



8/18/2017



Some Dam – Hydro News™ *And Other Stuff*



Quote of Note: "By all means, marry. If you get a good wife, you'll become happy; if you get a bad one, you'll become a philosopher." -- Socrates

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"Good wine is a necessity of life." -- Thomas Jefferson
Ron's wine pick of the week: 2014 Colome Malbec "Estate"
"No nation was ever drunk when wine was cheap." -- Thomas Jefferson



Dams:

(Getting ready for the rainy season.)

Crews start emergency repairs downstream of Oroville Dam

By Mike Luery, Reporter, Aug 3, 2017, kcra.com

OROVILLE, Calif. (KCRA) — Work crews with heavy machinery started emergency repairs Thursday to a levee downstream of the battered Oroville Dam. The Feather River Levee was part of millions of dollars in damage after this winter's spillway failures at the tallest U.S. dam. State and federal authorities pushed through permits and funding to carry out the \$28.5 million in Feather River levee repairs by December, which falls in the first weeks of California's next rainy season. The repairs will strengthen three miles of levee that protects 75,000 people in and around the Feather River town of Yuba City.

(Racing to the finish line.)

Oroville Dam: Six months after disaster, a race to repair before next winter

By Paul Rogers | August 7, 2017, mercurynews.com

Six months ago, relentless winter storms dumped nearly 13 inches of rain in four days on the Sierra Foothills, tearing an enormous hole in the spillway at Oroville Dam, the nation's highest,

and leading to an unprecedented emergency that prompted the evacuation of 188,000 people from nearby towns. Today, what could have been ground zero for America's worst dam disaster is now a hotbed of construction activity. Hundreds of construction workers are laboring 20 hours a day, six days a week with huge dump trucks, cranes, excavators, bulldozers, concrete pumps and other equipment to demolish and rebuild the 3,000-foot-long main spillway — a massive chute as wide as 15 lanes of freeway— by Nov. 1, before the next winter rain season begins anew.



“We are on target. We have done about 95 percent of the demolition that needs to take place, and we are already placing new concrete for the new spillway,” said Erin Mellon, a spokeswoman for the state Department of Water Resources, which owns the dam. “Progress is pretty substantial.”

Led by Kiewit, a contractor from Omaha, Nebraska, that built Los Vaqueros Dam in Contra Costa County in the 1990s, construction workers are also shoring up Oroville's emergency spillway, with a new underground retaining wall being built into its hillside and layers of concrete being poured to reinforce its top. In all, for both spillways, crews will install 8.5 million pounds of steel rebar, and 55,000 feet of drainage pipe, enough to stack 10 miles high. They will pour 946,000 cubic yards of concrete over the next year — enough to fill nearly 100,000 dump trucks. But the crisis isn't over. Major questions remain. And disaster could happen again. An independent “forensics team” ordered by federal regulators to find what went wrong issued preliminary findings in May, citing defects from the dam's construction in the 1960s to problems linked to poor maintenance and oversight by state and federal officials. Its final report is due this fall. A separate investigation by engineers at UC Berkeley concluded that construction workers laboring for former Gov. Pat Brown 50 years ago cut corners, building the main spillway on weak rock that should have been excavated, then constructing the structure as thin as four inches in some places and failing to anchor or reinforce it properly.



Those dangerous shortcomings were compounded, the Berkeley report found, by trees that were allowed to grow along the spillway walls, clogging its drainage pipes with their roots, and an attitude of “patch and pray” from Department of Water Resources crews when the main spillway repeatedly developed cracks in recent decades. “It's not that complicated,” said engineer Bob Bea, founder of UC Berkeley's Center for Catastrophic Risk Management “It's a tragedy of neglect. It was poorly built and poorly maintained.” Meanwhile, the price tag is expected to reach at least \$500 million. The state is hoping 75 percent will be

paid by the Federal Emergency Management Agency, and most of the rest will come from the agencies that receive water from the State Water Project, which include the Santa Clara Valley Water District and the Metropolitan Water District in Los Angeles. Like our Facebook page for more conversation and news coverage from the Bay Area and beyond.

Outside dam experts say the current repairs — which are scheduled to finish in 2018 — are only the beginning. The state Department of Water Resources needs to do far more to modernize other huge dams across California, they say, and to make additional fixes at Oroville, where the aging steel gates atop the dam's main spillway have numerous cracks and a mysterious green spot in the face of the 770-foot-tall earthen dam has some people worried whether the dam is slowly leaking. “There are safety issues that are still outstanding,” said Ron Stork, policy director with Friends of the River, a Sacramento environmental group. “They are going to need attention sooner or later.” Residents of the area are watching nervously. “In many ways things are back to

normal because we don't have an imminent threat," said Larry Matthews, 66, who lives in Yuba City, south of Oroville. "But people have a real concern that maintenance wasn't done correctly. They want it fixed correctly. There's certainly some paranoia but you can't blame people for that."

Matthews moved to Oroville with his family from Los Angeles in 1963 when he was 12. "I saw that dam being built when I was a teenager," he said. "People were proud of it. You trust the people who built it. It lasted for 49 years without any major problems. When I saw all that concrete broken on the spillway, I said "it can't be true. It looked like somebody photoshopped it." After the hole developed on Feb. 7, the issue became an international story. State officials closed the main spillway, and the lake level rose to the top. Five days later, on Feb. 12, as water poured over the emergency spillway, eroding so badly it threatened to collapse, Butte County Sheriff Kory Honea issued an emergency evacuation order with phrases like "This is NOT a drill" spread across social media, radio and TV. Chaos ensued. Matthews, who three years ago wrote a book, "The Building of the Oroville Dam," collected up birth certificates, passports and other vital documents in a garbage bag and prepared to flee with his wife and 93-year-old mother-in-law. Stores closed. Gas stations were overwhelmed. Panicked motorists drove on the shoulders of Highways 70 and 99. Matthews sat up all night watching TV news, ready to make a run for it with his family if he saw reports that the emergency spillway was collapsing, releasing Lake Oroville, which is 10 miles long and California's second-largest reservoir, onto the towns below. State water officials made a gambit. They re-opened the badly damaged main spillway to lower the lake. They knew the water — flowing at 750,000 gallons per second — would rip it apart, and hoped the violently out-of-control flows would not start eroding away the face of the dam itself. The plan worked. The lake level dropped. Water stopped flowing over the emergency spillway. The dam held. And two days later the evacuation order was lifted. "People are still concerned," said Beth Bello, an office manager who lives in Oroville. "They are saying on Facebook 'Is the dam leaking?' The construction workers are doing the best they can. But I do wonder how much the state is really telling us. They should have done more in the past. It could have been prevented."

John Laird, California's secretary of natural resources, who oversees the Department of Water Resources, said the incident brought back memories of the 1989 Loma Prieta earthquake, which destroyed Santa Cruz's historic downtown, where he once served as mayor. "I knew that the dislocation I felt then," he said, "was the dislocation being felt by the community evacuated in the Oroville area." Laird said the state, which has lowered the lake level by 110 feet, is committed to rebuilding the main spillway by this winter so it can handle new storms, and then finishing the job next year. The plan will be done in two stages, with the bottom 75 percent replaced now and the top replaced next year. He said the state plans to learn from the investigative reports. "We must never let down our guard and we can always do better," he said. Bea, of UC Berkeley, also investigated levee failures in New Orleans after Hurricane Katrina, the BP oil spill in the Gulf of Mexico and PG&E's 2010 pipeline explosion in San Bruno. He said the entire hillside at Oroville's emergency spillway should be armored with concrete, the steel gates on the main spillway should be replaced, and that the state needs to do an immediate, detailed investigation into the green spot on the dam, which state officials say is a harmless natural spring. Bea said California needs a top-to-bottom change in dam safety, with much more preventative work to avert future disasters that could kill thousands. "There is no free lunch," he said. "You pay a little now, or one hell of a lot later."

(Never ending comments.)

