrote, “While the State of Washington believes the 2014 BiOp represented a step forward for efforts to protect and recover 13 stocks of threatened or endangered Columbia and Snake river salmon and steelhead, HR 3144 would thwart constructive ongoing efforts to improve future salmon and dam management.” We believe, like Rep. McMorris Rodgers, that now is not the time to abandon the comprehensive BiOp plan that is fostering collaboration that is leading to real results for fish and wildlife. Like any introduction of structures in our waterways, there are differing opinions – from environmental groups and clean energy advocates and our governor to members of Congress – on how they impact the environment. Employers, our congressional delegation, NOAA and others are taking the challenge of meeting our region’s energy needs with clean, renewable hydropower while preserving the natural environment seriously. The success speaks for itself and HR 3144 is one way to continue it. Kris Johnson is the president of the Association of Washington Business, the state’s chamber of commerce and designated manufacturing association.

(Dam removal marches on!)

**More dam removals planned in Cleveland National Forest next few months**

By NATHANIEL PERCY | Orange County Register, January 26, 2018, ocregister.com

To improve stream habitats and help fish travel farther upstream to spawn, the removal of dams in the Cleveland National Forest, CA will continue this winter. Fifteen to 25 dams are expected to be torn out from the San Juan, Trabuco, Holy Jim and Silverado creeks by the end of March. The dams, which were built between 1940 and 1970, are no longer needed for flood control and keep native fish and other aquatic organisms from being able to move up and down stream, officials said in a release.

When built, the dams were meant to be in place about 50 years. “They were originally designed to retain water during the summer season for fish stocking, but they haven’t been maintained for about 30 years,” said Olivia Walker, spokeswoman for the Cleveland National Forest Service. “They’re just a safety hazard to have there at this point. People like to walk across and bike across and you never know when, and if, they’re going to fall down.”

Demolition work is expected to start by the end of January, officials said. The National Park Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife and other resource agencies are partnering on the project, which is part of a nation-wide initiative to restore natural spaces, officials said. To date, 18 dams have been removed – four in Trabuco Creek, 10 in Holy Jim Creek and four in Silverado Creek during 2014 and 2017 – and 29 others crumbled and were washed out during rainstorms, officials said. Another 63 dams are planned for removal over the next several years using excavators, hand crews and blasting depending on the dam’s size, location and access. In March and April, Marines blasted out 10 dams, which caused a rift between the United States Forest Service and canyon residents upset popular swimming holes would be lost and concerned water quality would be affected.
The next set of dams will be removed in similar fashion; including relocating species living in the area. Residents and those who use trails in the area could experience some temporary closures; notices will be posted by the Forest Service a week in advance, Walker said. Removing barriers is a key component in restoring stream health and function, officials said. The work removing the 10 dams last year has already benefited the Southern Steelhead trout, which travels upstream to spawn. “There was some progress this year where we’ve seen them go farther than they have before,” Walker said. Kirsten Winter, lead biologist for the project, said removing dams in San Juan Creek could also lead to the recovery of the Arroyo toad and the Arroyo chub, a small, minnow-like fish indigenous to Southern California streams. “The ability to move downstream,” the press release said, “is essential for aquatic species to complete their life cycles and maintain viable populations.”

(Lot of opposition.)

State scores Temperance Flat dam project at a big fat zero. Boosters are pushing back
By Lewis Griswold, fresnobee.com, January 28, 2018

An application for $1 billion of state bond money to build Temperance Flat dam east of Fresno scored a dismal zero from the California Water Commission on the cost-benefit ratio, potentially jeopardizing its construction. Supporters of the dam expressed shock and dismay and are blaming the commission staff for the low score. They’re not alone. All 11 water project applications from around the state under review by the commission have scored less than one or even zero on their public benefit ratios, said state Assemblyman Joaquin Arambula, D-Fresno. That includes the proposed Sites Reservoir project in Northern California.