Editorial: Oroville Dam repairs are just the start

By Chronicle Editorial Board, August 7, 2017, sfchronicle.com

Workers have been laboring hard to get the spillway at Oroville Dam fixed in time for the winter rainy season. There has been intensive construction to repair a hole in the spillway, as well as to shore up the dam's emergency spillway with a new underground retaining wall. The state Department of Water Resources, which owns the dam, is confident that the construction repairs for the spillway are on target. It will be good news indeed if the dam repairs are completed on time.

But outside dam experts — and local residents — have concerns about the dam that go beyond immediate repairs. They're right to have them.



Two separate teams of independent investigators have noted defects in the dam's original construction in the early 1960s. There also appear to be long-standing problems with maintenance and official oversight. Considering the struggles both reporters and the public have had in accessing information about the dam repairs, the problem of oversight may not be going away anytime soon. In June, the state Legislature voted to keep emergency action plans for dams secret. We understand that dams are crucial infrastructure and must be kept safe from terrorists. But considering the recent emergencies, it's indefensible to deny the public access to safety information. This is especially true in the face of growing public skepticism over the state of California's dam infrastructure.

California water officials have ordered inspections of spillways at 93 dams they believe could pose a risk to downstream communities. While many of those dams are likely to be fine, the list includes some older, larger dams that may warrant more scrutiny. If an older dam like Oroville had construction defects and maintenance problems, how many other problems are out there? Outside experts have already suggested that California needs to dramatically upgrade its dam infrastructure. A nervous public would certainly agree. However, it's an open question as to whether state and federal officials will agree. The price tag for the Oroville repairs alone is expected to be in the hundreds of millions of dollars. The matter of who pays for the state's badly needed infrastructure upgrades, and how much, is a question that goes beyond California's many aging dams. The one thing that's for sure is that Oroville's disaster could happen again. *This commentary is from The Chronicle's Editorial Board. We invite you to express your views in a letter to the editor. Please submit your letter via our online form: SFChronicle.com/letters.*

(Why are we hearing of this now?)

Panel Weighed Oroville Spillway Failure in 2014 — and Called It Unlikely

By Dan Brekke, August 9, 2017, kqed.org

Consider a couple of scenarios for big trouble at Oroville Dam: First: The facility's main concrete spillway suffers serious damage, resulting in erosion of the rock beneath it — and potentially threatening the safety of the dam itself. Second: Water fills Lake Oroville, the gigantic reservoir behind the dam, and begins surging down a steep unpaved hillside that's meant to serve as an emergency spillway. The slope suffers serious erosion, again potentially threatening the dam's safety. These scenes will sound familiar to anyone who followed the crisis at Oroville,



which began to unfold six months ago this week. In fact, you may think you watched them happen. KQED's Oroville Spillway Coverage Flaws in Design, Building and Upkeep Led to Oroville Spillway Failure, Report Says But these aren't descriptions of actual events. They're worst-case scenarios that a federal-state safety review considered more than two years before Oroville became a synonym for "near catastrophe." The review — part of a process in which state,

federal and independent experts study situations that could threaten a dam — agreed the scenarios were so unlikely that they didn't merit further consideration.

That finding, apparently based on inaccurate or incomplete information from the California Department of Water Resources about the condition of the dam's spillways and the strength of the rock they were built on, has led some dam safety experts and DWR critics to question both the evidence the safety board reviewed and whether the review process itself is effective. The study — called a potential failure mode analysis, or PFMA — was performed in 2014 as part of what's called a Part 12D safety review, a title that refers to a Federal Energy Regulatory Commission regulation that requires independent safety inspections for most large dams every five years. The PFMA declined further study of 31 "candidate" possible failure modes, including the two that outlined possible spillway failures. "Spillway chute is in good condition, and the underlying rock is very competent." 2014 Oroville Dam safety review

Although the details of the analysis for the spillway failure scenarios are not publicly available, Department of Water Resources documents KQED obtained under the California Public Records Act give a clear indication of why the experts decided to shelve them. In dismissing the possibility that the main spillway might be lost, the PFMA summary said the 3,000-foot-long concrete chute "is in good condition, and the underlying rock is very competent." The experts declined further study of the emergency spillway scenario — which contemplated an overflow about 25 times greater than the one that actually occurred in February — because of "competence of rock, with lack of erosional evidence" on the unpaved hillside.

"Competent" rock refers to rock that is only lightly weathered and is structurally sound and resistant to erosion. But despite the declarations in the PFMA summary, the February near-disaster showed that extensive areas of the rock underlying the concrete spillway and the hillside serving as the emergency spillway were incompetent and highly erodible. The condition of the main spillway, too, is called into question by records that show DWR was well aware its concrete surface was prone to chronic cracking and that water flowed through numerous flaws in the chute floor and undermined parts of the structure. The records show the spillway underwent top-to-bottom repairs on at least three occasions, including: 1977, when it was less than a decade old; 1997, after record releases caused what DWR described as "distress throughout the length of the spillway"; and 2009, when work was required at about 1,000 locations to fix cracks, exposed rebar, eroded concrete, broken subsurface drains and voids that had opened under the chute's slab. The four outside consultants hired to conduct the 2014 Part 12D safety review, including the PFMA process, did not respond to emailed requests for comment.

Department of Water Resources spokeswoman Erin Mellon said in an email Monday the evidence presented for the potential failure mode analysis included a site inspection and historical documents including past geologic studies of the area. While not offering specifics about the data considered, Mellon said "the information gathered showed the spillway was in good condition and the rock beneath it was extremely competent."

Poor-Quality Rock

J. David Rogers, a professor of geologic engineering at the Missouri University of Science and Technology who has visited the Oroville facility since the February crisis, said he was startled by the description of the rock under the spillways as being sound. "The principal issue with performance of the service and emergency spillways has been the poor quality of the underlying 'rock,'" Rogers said in an email. He characterized the material as "deeply weathered ... essentially with the consistency of stiff soil, not rock. The depth of weathering varies from 20 to 80 vertical feet, based on simple visual inspection." "The principal issue with performance of the service and emergency spillways has been the poor quality of the underlying 'rock.'" J. David Rogers, Missouri University of Science and Technology. Rogers said the review panel would not have had "any easy means" of determining the true character of the material underlying the spillways — except perhaps for the appearance of "apparently competent" bedrock exposed at the top of the spillway adjacent to the massive control structure that houses a set of eight huge

floodgates. But the appearance of that apparently sound rock might have been misleading, Rogers said, because crews had to remove 70 feet of material to reach it. Most of the rest of the spillway, he said, was excavated no more than 20 or 25 feet deep. **That left masses of weaker material in place under the spillway.** When the concrete chute breached during moderate flows in February, he said, “the rushing water was able to pluck crushed rock and soil” from beneath the spillway, ultimately destroying it.

Emergency Spillway: Theory vs. Reality

The main spillway failure in February came just as a series of powerful, warm storms dumped heavy rain over the Feather River watershed, partially melting a thick blanket of snow that had fallen earlier in the season and triggering a surge of runoff into Lake Oroville. Dam managers responded by ramping up releases down the spillway to about 50,000 cubic feet per second, less than 20 percent of its design capacity and about one-third of its record flow rate in January 1997. After a large hole appeared in the spillway on Feb. 7, DWR temporarily stopped releasing water down the chute, then resumed limited flows as large sections of the rock beneath the concrete structure rapidly eroded — contrary to the confident assertions that the material was “very competent.”

Meantime, the lake rose toward its rim. On Feb. 11, for the first time in the dam’s history, water began pouring over a 1,700-foot-long weir adjacent to the concrete chute and down the hill designated as the dam’s emergency spillway. Less than 30 hours later, on the afternoon of Feb. 12, uphill erosion of the type dismissed by the 2014 PFMA had scoured channels as much as 50 feet deep and appeared to be threatening the stability of the weir. The fear of a collapse, which would unleash a catastrophic flood down the Feather River, prompted the emergency evacuation of Oroville and other riverside communities. **That uncontrolled flow in February peaked at about 12,500 cubic feet per second, just a tiny fraction of the 350,000 cubic feet — about 2.6 million gallons — per second it was supposed to handle.** (The regulated flow over Niagara Falls, by comparison, is 100,000 cfs during “tourist” hours.) **That theoretical maximum flow over Oroville’s emergency weir represented what might happen in a worst-case flood scenario, when both spillways would have a single purpose: preventing water from flowing over the top of Oroville Dam, an event that could lead to the structure’s collapse.** The Department of Water Resources and FERC had insisted for more than a decade prior to the February emergency — and through three separate potential failure mode analyses — that even under the duress of extremely high flows racing down the tree- and brush-covered slope, erosion would be limited to just 1 to 4 feet of surface material.