A score of one or greater is considered the minimum needed to be awarded money. “It’s clear to me that something is not working in the process,” Arambula said. The Association of California Water Agencies also complained about the low scores. “I was surprised to hear that the California Water Commission staff’s preliminary analysis indicated none of the 11 storage projects were worthy of funding,” said Timothy Quinn, executive director of ACWA. “We have reached out to commission staff to better understand their evaluation criteria and hopefully be able to assist our member agencies who are going through the appeals process.”

We were standing there with our jaws open, Mario Santoyo, San Joaquin Valley Water Infrastructure Authority Chris Orrock, California Water Commission spokesman, said the ratio counts for only one-third of each project. “It’s not a decision by the commission.” Additionally, there’s an appeals process, he said.

Scores will be made public Feb. 1 when the nine-member commission holds a three-day meeting, although applicants have already been told what their public benefit ratio score will be. A big dam east of Fresno has been talked about for years. Now it’s time to talk money. Proposition 1, approved by voters in 2014, authorizes the sale of $7.5 billion in general obligation bonds to fund water supply projects, ecosystem and watershed protection and restoration, and drinking water protection. Of that, the commission is doling out $2.7 million for water projects by the end of July. Arambula said he and Assemblyman Rudy Salas, D-Bakersfield, whose district includes Kings County, met with commission staff Jan. 16 to get a better understanding of why Temperance Flat scored so poorly. It appears the staff is being cautious in matching information in the application with the language of Proposition 1, Arambula said. “It leads you to say no information has been given,” he said, resulting in the zero score. In a statement, Salas said he was “disappointed” but believes the score will climb as advocates make their case on appeal. It’s clear to me that something is not working in the process.
Assemblyman Joaquin Arambula, D-Fresno Mario Santoyo, executive director of the San Joaquin Valley Water Infrastructure Authority that's trying to build the $3 billion Temperance Flat dam, said the authority hired an expert to calculate the public benefit ratio. The expert determined it was 2.83, which means that "for every dollar that the state invests, they get a return of 2.83 dollars in value," he said. To get a zero from the commission staff made no sense, he said. He met with commission staff Jan. 10. "We were certainly shocked and unhappy when we heard," Santoyo said. "It came as a big surprise ... We were standing there with our jaws open. “State officials travel by boat to tour Temperance Flat dam project site

But the staff said "don’t panic, this will be corrected as you provide us clarity” in the appeals process, Santoyo said. A possible reason for all the low scores is that the state is using a new process to fund water supply projects that has flummoxed the staff, he said. “There are efforts to change the process, to try to put some common sense to this,” he said. We’ve always said the cost-benefit is not adequate. But Chris Acree of Fresno, executive director of Revive The San Joaquin and an opponent of the dam, said the commission staff made the right call. Requiring additional conservation on the Valley floor would stretch existing water resources at far less cost that building a new dam, Acree said. In addition, the project would flood a river gorge that has rare Indian archeological sites, he said.

(Some of the opposition.)

**Farmers need recharge not Temperance Flat dam**

January 28, 2018, fresnobee.com

The Bee ran an editorial a couple months ago touting the idea of Temperance Flat dam, stating that the benefits of the dam outweigh the costs. The Editorial Board could have been trying to please its readership, or maybe just made a mistake. Since we don’t have unlimited resources, every investment California makes should be weighed against alternatives so that the best option gets the most funding. A study done by a Stanford University group called “Water in the West” concluded that groundwater recharge was cheaper, sometimes by a very large factor depending on the project, and can store much more water. Valley farmers would benefit from calling for more money for groundwater recharge than for new dams. Not only would they have more water, they wouldn’t have to waste time, energy and money fighting environmental groups, and they would have the support of every significant stakeholder in the state. DANNY VARTAN, FRESNO, CA

**Hydro:**

(Restoring history.)

**Bass Pro Shops founder to restore historic Missouri mill**

BY ELIZABETH DONALD, January 17, 2018, bnd.com

The founder of Bass Pro Shops has plans to restore a 185-year-old mill near Springfield, Missouri. Johnny Morris, founder of the popular outdoor gear chain Bass Pro Shops, has owned the historic Ozark Mill on the Finley River since 1993, according to the Springfield Business Journal. Speculation had circulated for years as to his plans for the site, but now he has announced plans to renovate and restore the building and open it
to the public as a venue. The plans include lifting and temporarily moving the structure to allow rebuilding of the foundation, according to the Business Journal.