Erin Mellon, the DWR spokeswoman, on Monday repeated earlier department statements that it’s up to an independent forensics team — appointed in March at FERC’s direction — to analyze the causes of the spillway failure. She didn’t respond to a question about why DWR’s understanding of the conditions underlying the spillways was so different from actual conditions.

A Need for Re-evaluation?

Martin McCann, an adjunct professor at Stanford’s College of Civil and Environmental Engineering and director of the college’s National Performance of Dams Program, says the Oroville episode shows a re-evaluation of the way potential failure mode analyses are done may be in order. **“In light of the two regulatory bodies and a responsible owner being involved in the PFMA process, we’ve got to ask ourselves, ‘Are we getting it right?’”** McCann said in an interview. **“This stuff is not easy — it really is quite difficult,”** he said. **“It takes expertise, it takes experience, it takes interpretation and evaluation on the part of experts, and that’s very hard. Perhaps the process needs to be re-examined.”** **David Rogers, the Missouri geoenvironmental expert, said Oroville could shake up future safety dam reviews.** **“Unexpected failures have a way of waking people up and providing a much needed ‘reality check’ for both the engineers and the politicians,”** Rogers said. **One of those who agrees is Assemblyman James Gallagher, who represents Oroville. He’s proposed legislation, AB 1270, that would require more frequent and tougher dam safety inspections and subject them to periodic review by UC Berkeley’s Center for Catastrophic Risk Management.** Gallagher said in an interview last week that the 2014 PFMA decision to

decline further study of the possibility of spillway failures “goes to one of the fundamental issues” raised by the Oroville crisis. “We have independent oversight,” Gallagher said. “But the question is, are they asking the right questions? Do they have the right data to properly provide that oversight? ... When something catastrophic happens, do we have enough information and the right processes and procedures in place to handle those situations? And the answer right now is clearly, no, we don’t.”

(FEMA money headed to Oroville.)

FEMA pays almost \$23 million toward Oroville Dam spillway crisis costs

By Staff Reports, 08/09/17, 2:57 PM PDT | chicoer.com

Oroville, CA >> The Department of Water Resources has received a first payment from the federal government for costs related to the Oroville Dam spillway emergency.

DWR received \$22.8 million from the Federal Emergency Management Agency to pay part of the initial costs of responding to the emergency in February, DWR Public Relations Director Erin Mellon told a media call Wednesday. Mellon said DWR had submitted a \$30 million claim to cover costs of the first few days of the crisis, and that FEMA typically pays about 75 percent. She said it was the “first of many submissions” to FEMA.

(Putting Fed money to work.)

Federal Funds to Help Research Monitoring of Kentucky Dams

By STU JOHNSON • 7/31/17, weku.fm

A \$200,000 homeland security grant is expected to help ensure safety around scores of dams across Kentucky. The federal funds will help state officials begin research into new monitoring and flood warnings for people downstream. Kentucky has some 960 regulated dams along its waterways with about 200 state or local government-owned.



Division of Water Director Peter Goodmann says the homeland security money is focused on ways to better manage risks downstream from dams. “What kinds of things can we do on the dam instrumentation on and in the dam? How well does that work? And then how do you translate that into some sort of downstream warning system?” posed Goodman. Goodmann says there are about 300 high-hazard dams in Kentucky. He says that doesn’t mean they are at risk of failure, just that if there is a significant breaching of the dam, loss of life is likely.

(Tragedy at low head dam. Signs aren’t enough.)

Death of Fort Wayne kayaker fuels efforts to warn of dam risks

By WANE Staff Reports, July 31, 2017, wane.com

FORT WAYNE, Ind. (AP) — A northeastern Indiana couple whose 24-year-old son drowned in a low-head dam is raising awareness about the dangers of dams. The Pelorus Project has put up 30 signs along Fort Wayne’s three rivers warning kayakers and canoeists to get out of the river before they reach a dam. The Hiebel family founded the organization after Sean Hiebel died two years ago while kayaking in the Maumee River Dam, also known as the Hosey Dam.



On June 23, 2015, Sean and his two friends kayaked over the dam and were thrown from their kayaks. Two made it to shore. Sean drowned in the hydraulic action at the base of the dam, an experience compared to being trapped in a washing machine. His parents searched for him for

three days. "During those three days, of course we were distraught," said his mother, Jennifer Lovely. "Our world was just spinning out of control. We didn't know what we were going to do, how to deal with the situation."

Low-head dams can be deadly because people can get trapped in the hydraulic action of the water at the dam's base. So far in 2017, 16 people have been rescued from low-head dams, four have been injured and four have died. "You might think it's a very calm situation where you are going to go over and try to take a risk, but it's a life and death matter right there to where you're going to go in and that circulating current will keep you at the face of the dam," explained Indiana DNR corporal Rodney Clear. "Basically it's called a drowning machine. It's very, very unfortunate these situations." There's no state or federal program that funds signs on rivers to warn about the dams, a shocking truth for Sean's parents. "Legislation is always going to take time, we understand that," said David Hiebel, Sean's father. "I think our feeling is more for the immediate. We want to get things to happen soon and now to save lives so really what we need is people in their own communities to pick up the baton and run with it to carry this initiative through their communities through their city and government leaders." The Pelorus Project has also carved out a port about 400 feet from the Maumee River Dam where kayakers can get out of the river. It's the last place you can get out of the river safely before you go over that dam. They report that their dam safety awareness partners are also working to get buoys in the rivers with warning signs on them of upcoming dams. Visit the Pelorus Project's website to learn more.

(100 years and still ticking.)

Orman Dam still providing farmers with water after 100 years

By Brenna Ramsden | Aug 04, 2017, kotatv.com

RAPID CITY, S.D. (KOTA TV) - When Orman Dam was built, it wasn't expected to last long. Some people say it was rumored to last only 50 years, but the dam has doubled its expectancy. Orman Dam and the Belle Fourche Reservoir have been providing farmers in the Northern Hills with irrigation capabilities since 1912, and today serves at maximum capacity.

"We have 57,143 acres I believe," said Bill Anderson, Project Manager of the Belle Fourche Reservoir, "That is the state limitation, we cannot exceed that." When construction started on Orman Dam in 1906, engineers didn't use modern construction practices. It's made mostly of native clay soils, but Anderson has a theory as to why it works so well. "I think it got good compactions because of the mules and horses," said Anderson, "Those hooves have good compaction."



The original idea was to use using gravity to push water to farmers in the area, but now different practices are used. Anderson says nearly 20 percent of the acres in the project are using pivot irrigation systems. Some parts of the project have been updated from the original clay pipes and open canals. Nearly 41 miles of pipe have been laid underground, but other areas are still functioning as they did 100 years ago. "We still have 400-some miles of dirt ditches which are not terribly efficient," said Anderson, "There is a lot of losses on those dirt ditches." Anderson says the tow drain on Orman Dam runs 8-10 gallons year round, while the neighboring Angastora Reservoir runs nearly 200 gallons. Although the dam is directly impacting farmers in the project, the wealth does not stop there. "It's not just the immediate farmers, it is the entire tri-state area," said Anderson "There is a lot of economy that depends on this project."

(Those stubborn dam builders.)

Franklin: Beavers raising water, worries

By Scott Calzolaio, Daily News Staff, Aug 3, 2017, milforddailynews.com

FRANKLIN, MA — Local officials are weighing what to do with a colony of beavers whose natural handiwork threatens an earthen berm at DelCorte Reservation off Pleasant Street. An expert from ESS Group, an environmental engineering firm, walked around the ponds and other parts of the reservation on April 7 looking for signs of beaver busywork. After discovering that the critters were indeed making themselves at home, ESS installed a motion-activated camera for 13 days.