The mill was constructed in 1833, originally known as Hoover’s Mill and included the original post office before Ozark was actually a town. The original building burned down, and the current structure was built in 1939. It operated for 50 years before the owners sold it to Morris. Morris also owns more than 32 acres around the mill in a series of purchases since 2012. Bass Pro also owns the America’s Wildlife Museum and Aquarium, purchased and redeveloped by Morris and reopened in September as Wonders of Wildlife, a nonprofit attraction in Springfield. They also own the Big Cedar Lodge resort in the Ozark mountains. Bass Pro has been renovating the lodge, fighting sinkholes and caves, and constructing golf courses around the resort, according to the Business Journal. Restoration at the mill is slated to begin next month.

(Small, but many.)

**Small hydroelectric dams increase globally with little research, regulations**

By Michelle Ma, UW News, January 22, 2018, washington.edu

Hydropower dams may conjure images of the massive Grand Coulee Dam in Washington state or the Three Gorges Dam in Hubei, China — the world’s largest electricity-generating facility.

*But not all dams are the stuff of documentaries. Tens of thousands of smaller hydroelectric dams exist around the world, and all indications suggest that the number could substantially increase in the future.*

These structures are small enough to avoid the many regulations large dams face, and are built more quickly and in much higher densities. As streams, rivers and watersheds absorb more small dams, however, surprisingly few scientific studies have considered their environmental impact, and policies or regulations are lacking or largely inconsistent.

University of Washington researchers have published the first major assessment of small hydropower dams around the world — including their potential for growth — and highlight the incredibly variability in how dams of varying sizes are categorized, regulated and studied. Their paper, the first to provide a global synthesis of the science and policy of small hydropower, appears this month in the journal *Frontiers in Ecology and the Environment.* “As we started exploring this topic of small hydropower development, we realized we’re facing a proliferation of this kind of facility, but we don’t know exactly how their environmental impacts scale up in a watershed,” said lead author Thiago Couto, a UW doctoral student in the School of Aquatic and Fishery Sciences.

“We have identified some important gaps in policy and science that should be filled to better manage small hydropower dams and to have science that really informs policy.” Dams, big or small, have the potential to change a river’s water flow, temperature, sediment, and ultimately the patterns in plant and animal diversity. These factors have been long-studied for large dams, yet have been largely ignored for small dams — especially considering the potential cumulative effects of many small dams in a single river system. Their research reports that nearly 83,000 small hydropower plants are operating or are under construction in 150 countries. For every large hydroelectric dam, 10 small dams exist. If all hydropower
capacity were to be developed, the study estimates that this number could more than triple. Small hydropower can take many different forms. Some small dams are built to store water in reservoirs and then release water downstream, while others divert water away from rivers into powerhouses; in all cases water is used to turn turbines and create electricity. One of the challenges the researchers faced in compiling these numbers is that countries define “small” hydropower plants differently. As such, there is no international standard with which to categorize and compare dams. Moreover, while the modifier “small” is assumed to equate with few environmental impacts, this is a largely untested notion.

Additionally, countries that do classify small hydropower dams do so based on only their energy capacity and consequently ignore other factors during the licensing decision that might contribute to environmental impacts. In Brazil, for example, there are cases of small hydropower dams producing the same amount of power, but varying greatly in the sizes of reservoirs behind them. This kind of discrepancy happens because most classifications ignore measurements of a dam’s physical footprint, height or whether it has a reservoir behind it. “It was surprisingly difficult to find scientific articles that have rigorously quantified the individual and cumulative impacts of small hydropower. This is a critical research frontier for the future,” said Julian Olden, senior author and UW professor of aquatic and fishery sciences. “Individually, large hydropower dams will always cause greater environmental impacts, but with rapid growth of the small hydropower sector, our rivers might just suffer from many small cuts.”