Four beaver lodges were found along the shoreline, two of which appear to be in use. One dam in the area is blocking water flow from the upper basin to the southern basin. The dam is flooding trees near a berm on the upper basin, or pond, according to an ESS study. That could be a problem if the berm continues to flood. "There are undesirable conditions which, over time or during a large rainfall event, could lead to erosion of the earthen berm and potentially impact its structural integrity," ESS reports. ESS recommends removing the dam but first clearing trees from the berm. Beavers would use those trees to rebuild their dam. If the problem continues, experts suggest trapping and moving the beavers elsewhere.

(Another low head dam incident.)

Caught on video: Man jumps in Comal River to save teen from dam backwash (Watch video.)

<https://www.ksat.com/news/caught-on-video-man-jumps-in-comal-river-to-save-teen-from-dam-backwash>

'She was just rolling and rolling'

By Garrett Brnger - Reporter, August 05, 2017, ksat.com

NEW BRAUNFELS, Texas - Charging along the top of the dam, Adan Sanchez leapt into the churning waters of the Comal River to save a stranger. His wife caught Sanchez's leap on camera, as well as a girl struggling in the backwash of a small dam just downstream of the popular New Braunfels City Tube Chute. Sanchez said he was able to grab onto the girl and get both of them clear of the boil. "She could have drowned," Sanchez said. "She was going under. I think her feet were sideways, and she was just rolling and rolling. She'd come up and go back down." Sanchez, a U.S. Border Patrol agent who was vacationing with his family, had been relaxing on the river bank downstream of the popular City Tube Chute when, he said, a woman came running past. "She grabbed a noodle, those floaty noodle things, jumped in," Sanchez said. "And someone started yelling, 'Little girl's drowning over there. Little girl's drowning.'"



Sanchez and his wife, Delia, said it was not crowded when the incident happened, and the city's park rangers weren't around. So if anybody was going to help that girl, it was going to be a bystander. At first, Sanchez said he came over just in case, but when the girl's mother jumped too far past the girl to save her, he jumped in too. "Kind of hoping somebody would have done it if my child was drowning as well," he said. "So, I don't know. I just reacted. I just did it. I don't know why. I just did it." On the shore, Delia Sanchez didn't realize what her husband was doing until he jumped. "At first I was like 'OK, he's going to save her.' But then I realized, you know, like, 'What if something happens to him right there?'" she said. The water was not very deep, he said, but it was strong. "It was just constant pushing, pushing, trying to fight it. It was tough," Sanchez said. Sanchez grabbed onto the girl, and he thinks he was able to push off the bottom a little, getting them out of the seething water that had trapped the girl. The teen is hardly the first to get in those waters, and a line of buoys upstream keeps the majority of people from going over the dam. "You used to see that on a regular basis, where people would get kind of caught up in that white water, that undertow," New Braunfels Police Lt. Jacob Pullen said. "But since those buoys got put

in there, it's a very rare occurrence now." When it does happen, though, it's good to have someone like Sanchez nearby.



Hydro:

(Bigger and big. Three Gorges is bigger. This is big.-16,000 MW)

Construction of world's second largest hydropower station begins

Source: Xinhua | 2017-08-03-2017 | Editor: Yang Yi, news.xinhuanet.com

A ceremony is held at the construction site of Baihetan project, which is located downstream of the Jinsha River, the upper section of the Yangtze, in Ningnan county of southwest China's Sichuan Province and Qiaojia county of neighboring Yunnan Province, on Aug. 3, 2017. Building work on what will be the world's second largest hydropower station started Thursday. (Xinhua).



(An argument for dam removal.)

A changing electrical grid may make Snake River dams expendable — and help save salmon

By Rocky Barker, idahostatesman.com, August 04, 2017

PASCO, Wash. - *Editor's note: The Northwest has yet to figure out a sustainable plan to save imperiled Columbia salmon. This is part two of a series exploring whether salmon can ultimately survive.*

The fate of the Northwest salmon may be decided by the way you use your heater and your air conditioner.

In the near future, the U.S. electric grid will be able to digitally manage the vast Northwest hydroelectric network in a way unimaginable just a few years ago.

With consent from customers, it will be able to adjust the heaters and air conditioners of millions of homes and buildings, or tap into the batteries of electric cars or other smart appliances. It's a revolutionary change for the Northwest economy, the energy market, the Columbia Basin dam system and the salmon that migrate through it.

The four dams of the Snake River in Washington are less valuable now due to a power surplus caused by wildly successful energy-efficiency programs, cheap natural gas, and rapidly growing wind and solar energy options. The dams hinder the salmon that spawn in the best habitat in the Northwest — in Central Idaho. And this stronghold has the highest, coolest mountain streams that may keep salmon surviving in a warmer, drier future. Twenty years ago, arguments against breaching those dams centered around the loss of crucial power supplied to the region. But as the role of the dams in the Northwest hydrosystem changes, so does their role in the political and environmental ecosystem. As the four lower Snake dams become less relevant pieces of a larger, flexible network, they become more vulnerable. Climate change has contributed to this transformation because public policy demands the low-carbon power like the dams produce.



The future of the Northwest's hydroelectric system will be to augment the ever-growing supply of intermittent low-carbon energy sources like wind and solar. It also will continue to play a crucial role as quick-response electricity at times of peak demand. But the dams still have strong political and cultural pull. Wheat farmers in Idaho and eastern Washington still depend on shipping their grain and staying competitive in the Asian markets even though shipping on the Snake has dropped more than 70 percent since 1998. Independent biologists say the \$16 billion spent over the last two decades is not enough to offset the effects of the dams and climate change on wild salmon and steelhead. And some already argue that the savings from removing the four dams on the lower Snake River and spending less to mitigate the damage to salmon exceeds their benefit to the electric grid and economy. If the four dams are less important to the Northwest electric grid, argues Ben Otto, a Boise lawyer and environmentalist who chairs the Northwest Energy Coalition, they are more critical than ever to the Idaho salmon that migrate down and up the Snake River. "Removing these dams is very important to allowing salmon a chance to move freely between the habitat they need to live," Otto said.

DO WE NEED THE POWER?

The hydropower posse promotes the dams' importance. The 1,000 megawatts the four dams produce annually -- enough to supply the city of Seattle, are mostly produced in the spring, when water is plentiful but electric demand and prices are low. The Bonneville Power Administration pays wind producers to turn off their generators at times of surplus power in the spring. The greatest value these four run-of-the-river dams provide is "sustained peaking capacity," which means the ability to meet energy needs for four to eight hours when a cold spell or heat wave produces a big surge in electricity demand. The region is forecast by 2021 to have a shortage, which makes the grid less reliable due to the planned closing of coal-fired power plants in Oregon, Washington and Montana. Removing the four lower Snake dams would make the system slightly less reliable, said John Fazio, an energy analyst with the Northwest Power Planning and Conservation Council.

But the council, an eight-member panel appointed by the governors of Oregon, Washington, Idaho and Montana to advise the BPA, says in its latest plan that 3,500 megawatts will be available as demand-response technology develops, enough to keep the system safe. A series of digitally connected buildings, for instance, could have their thermostats raised or lowered by a half a degree or more to reduce the peak demand load when needed. The same technique can be used when the wind doesn't blow or clouds cover solar generators. The Pacific Northwest National Laboratory's many scientists are helping develop new technologies, including storage batteries that can make the region's renewable energy meet the same need. "The reality is we just aren't there yet where we can replace baseload hydroelectric power," said David Reeploeg, the council's vice president for federal programs. But Otto and other green energy supporters say that could change within the next decade and they are confident the current system can be reliable without the four Snake dams.