It was not too long ago that the world turned to developing small hydropower plants. The trend toward small dams began in Europe in the mid-1980s and has grown rapidly in recent decades. Small dams are ideal for rural areas because they don’t have to be connected to the electric grid to power homes and businesses. As a result, many private landowners and corporations can leverage easier environmental permitting to build small hydropower dams for a fraction of the time and cost of large dams. The researchers say more research is needed to understand the cumulative effects of many small dams on the landscape, especially given the rapid pace of development. But in the meantime, they advocate for a standard definition of “small” dams that include more than just generation capacity so that regulations and policies can be applied more rigorously. “I think one of the most important results of this paper is to show that the development of the small hydropower sector is actually happening in many regions of the world,” Couto said. “There is a proliferation of small dams and not much known about how multiple dams affect watersheds as a whole, so that's where science has a key role to play.” The researchers will contribute to that work this spring when they start to study the ecological effects of multiple small hydropower dams in southern Brazil. This research was funded by the H. Mason Keeler Endowed Professorship and CNPq (Science without Borders).

(All you need is enough water.)

Montana’s hydroelectric generation recovered following last summer’s drought
January 23, 2018, by Kevin Randolph, dailyenergyinsider.com

Hydropower generation in Montana has recovered to levels consistent with previous years following a flash drought that hit the state this past summer, the U.S. Energy Information Administration (EIA) said.

Hydroelectric generation in the state during the first three months of 2017 was higher than the previous five-
year range. During the spring, when hydroelectric generation typically increases as snowpack melts, hydroelectric generation relatively flat due to the onset of the drought. In May, hydroelectric generation was 10 percent below the lowest May generation of the previous five years. In September and October 2017, Montana’s hydroelectric generation moved closer to previous five-year average levels.

Over the past 15 years, hydropower has made up as much as 60 percent of Montana’s total electricity generation in July, the month with the highest summer electricity demand. In July 2017, hydropower generated just 32 percent of the state’s electricity. The drought began in the eastern part of the state around the middle of May, causing the state declaring a drought emergency in 20 counties. The drought then worsened for several months and peaked in mid-September. At the peak, half of the state experienced the two most severe drought categories in the Department of Agriculture’s U.S. Drought Monitor, exceptional drought or extreme drought. As of Jan. 9, no part of the state remains in exceptional drought or extreme drought, but 9 percent of the state is still in a severe drought. Hydroelectricity is the second-largest source of electricity generation in the state behind coal. As of 2016, Montana had 2,665 megawatts (MW) of conventional hydropower capacity, which provided an average of 36 percent of Montana’s total generation including exports. Montana produces approximately twice the amount of electricity the state consumes and exports the rest to nearby states. When hydropower generation in Montana decreased, the states typically meets electricity demand with increased generation from coal, and to a lesser extent, wind and natural gas.

(Where’s my money?)

Hydro company wants its dam money
By TEREASA NIMS, For the Daily News, January 25, 2018, ourmidland.com

Beaverton City, MI Manager Heath Kaplan is buried in financial statements, sifting through boxes and more boxes trying to catch up on two years of audits while also trying to keep collectors at bay until the city can get a bond to pay some debts. The city owes an estimated $250,000 to Hydro Consulting and Maintenance Services Inc. of York, Pennsylvania. Kaplan said the business owners have suggested placing a lien on the dam property until the money is paid. The city has paid the company more than $100,000 for consulting and labor, but an estimated quarter million is still due. It's unknown how a lien on the hydro dam would impact the city. "I don't know right now, it's unknown," Kaplan said. "If they put a lien on it, we don't know if we would still be able to operate the hydro dam and sell the electricity."

An HCMS representative said Tuesday that the business owners have no comment at this time on the subject. "This was not my debt," Kaplan said, noting that this transaction was approved months before his tenure began. "I will clean it up and move the city forward, but I didn't have anything to do with this." He isn't throwing anyone under the bus; yet, Kaplan said he doesn't understand why the dam work was approved. He said the former city manager had to know the municipality would not be able to secure a bond being two years behind in audits. Kaplan said he has talked to HCMS, attempting to keep the company from taking any legal action until the debt is paid. But, he does not know where the company stands with that. "I'm working diligently to get through the financial records," said Kaplan, who marked his third week on the job Tuesday. "I'm 90 percent done with the 2015-2016 audit and will immediately move on to the 2016-2017 audit." Kaplan made residents aware of the audit delinquency at his inaugural Jan. 8, city council meeting. He told residents that he had to focus on a looming deadline with the Michigan Department of Treasury. He said by not doing so, it could mean a delay in state funding. At the time, with less than a week on the job, he wasn't aware of HCMS' debt.