TIME FOR A DECISION

The Columbia River system once sustained 8 million to 16 million salmon returning annually. But 150 years of overfishing, habitat destruction, dam building and water pollution took its toll. By 1995, less than 800,000 returned and Columbia Basin salmon were listed under the Endangered Species Act, a law that forces the federal government to show its actions help, not harm, the fish. Three federal judges since 1994 ordered the BPA, the Army Corps of Engineers and the Bureau of Reclamation to take increasingly stronger steps to reduce or offset the effects of the dams on salmon. U.S. District Judge Michael Simon has now ordered the agencies to conduct a new environmental review and plan, with an immediate plan for operating the dams due by 2018 and a final decision on a long-term plan by 2021. Simon said that plan must include a review of keeping or breaching the four Snake dams, the latter being an option that many scientists argue is the best way to rescue those imperiled salmon. The four dams are Ice Harbor, built in 1961; Lower Monumental, built in 1969; Little Goose, built in 1970; and Lower Granite, built in 1975. As the court cases have crept along, technology, politics and money have transformed the electrical grid that serves as the foundation of the Pacific Northwest's \$820 billion economy. The transformation

goes well beyond the growth of renewable energy sources and replacing coal with cheap natural gas.

"The industry is going through a fundamental change and nothing is standing still," said Shauna McReynolds, executive director of Pacific Northwest Utilities Conference Committee.

"Environmental policies and other policies are driving the industry like they never have before." Will Hart, executive director at Idaho Consumer-Owned Utilities Association, represents 130,000 Idahoans who get all or part of their electricity from the federal dams. He points to two reasons they remain a public good: the carbon they avoid and the historic returns of mostly hatchery salmon during the last decade. "I see a future for those dams," he said. He thinks the 30 percent of his customers' power bills that go to salmon costs have been worth the price. But Jim Waddell, a retired U.S. Army Corps of Engineers manager who led the last environmental review of the four dams, in 2002, said the costs for those dams far outweigh the benefits. "For every dollar the taxpayers and the ratepayers invest in these four dams, they get back 15 cents," Waddell said.

(Another argument against dam removal.)

Is Snake River shipping worth enough to keep dams that harm salmon?

By Rocky Barker, idahostatesman. August 06, 2017

LEWISTON - For Idaho wheat farmers like Joe Anderson, staying competitive in international markets is critical to their future. That's why Anderson, a fourth-generation farmer from Genesee and a member of the Idaho Wheat Commission, met in June with delegations from China, Chile and Taiwan, negotiating contracts and showing off what the farmers can deliver. One of the advantages they tout is access through Lewiston to ship wheat on barges down the Snake and Columbia rivers, to Pacific ports.



"This river system is incredibly important as a competitive factor," said Anderson.

Wheat farmers are nearly the only shippers still using the Snake River waterway, completed in 1975, that links Lewiston to the Pacific. Shipping on the Snake has dropped by 70 percent since its peak in 1998. Other shippers have shifted to Puget Sound ports for hauling their products to Asia, and the various ports always had a hard time getting goods to move back upriver to Lewiston. Clearwater Paper Co., the major employer in the port 465 miles from the ocean, has moved its operations to rail — a major change from about two decades ago, the last time the U.S. Army Corps of Engineers and other federal agencies considered removing four key Snake River dams in Washington. At the same time, a handful of farmers who irrigate their orchards, potatoes, corn and other crops from the reservoir behind one of the dams, Ice Harbor, have expanded their presence from 35,000 acres up to 60,000, also growing their economic clout. Energy efficiency, cheap natural gas, and growing wind and solar plants have made the dams' combined power — enough to keep Seattle lit each year — less essential. For years now, environmentalists have argued for removing them, saying the benefits to Northwest salmon runs will far outweigh any negative effects.

The dams' value to shipping, irrigation and recreation comes into play as federal officials again weigh their economic benefits. The most recent environmental study, finalized in 2002, concluded that leaving the dams in place was cheaper than taking them out. But Jim Waddell, the retired U.S. Army Corps of Engineers manager who headed the study, now says the agency's calculations were wrong. "A re-analysis of the 2002 report demonstrates that the projected cost of keeping the dams was understated," Waddell said. "Today the reality is not that breaching the dams would be too expensive, but rather that we cannot afford to keep these dams in place in their present configuration." His view is not shared by the people who depend on those dams.

"I believe the current efforts by the region to restore salmon runs are important," said David Doeringsfeld, director of the Port of Lewiston. "I also believe protecting fish, producing renewable energy and sustaining our economy are not mutually exclusive."

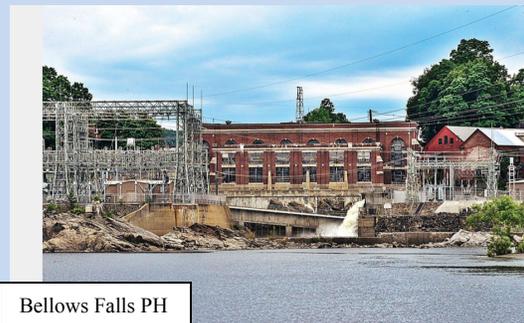
In 2014, the Port of Portland, the key destination for most goods shipped from Lewiston, lost its container shipping. Lawsuits also halted the shipping of oversized loads of mining equipment on the river and U.S. 12 east to Montana. Reversing both of these decisions would be necessary for Snake River shipping to recover, critics say. Doeringsfeld is optimistic that Portland will get a new container shipping contractor and that a court decision will allow oversized loads to resume. "With the return of container steamship service in Portland and transport of oversized cargo on U.S. Highway 12, I believe shipping volumes will grow," said Doeringsfeld.

(Relicensing woes.)

Dams' owner must re-examine erosion

By Mike Faher, Special to the Reformer, August 6, 2017, reformer.com

Federal regulators say the owner of three Connecticut River hydroelectric dams needs to take another look at erosion issues. Great River Hydro is seeking renewed Federal Energy Regulatory Commission licenses to operate the Wilder, Bellows Falls and Vernon hydro dams. As part of that process, the Massachusetts-based company had submitted two years of erosion-monitoring data. But in a recent decision, federal officials said the company's analysis was "incomplete and inconsistent with what was required in the approved study plan."



The commission ordered Great River to submit revised erosion reports by Nov. 15. That's good news for Connecticut River Conservancy. The Greenfield, Mass.-based nonprofit had been critical of Great River's studies and wants more information on the hydro dams' possible effects on riverbank erosion. "This might help us make better recommendations about how we want them to operate in the future," said Andrea Donlon, a river steward at the conservancy. Jennifer Griffin, a Great River staffer who handles federal licensing and compliance, said the company is "still reviewing the contents of the FERC letter and determining a response but cannot offer any details at this time." Griffin also noted that the company has 30 days to decide whether to ask the commission to reconsider its request.

Earlier this year, Great River Hydro acquired 13 hydroelectric properties on the Connecticut and Deerfield rivers. Great River, which is a subsidiary of Boston-based ArcLight Capital Partners, paid TransCanada nearly \$1.07 billion for the properties. TransCanada already had been pursuing relicensing for the Wilder, Bellows Falls and Vernon dams for several years. Those licenses are due to expire at the end of April 2019. Soon after Great River took control of the dams, an administrator said the company wouldn't miss a beat in the relicensing process. In fact, federal regulations required Great River to submit a voluminous relicensing application by May 1 - less than two weeks after becoming the property owner. Due to that tight time frame and the complexity of the process, some environmental studies associated with relicensing are not yet finished. But a Great River Hydro representative in June said the company had wrapped up all erosion studies. Erosion has been a hot-button issue in communities where some say river fluctuations from hydroelectric operations have impacted riverbanks much more than natural flows would have.

Connecticut River Conservancy had been among several nonprofit and governmental entities that took issue with Great River's erosion studies in connection with the federal relicensing process. In comments filed with the federal commission in May, the conservancy - which enlisted an

engineering consultant to review Great River's studies - said the company "failed to rely on generally accepted scientific methods" and "otherwise reached conclusions that the science, data or evidence do not support." It fell to FERC to weigh such objections against Great River's reports. And commission staff, in a determination issued July 21, sided in part with Great River. For instance, federal officials rejected calls for the company to perform additional statistical analysis of its erosion data. And the commission declined to compel Great River to collect additional groundwater data as it relates to erosion.

But FERC did send Great River back to the drawing board in several respects, including: - The commission says Great River must file a revised study report in November analyzing "critical shear stress" - defined as the point at which the force of a river picks up sediment - and near-riverbank water velocities at 21 monitoring sites. The company also is supposed to consider potential connections between those two issues and the hydro dams' operations. The ruling appears to validate concerns expressed by the Connecticut River Conservancy and the New Hampshire Department of Environmental Services. Those organizations had argued that Great River's study method "fails to capture the complexities of the erosion processes," according to federal documents. - FERC also wants Great River Hydro to revisit its measurements of river velocities. **The company measured velocities at six monitoring sites and found that, "under normal project operation," river flows were below the speed required for erosion.** But federal officials say Great River should gather information about riverbank water velocities associated with multiple water elevations - not just normal dam operations. Also, the company must submit an analysis of river velocities at its 15 other monitoring sites. "Accurate velocity assessments are necessary to determine the conditions under which sediment is transported from bank areas," the FERC order says. - In its revised November report, Great River also is supposed to include more information about the relationship between observed erosion and riverbank characteristics including soil types.

FERC notes that "stream bank erosion may be more likely to occur with certain soil types" when **subjected to fluctuations in water elevations.** Even after Great River Hydro submits its revised erosion reports, there will still be a long way to go in the relicensing process. In a meeting in Windham County earlier this year, a Great River representative described the process as lengthy, complicated and expensive. **But Donlon said the conservancy and other participants in that process want as much accurate information about the dams and the river as possible.** Donlon acknowledges that there are river issues Great River Hydro doesn't control. But she added that "we want to know what effect they're having on the part they can control."

(Free money – sort of!)

US Dept. of Energy Announces Availability of Hydroelectric Incentive Funds

By Dan McCue, renewableenergymagazine.com, 07 August 2017

The US Department of Energy's renewable energy office Monday announced the availability of hydroelectric incentive funding and issued an updated guidance on the program.

Both the notice and the guidance were published in the Federal Register. **The US Congress established the incentive program supporting the expansion of hydropower energy development at existing dams and impoundments in 2005.** In fiscal year 2017, the Energy Department allocated \$6.6 million for this purpose. Recently, the department made what it calls a "minor" update to its guidance for the program. That guidance is located here. The guidance describes the hydroelectric incentive payment requirements and explains the type of information that owners or authorized operators of qualified hydroelectric facilities must provide the department when applying for hydroelectric incentive payments.

The incentive is available for electric energy generated and sold for a specified 10-year period. Presently, the department is only accepting applications from owners and authorized operators of qualified hydroelectric facilities for hydroelectricity generated and sold in calendar year 2016. **The**

application period opens Monday and continues through Sept. 6, 2017. Applications must be sent to hydroincentive@ee.doe.gov by midnight EDT, September 6, 2017, or they will not be considered timely filed for calendar year 2016 incentive payments. Requests for additional information should be directed to Timothy Welch, Office of Energy Efficiency and Renewable Energy (EE-4W), U.S. Department of Energy, 1000 Independence Avenue SW., Washington, DC 20585-0121, (202) 586-7055 or by email at hydroincentive@ee.doe.gov.

(A hydro dilemma.)

Leesville Lake sees increase in debris

By Emily Sides, 8/7/17, newsadvance.com

Although the Leesville Lake Marina has seen about 50 boat launches per week this summer, there have been times this year when natural debris is so heavy it blocks boats from entering the marina, Leesville Lake Marina owner and operator Lisa Zimmerman said. “I think there is definitely more debris this year,” Zimmerman said. “There have been days specifically at our marina, and we have a home property, where we cannot even get out of our dock and people cannot come into our dock because there’s so much debris.” Zimmerman said while this isn’t the norm, the debris is a concern.



Since the beginning of this year, Appalachian Power Company, a subsidiary of American Electric Power, has removed 555 tons of natural debris from the Smith Mountain Project — a two-reservoir hydroelectric generation project operated by APCo — and specifically Leesville Lake, surpassing last year’s collection of 528 tons, APCo spokesperson John Shepelwich said. In 2015, the company removed 171 tons of debris. Leesville Lake is a reservoir with the Smith Mountain Project, and its water level can fluctuate about 13 feet, Shepelwich said. When the water level lowers, debris composed of trees, branches and even roots can be dragged into the lake. The water fluctuation is controlled by PJM, a regional transmission organization, so water level changes are not necessarily predictable, Shepelwich said.

Lee Walker, outreach director for the Virginia Department of Game and Inland Fisheries, said boaters should look out for debris, slow down and wear life jackets. Boaters also should be aware of limited visibility early in the morning, late in the afternoon and during fog or rain. APCo, which built Leesville Lake in the 1960s, operates the 636-megawatt hydroelectric facility. Most of the increased debris can be attributed to the removal of the Power Dam on the Pigg River, which empties into Leesville Lake, Shepelwich said. The Power Dam was removed in August and September of last year, said Bill Tanger, chairman of the statewide river conservation coalition Friends of the Rivers of Virginia. Tanger expects increased amount of woody debris for several years. “Even after the temporary increased amounts have subsided, there will be some permanent increase due to the absence of the Pigg River dam, which will now allow woody debris from much further upstream to move downstream toward the lake,” Tanger said in an email. “Until then, APCo has appropriately increased debris removal efforts.” The dam was removed to help restore the Pigg River, including improving the conditions for fisheries and specifically for the endangered fish species Roanoke logperch, Tanger wrote. The nonprofit Leesville Lake Association created a debris committee this summer to communicate with APCo, said Jim Weiss, of the committee, who added there currently are nine members. We formed the committee so we can make sure that AEP is being informed when there is debris and that they are keeping up with their contractual obligations of keeping the lake clean of what seems an increased load,” Weiss said. Since the committee was formed, debris reporting has increased, Weiss said. “We all came to this lake because it’s beautiful and peaceful and the lifestyle is really close to idyllic, and we want to keep it that way,” Weiss said.

(Now, they have a formula for a hydro killer. Bet, no large project would survive this.)

HydroCalculator: new, free, online tool helps citizens assess dams

By Claire Salisbury on 7 August 2017, news.mongabay.com

- With mega-dams planned globally, especially in the Amazon and Mekong, the Conservation Strategy Fund (CSF), an NGO, has developed a new free tool for evaluating a planned dam's economic viability, greenhouse gas emissions and more.
- The HydroCalculator estimates the net economic value of a proposed dam, with and without the cost of greenhouse gas emissions factored in, number of years required before a project generates a profit, and years until net emissions become negative.
- The tool has been used by CSF, International Rivers, and a development bank and found to be very useful. Its forecasts have been tested against the economic viability and carbon emissions of existing dams, and found accurate.
- The HydroCalculator is meant for use by communities, researchers and activists who are often closed out of the technical dam planning process. It is available free online.



Mega-dam construction is booming around the world, with promoters hyping hydropower as a green, renewable source of energy and a means of curbing climate change. But as these dams are built in the Amazon, Mekong and elsewhere, they're doing great environmental and social damage and their green credentials are no longer adding up.