Once the audits are complete by the city's auditor, Rehmenn, then Kaplan said the city will ask the state for permission to float a bond. Kaplan notes the state will most likely deny the request. The request is supposed to be filed six months after the audit. But, the city is two years behind.
However, there is a long form the municipality can file to aid it in getting permission. The last time the city asked the state’s permission to bond was in 2008. How long will it take to get a bond? “That’s the million-dollar question,” Kaplan said. Beaverton Mayor Ray Nau said Kaplan has been working long hours to catch the city up and get the legal issues in order. “We have the right person at the wheel.”

(Hydro ain’t dead yet!)

**Energy storage has an upstream swim in the Pacific Northwest**

The dominance of low cost hydropower in the region, along with policies that favor large power plant development over distributed energy resources, present challenges for the resource.

AUTHOR Peter Maloney, Jan. 30, 2018, utilitydive.com

States in the Pacific Northwest are moving forward with policies encouraging new energy storage projects, but the region already has a lot of old fashioned storage — the type that sits behind a dam. Hydropower provides the region with a cheap and abundant source of renewable energy that can also be used, in some instances, to store energy; and that presents a challenge for newer technologies, such as lithium ion batteries. “Policy is pushing energy storage in the Pacific Northwest, but the economics of storage could have an uphill battle against the economics of hydropower,” said Jay Paidipati, a director at Navigant Consulting.

In a new report, consulting firm Cadmus Group says energy storage development in the Pacific Northwest is stymied by the lack of a compelling business case, policies and pricing structures that favor large power plant development over distributed energy resources, sluggish movement towards grid resiliency planning, and potential concerns about storage technology lifetimes. The Northwest does not have an organized capacity market, which means that storage cannot be traded with clear price signals. The region also lacks differential pricing that recognizes the locational and temporal flexibility of storage. That severely limits two possible revenue sources for a potential battery storage project: the sale of ancillary services and the opportunities that high electricity prices create for price arbitrage. The Cadmus report, which takes a broad look at energy storage in the Northwest, also notes that there are many balancing authorities in the region, but there is no mechanism to easily aggregate and transfer storage resources across them. That engenders a need for complex bilateral agreements that make collaboration more difficult.

**Hydro dominant**

As much as 80% of the electricity generated annually in the Northwest is produced by hydropower, most of it owned and run by the federal Bonneville Power Administration. Historically, pumped hydro projects have been the storage technology of choice in the Northwest, and they still lead the development pipeline. But pumped hydro projects have long lead times and are difficult to site. Meanwhile, battery storage projects have begun to show up in the pipeline. There are only handful now, but Paidipati said those projects are poised to grow, propelled by policy changes in Oregon and Washington State, and they will have to find a niche to fit into the regional market. No single application is going to be cost effective for every utility, said Paidipati, but the applications that are emerging in the region include using storage for capacity or resource adequacy, for the deferral of distribution upgrades, and for providing system reliability as the region’s mix of renewable resources grows.

Since 2010, utilities in the region have been exploring new energy storage technologies; for example, Portland General Electric (PGE) with its 5 MW, 1.25 MWh Salem Smart Power Center in Oregon and Puget Sound Energy with its 2 MW, 4.4 MWh Glacier project in Washington.
Three more utilities have now stepped up with new pilot projects: the Snohomish Public Utility District is installing a 1 MW, 0.5 MWh lithium ion battery and a 2 MW, 8 MWh flow battery; Avista Energy is installing a 1 MW, 3.2 MWh storage project; and Kodiak Electric Association is installing a 3 MW battery storage project and a 2 MW flywheel project. Despite the challenges, the region’s storage capacity is set to grow quickly, driven by recent policies.

State policy drivers

In 2015, Oregon passed HB 2913, which requires the state’s two major utilities, Portland General Electric (PGE) and PacifiCorp, to have a minimum of 5 MWh of energy storage in service by Jan. 1, 2020. The state’s Public Utility Commission released guidelines and timelines for the storage mandate last June. In October, regulators in Washington State issued a policy statement directing the state’s investor owned utilities to include energy storage in their integrated resource plans. Washington also provides grants to energy storage projects, such as Puget Sound Energy’s Glacier project, through its Clean Energy Fund. Avista Energy, which operates in parts of Idaho, Oregon and Washington, expects to include large quantities of storage in its 2019 integrated resource plan, according to the Cadmus report. The biggest challenges energy storage faces in the region are in Idaho and Montana, Vincent Sprenkle, manager of energy storage at the Pacific Northwest National Laboratory, told Utility Dive. Both states lack any distinct law or mandate to drive energy storage. “As we plan down the line, we want to have more data so we can get more bang for the buck.” Steve Corson Spokesman, Portland General Electric

In Montana, the state’s renewable resource standard allows for energy storage, if it is paired with renewable sources. Montana has also begun to look at energy storage to help smooth out the intermittency of wind power. The state has a tremendous wind regime, but it will need long duration energy storage to optimize that resource, Sprenkle said. Ideally, those durations would be longer than six or eight hours, but the economics of long duration storage are still not favorable, Sprenkle said. He did note, however, that the cost of lithium ion storage projects continues to decline while the cost of pumped storage projects is flat or rising.

The seasonal need

The biggest need in the Northwest is for seasonal storage — finding a way to capture an oversupply of winter wind and the runoff of the winter’s melting snowfall, Sprenkle said. Those needs are enormous and would be best suited for large scale projects like pumped storage. “It is a proven technology, but it is difficult to permit,” Sprenkle told Utility Dive. For now, Sprenkle said the main applications for energy storage are resiliency, renewable integration, transmission and distribution deferral, particularly at remote, end of the line locations, and backup power for homes and businesses. Those are among the applications being explored by PGE, which in November filed a proposal with Oregon’s Public Utilities Commission (PUC) seeking approval of a plan to spend up to $100 million on nearly 39 MW of storage projects. PGE’s proposal is very close to the high end of the target set by the PUC of up to 1% of 2014 peak load, which in PGE’s case would be 38.7 MW. The utility’s filing includes a variety of use-cases for its proposed storage projects, including a microgrid pilot project that will include batteries alongside existing solar power and biomass facilities, a battery at a substation that would provide energy and capacity and other ancillary services, up to 500 residential, behind-the-meter batteries that will be controlled by the utility, and a 4 MW to 6 MW transmission-connected storage facility that will be used to create a hybrid plant at PGE’s 220 MW Westward 2 gas plant. All the facilities are envisioned as pilot projects, PGE spokesman Steve Corson, told Utility Dive. “They are useful in and of themselves,” but they also serve as a guide for future investment, he said. “As we plan down the line, we want to have more data so we can get more bang for the buck,” Corson said. This story has been updated to clarify that PNNL Energy Storage Manager Vincent Sprenkle said the biggest challenges energy storage faces in the Northwest are in Idaho and Montana.
**Water:**
(The big deal, will we get a fair shake?)

**New treaty must address ecosystem concerns**
BY JOHN DEVOE, For The Register-Guard, JAN. 28, 2018, registerguard.com

The entire Pacific Northwest depends on a healthy Columbia River. Soon, the United States and Canada will begin negotiations to modernize the Columbia River Treaty. The existing treaty, implemented in 1964, has provided big benefits for the region through hydropower and flood risk management — but at tremendous costs. Now is the time to restore balance. The current treaty reflects a limited and outdated set of values and priorities. It addresses only two concerns — hydropower and flood risk management. With this agreement in place, Canada built three dams in the upper Columbia basin, the United States built Libby Dam in Montana and the two countries began to coordinate hydropower and flood management operations.