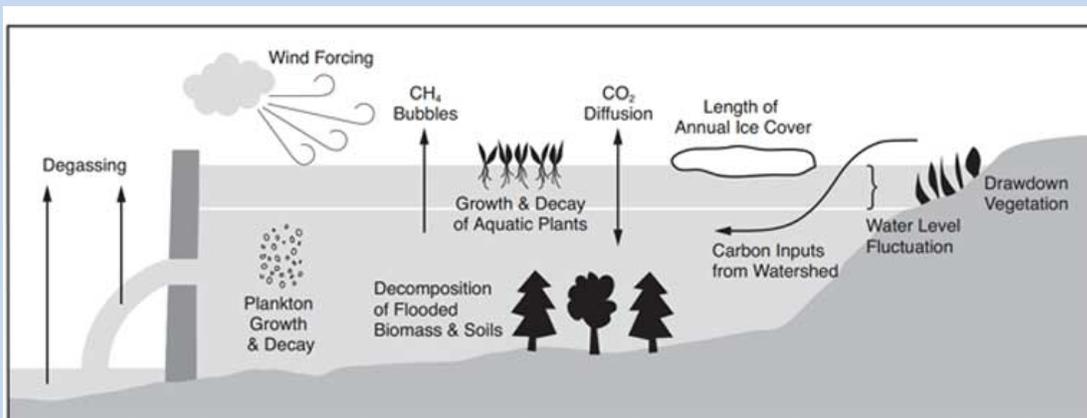
For example, high quantities of greenhouse gases are released from submerged soil and rotting vegetation, and from turbines and spillways, especially in the tropics, meaning that dam projects are often not the environmentally-friendly option they seem. But assessing the various impacts of dams, alongside their economic viability, is a complex task, and the decision-making process behind a dam is rarely transparent. Now, a new tool has been developed with the aim of making this kind of assessment more open and available to all. The free HydroCalculator tool, developed by the NGO Conservation Strategy Fund (CSF), is accessible online and is easy to use. The tool's developers, CSF founder John Reid and CSF researcher Thaís Vilela, hope it will allow "a broad group of citizens, researchers and policymakers, to foresee and monitor the economic and environmental consequences of hydropower projects." The HydroCalculator's end output offers a clear presentation of the net economic value of the dam under consideration, with and without the cost of greenhouse gas emissions factored in; the number of years required before the project generates a profit; and the number of years until net carbon emissions become negative.

Reid was inspired to develop the HydroCalculator tool after carrying out numerous cost-benefit analyses of dams, and finding that many such projects "threatened ecosystems and didn't deliver much economic benefit," he said. "I wanted to make it easy for other people to do this sort of analysis." "For too long, environmentalists had tacitly accepted that it was none of their business to weigh in on the economic merits of big construction projects. That's nonsense," he continued. "The tool is part of a bigger effort to make nature's advocates real players in large public investment decisions." Vilela says the number of projects which aren't financially feasible "is surprising," and that "transparency in the decision-making process is our main goal." To use the tool, accessed via CSF's website, the user inputs key project data, including the size of the area to be flooded, the vegetation types that will be submerged, projected costs, dam generating capacity, and the price at which the electricity will be sold. Default values for several factors, such as vegetation carbon content, the wholesale price of energy, and the energy discount rate, are available online if specific details are unknown. All of the dam project analyses that have previously been carried out can also be consulted on the website.

Reid and Vilela validated the tool against in-depth, peer-reviewed studies of Amazonian dam impacts, and found that their simplified methodology produced comparable results. Although the precise results varied, the relative costs and benefits of different existing Amazon dams, and their economic feasibility, was similar. The inclusion of the cost of greenhouse gas emissions had both

positive and negative effects on the economic feasibility of different dams, they found, but did not change the overall feasibility for any of them. Recent scientific studies have shown how important hydropower dams are as a source of methane, something largely overlooked in dam impact assessments. Methane is far more potent than CO₂, but it also degrades more quickly: over 100 years, methane has an effect more than 30 times stronger than CO₂, but this increases to 86 times stronger when considered over a period of 20 years. This shorter timeframe is what really counts, scientists say, given the urgency with which CO₂ emissions need to be curbed to prevent catastrophic global warming. As a result, the incorporation of accurate greenhouse gas emissions estimates was key to the creation of the HydroCalculator. That “required installing a global map of carbon density, figuring out the emissions from each country’s electricity mix, and finding a formula for reservoir-based emissions that can work for any project,” said Reid. “The difficulty with emissions points to the central challenge with any web-based analytical tool: precision versus practicality.”

In the name of practicality and ease of use, the Hydrocalculator does make some minor concessions to accuracy. Emissions from turbines and spillways, for example, were excluded from this version of the tool, because there’s greater uncertainty around these sources, said Vilela. As a result, the calculator’s emission estimates will be conservative, for now, but CSF is planning to add these additional sources into future versions. The HydroCalculator has been well tested. It has been used by CSF for some time, and other organizations, including a development bank and International Rivers, an environmental NGO, have also employed the tool in their



research. Sarah Bardeen, of International Rivers, said their staff has “found the HydroCalculator to be useful in assessing a [dam’s] economic viability when we have limited information about a project.” “The HydroCalculator shows that hydropower is far from carbon-neutral, and helps users calculate a ballpark estimate of greenhouse gas emissions from a dam’s reservoir,” Bardeen added. “This is important, because it puts information about reservoir emissions into the hands of affected communities, who are often shut out of the opaque planning processes around hydropower projects.”

Both Bardeen and the CSF team emphasize that the tool should not be used in isolation, but as part of a broader assessment process. “Hydropower is a notoriously complex and risky power source to build, and there really isn’t a tool that can capture and show all the environmental, social and economic consequences of building a dam,” Bardeen explained. Assessing the tradeoffs of hydropower development should be done through “deep analysis of primary data and listening to the people who would be affected,” agreed Reid. “The HydroCalculator just lets you take a first step along that path.” Major environmental risks of dams — such as the direct and indirect impacts to biodiversity, effects on aquatic and terrestrial wildlife connectivity, and reduction in a waterway’s nutrient and sediment flow — along with the consequences to local communities, must all be carefully weighed against the benefits of a proposed dam. Though, at present, none of these risks are tallied by the Hydrocalculator. Still, the tool goes a long way toward empowering dam project-impacted communities, the experts said.

In the Amazon, where mega-dam projects are slated for many of the basin's rivers, scientists fear that harm from dams will be irreversible. There, Indigenous people and traditional river communities are fighting to protect their sacred lands and livelihoods. And untold numbers of species still not described by science are at risk. "Communities protecting their lands and waters need all the help they can get to evaluate the impacts of proposed hydropower projects. In the Amazonian context, this tool is another arrow in their quiver," Bardeen said. "But bad hydropower projects go forward for many reasons — and in Brazil, corruption, graft and authoritarianism have the tendency to steamroll reason and science." The global debate around hydropower "is likely to intensify as pressure grows to meet expanding electricity demand and rein in greenhouse gas emissions," Reid and Vilela conclude in their paper. Tools such as the HydroCalculator can help provide the knowledge needed to navigate that debate.



Water:

(Will this help fix the problem?)

California WaterFix Update

California WaterFix Summer Milestones, August 3, 2017

In recent weeks, federal and state agencies have cleared three major milestones toward modernizing the state's primary water system with California WaterFix.



Notice of Determination:

The California Department of Water Resources has issued a Notice of Determination that certifies California WaterFix complies with the California Environmental Quality Act. DWR also filed a "validation action" with the Sacramento County Superior Court to affirm its authority to issue revenue bonds to finance the planning, design and construction of the project.

Biological Opinions:

In June, two federal agencies - the National Marine Fisheries Service and U.S. Fish and Wildlife Service - released their biological opinions for WaterFix. Both biological opinions found the construction and operations of WaterFix as proposed would not jeopardize the continued existence of endangered species or destroy or adversely modify their critical habitat.



Salmon in the Feather River, DWR

Incidental Take Permits:

Last week, the California Department of Fish and Wildlife issued an incidental take permit (also known as a 2081(b) permit). Under this permit, California WaterFix complies with the state Endangered Species Act by implementing measures to minimize impacts of any incidental take of state endangered species. These actions allow California WaterFix to take important steps forward to ensure the continued

reliable deliveries of water to much of the state.

Protecting the Delta Environment

California EcoRestore is a companion plan to the California WaterFix. The plan is providing major and necessary environmental benefits to the Sacramento/San Joaquin Delta, including:

- Improved habitat conditions along juvenile salmon migration routes
- Restored wetlands and native riparian forest habitat

- Increased food production, spawning and rearing areas for fish species
- Provides refuge from predators and changing climate conditions
- Improved connectivity between existing areas of natural habitat

Other environmental benefits will be advanced through The Delta Smelt and Sacramento Valley Salmon Resiliency Plans.