However, when the treaty was first negotiated, ecosystem concerns were not included — they weren’t even on the table. U.S. tribes and Canadian First Nations had no say in the negotiations or in the resulting governance structures. Energy conservation and wind and solar power were not yet large factors in meeting our region’s energy needs. Climate change was not yet understood to be a major factor in our future. Since the treaty’s adoption, Columbia River wild salmon and steelhead populations — once the largest on the planet — have continued to dwindle. Lack of fish passage, impaired streamflows and degraded water quality have harmed our region’s most iconic fish — as well as other important species such as sturgeon — across the basin. As these and other species have continued to slide toward extinction (one need look no further than the devastating 2015 fish kills), the jobs, cultures, traditions and communities tied to the fish have suffered accordingly.

Though few in the U.S. are aware, the dams in Canada have also done significant harm to the environment and communities there. Treaty dams in Canada have permanently flooded important terrestrial habitat. Highly variable reservoir levels create large muddy wastelands in the vicinity of the reservoirs as lake levels go up and down to satisfy current power and flood management operations. With the treaty now opening for renegotiation, we do not have to stand by and watch salmon slide toward extinction or sacrifice this tremendous opportunity to restore the river’s ecosystem — and river-reliant communities — on both sides of the border. We need to act now to restore balance to the Columbia River basin.

A modernized treaty should include ecosystem function as a third treaty priority, in addition to hydropower and flood management. In 2013, federal agencies, basin states, tribes, conservation groups and power interests already agreed to this in the Regional Recommendation for the Future of the Columbia River Treaty. Now it is time to make ecosystem function real in the treaty. This means much more than providing small amounts of increased streamflows in the few driest years. A modernized treaty must provide water of sufficient quantity and quality at the right times of year to bring back salmon and other species. A modernized treaty must include salmon reintroduction above Grand Coulee Dam to historic habitats in Canada. A modernized treaty must restore ecosystem function to the Canadian portion of the river basin. A modernized treaty should...
also include governance mechanisms that include fair representation for ecosystem concerns. And a modernized treaty must begin to right historic wrongs visited upon the original inhabitants of the Columbia River basin.

The Columbia River is the life force running through the heart of the Pacific Northwest, supporting fish, farms, cultures and economies. The existing Columbia River Treaty is very important — but badly out of date. As negotiations begin, it is critical that the congressional delegation and governors of the Pacific Northwest ensure that the U.S. Department of State seizes this once-in-a-lifetime opportunity to return balance to how we manage the mighty Columbia, by making sure that flood risk management and hydropower are properly balanced with keeping the river healthy. A healthier Columbia River — through a modernized Columbia River Treaty — means a healthier Pacific Northwest, for people today and in the future. John DeVoe is executive director of WaterWatch of Oregon. He submitted this essay on behalf of American Rivers, the Center for Environmental Law and Policy, the Idaho Conservation League, Idaho Rivers United, Pacific Rivers, the Save our Wild Salmon Coalition, the Sierra Club and WaterWatch of Oregon.
In all, 992 dots (646 green and 346 red) were placed to inform FishPass design. The community indicated desire to keep the site naturalized. The top five most popular features included a public restroom, fish sorting channel observation (i.e., viewing platform and underwater video), self-guided tours, a fishing pier and natural plantings with native trees. The five most undesirable features included interactive display and education screens, parking, permanent kayak and canoe parking/storage, grills and bare/linear concrete surfaces. Complete results from the red and green dot exercise are presented on the FishPass website (http://www.glfc.org/fishpass.php). Features deemed undesirable to the public (i.e., grills, covered pavilions) have been excluded from design consideration. A 30 percent engineering design, led by AECOM and overseen by the U.S. Army Corps of Engineers, will incorporate input from the public open house, surveys and project team meetings with local stakeholders. The project team is deeply engaged with the community and continue to provide project updates at pertinent Traverse City Commission and other meetings. The final engineering design is expected to be complete by December 2018 and will be put forward for public review and input.

The FishPass team appreciates the chance to work with such an engaging, educated and progressive community as Traverse City and sincerely thanks all those who provided thoughtful input to the design of FishPass. The team is working hard to “develop a unique engineering design that will reflect the desires, uses and values of the City of Traverse City” while advancing the science needed to sustain and improve our fisheries. Andrew Muir is the science director at Great Lakes Fishery Commission.

Other Stuff:
(We'll see.)

Wind To Blow Past Hydropower As Top Clean Electricity Source In Major Milestone

Wind offers an optimistic outlook two days after the White House dealt a serious blow to the solar industry.

By Alexander C. Kaufman, 01/24/2018, huffingtonpost.com

Wind power is forecast to surpass hydroelectricity for the first time as the nation’s top source of renewable electricity sometime in the next year, the U.S. Energy Information Administration said Wednesday. The sector is expected to produce 6.4 percent of utility-scale electricity in 2018, and 6.9 percent in 2019, propelled by a construction boom of new turbines across the country. Few new hydropower plants are in the works, so new electricity generation depends on how much rainfall and water runoff pools in existing dams and reservoirs. Hydropower provided 7.4 percent of utility-scale generation in 2017 — a particularly wet year — but that figure is projected to fall to about 6.5 percent in 2018 and 6.6 percent in 2019. “Although changes in weather patterns also affect wind generation, the forecast for wind power output is more dependent on the capacity and timing of new wind turbines coming online,” Owen Comstock, the lead industry economist at the EIA, wrote in a press release. The news marks a new milestone in wind’s steady rise. Wind energy usurped hydropower’s generating capacity for the first time in February 2017 as turbine installations tripled from 2008.
The latest announcement comes two days after President Donald Trump imposed new import fees on solar panels in a move analysts say will drive up costs and slow down a sector that has grown 17 times faster than the U.S. economy. The decision represented the most direct hit yet to the renewables industry from a White House that remains deeply skeptical of clean energy and the man-made climate change that necessitates it. Yet, as solar deployments are now expected to slow by 11 percent over the next five years, wind turbines are on track to continue proliferating. The United States is projected to gain 37 gigawatts of new wind capacity between 2017 and 2020, according to Bloomberg New Energy Finance. The share of capacity increases each year, from 7 gigawatts in 2017 to a projected 11 gigawatts in 2020. “What this means for generation is, basically, we’re seeing greater, bigger wind turbines, and more turbines that are better situated for the environment that they’re in,” Alex Morgan, North America wind analyst at BNEF, told HuffPost by phone Wednesday morning. “So, more bang for your buck.” Part of what’s driving the boom is a rush to build turbines to get the full benefits of the production tax credit. Congress extended the subsidy, which has been in place since the early 1990s, for five years in 2015. But the credit began phasing down by 20 percent in 2017, kick-starting a dash to build as many turbines as possible before the federal benefit expires.

Wind power has increasingly been a key energy resource during extreme weather events, such as the recent ‘bomb cyclone.’ Dylan Reed, Advanced Energy Economy Yet states are expected to continue providing incentives for wind energy long after 2020. The offshore wind industry — a popular form of energy in Europe, though currently limited in North America to five turbines off the coast of Block Island, Rhode Island — is only expected to gain steam after 2021, according to BNEF. For example, in New York, where the state plans to get half its electricity from renewables in 12 years, a series of projects off the coast of Long Island are expected to provide 2.4 gigawatts of energy by 2030, enough to power 1.25 million homes. “It’s no surprise to see wind power gaining in generation nationally like this as it now competes on long-term contract price in many markets across the U.S.,” Dylan Reed, head of congressional affairs at the trade group Advanced Energy Economy, told HuffPost by email. After a year of powerful gusts from record-breaking storms, the energy source has proved itself more valuable than ever, he said. “Wind power has increasingly been a key energy resource during extreme weather events, such as the recent ‘bomb cyclone.’”

However, effects of climate change are not necessarily a tailwind for turbines. Warming temperatures will significantly reduce the power of winds across north mid-latitudes, cutting wind
strength across the central U.S. — the nation’s main wind-producing region — by nearly a fifth, according to a provocative study published last year. “We found some substantial changes in wind energy,” Kristopher Karnauskas, an author of the study and researcher at the University of Colorado at Boulder, told The Guardian. “But it does not mean we should not invest in wind power.”