(If not for Hoover Dam, where would the water come from?)

Hoover Dam and Lake Mead key in providing water to lower Colorado River basin

By Eric Lupher, Kevin Krug, Aug 5, 2017, thedenverchannel.com

BOULDER CITY, Nev. -- Ron Tischer grew up in Las Vegas, but says the water levels he saw at Lake Mead on a recent trip with his kids are somewhat disturbing. "It's a lot lower than what I'm used to seeing," he said. Colorado River: Lifeline of the West airs Saturday, August 5 at 6:30 p.m. with an encore presentation Sunday, August 6 at 2 p.m.

Lake Mead is the reservoir formed by the Hoover Dam on the Colorado River about an hour outside Las Vegas.

"The drought really kicked in about 2000," the Bureau of Reclamation's Rose Davis told Eric Lupher while standing above the dam. "We've had 17 years of low drought so what you see now when you look around is about 145 feet low." The water levels at Lake Mead are watched closely. Hoover Dam is instrumental in delivering water to states in the Colorado River's lower basin, which includes California, Arizona and Nevada. In fact, 90 percent of the water used in nearby Las Vegas comes from Lake Mead, but don't blame the tourists for using too much water. Most of it is used by residents in the area. In fact, the resorts are so good at conserving water they have found ways to not only reuse it on their own properties, but they've developed ways to send some of it back to Lake Mead.



Davis says conserving the water is on everyone's mind. "We had a good winter this winter and the conservation measures from the states and people like me at my house taking care of my water supply is really helping to keep water in Lake Mead and keep the levels up," she said. In fact, she doesn't think Lake Mead will ever completely dry up and go away. "I think we continue to face challenges in water allocation. We continue to face challenges with climate change," she said. "We're doing a lot of studying about how that has altered the way the snow has come and the rains have come. But I don't think Lake Mead is going anywhere."



Environment:

(Fish gotta swim upstream.)

Oswegatchie River fish passage being added to Brookfield's Heuvelton dam

By LARRY ROBINSON, AUGUST 4, 2017, watertowndailytimes.com

HEUVELTON, NY — A long-awaited project to help fish navigate the Oswegatchie River past the Heuvelton dam is set to begin next week, according to Brookfield Renewable Power, owner of the hydroelectric facility. Construction of what officials describe as a "nature-like fish passage" is part of the company's 2012 re-licensing agreement with the Federal Energy Regulatory Commission. Work on the project is expected to begin Monday and last through November. The passage will be completed in the spring. The new fishway will allow American eel, sturgeon and other fish to traverse the dam without being injured. It will also allow the fish access to new habitat along sections of the waterway where access was



Heuvelton dam

previously limited. Sturgeon, in particular, are expected to benefit greatly. In March the state Department of Environmental Conservation reported that biologists have seen an increase in wild sturgeon in the Oswegatchie River. The native-born fish are believed to be the result of previous state stocking efforts.

The slow-growing sturgeon, a protected species, do not reproduce until they are approximately 20 years old. The DEC has been working for more than 25 years to restock the fish in waterways throughout the state, including the St. Lawrence and Oswegatchie rivers. Brian Noonan, a spokesman for Brookfield Renewable, said sturgeon will be just one species to benefit from having safe access around the dam and hydroelectric generating station in downtown Heuvelton. "Obviously sturgeon will pass through there, but it's designed for all fish species," Mr. Noonan said. As early as Monday, village residents will see increased activity around the dam. That activity will ramp up throughout the month when tons of stone and concrete is blasted from near the dam, according to Mr. Noonan. He said the heaviest and most noticeable construction work is scheduled for approximately Aug. 21. Prior to blasting, he said contact is being made with property owners in the area to ensure safety and to avoid damage to nearby dwellings. Mr. Noonan said he and other Brookfield officials are excited about the project and the opportunity it presents to enhance the quality of life for the residents of Heuvelton and the wildlife inhabiting the Oswegatchie River. "We've always had a good partnership with communities in the north country, with local residents and local officials," Mr. Noonan said. "I do think this is another example of working together to achieve something for the greater good of the community." During construction of the fish passage there will be increased activity on the Union Street side of the dam, according to Mr. Noonan. He said there may also be times when one lane of the street will be closed to accommodate large trucks and construction crews.

(Good luck.)

Governor says dredging near dam could help Chesapeake Bay

By The Associated Press, August 8, 2017, wtop.com

DARLINGTON, Md. (AP) — Maryland Gov. Larry Hogan says the state will dredge sediment trapped behind a Susquehanna River dam to see whether the work improves the health of the Chesapeake Bay. The Baltimore Sun reported Tuesday that the test project will determine whether dredging on a large scale will make a difference. Hogan said the state will ask companies this month for dredging proposals. The test project would be done this winter.



The Hogan administration has been focusing on ways to reduce bay pollution that comes by way of the Conowingo Dam. Lower Susquehanna riverkeeper Ted Evgeniadis said the Conowingo Dam was built in 1928, and the sediment that has been trapped at the site of the hydroelectric plant has been a frequent source of concern: "There was a study back in 2010 that said that the dam would reach full capacity by 2025."

Don Boesch, president of the University of Maryland Center of Environmental Science, said, "In the last 10 years, it's filled up faster than we originally thought, so it's made the problem more urgent." Boesch says dredging alone can't be the solution to curbing pollutants in the Chesapeake Bay: "We have to also deal with the original sources of the nutrients that come from up in the basin." The Susquehanna River originates in New York, and Boesch said dealing with pollutants in the river and the sediment trapped at the Conowingo Dam is the responsibility of all the states in the Chesapeake Bay watershed. In particular, he cited "the need for the upstream states, Pennsylvania and New York — which are kind of behind schedule in lowering their pollution loads — to take this seriously and pick up the pace" of waterway cleanup.

Hogan didn't say how much the demonstration project would cost. Evgeniadis said the cost of dredging has been estimated at anywhere between \$100 million to \$250 million — "It's a pretty large project."

Part of the governor's plan for dredging the dam includes finding a market for the dredged material. Possible uses could include the use of sediment in materials for road fill or even home countertops. As for the benefits of alleviating the accumulation of the sediment, Evgeniadis said, "Getting that sediment out of there would do wonders for the bay." The Susquehanna River provides about half of the bay's fresh water. It also accounts for about half of the bay's nitrogen pollution, as well as about a quarter of its phosphorous and sediment pollution.



Other Stuff:

(Always said the worst thing that happened to me was the fall of the Roman Empire.)

Why Roman concrete still stands strong while modern version decays Scientists have cracked the secret to Roman water-based structures' strength – and findings could help today's builders

By Nicola Davis, 4 July 2017, theguardian.com

Their structures are still standing more than 1,500 years after the last centurion snuffed it: now the Romans' secret of durable marine concrete has finally been cracked. The Roman recipe – a mix of volcanic ash, lime (calcium oxide), seawater and lumps of volcanic rock – held together piers, breakwaters and harbours. Moreover, in contrast to modern materials, the ancient water-based structures became stronger over time.



Scientists say this is the result of seawater reacting with the volcanic material in the cement and creating new minerals that reinforced the concrete. "They spent a tremendous amount of work [on developing] this – they were very, very intelligent people," said Marie Jackson, a geologist at the University of Utah and co-author of a study into Roman structures.

As the authors note, the Romans were aware of the virtues of their concrete, with Pliny the Elder waxing lyrical in his Natural History that it is "impregnable to the waves and every day stronger". Now, they say, they've worked out why. Writing in the journal American Mineralogist, Jackson and colleagues describe how they analysed concrete cores from Roman piers, breakwaters and harbours. Previous work had revealed lime particles within the cores that surprisingly contained the mineral aluminous tobermorite – a rare substance that is hard to make. The mineral, said Jackson, formed early in the history of the concrete, as the lime, seawater and volcanic ash of the mortar reacted together in a way that generated heat.

But now Jackson and the team have made another discovery. "I went back to the concrete and found abundant tobermorite growing through the fabric of the concrete, often in association with phillipsite [another mineral]," she said. She said this revealed another process that was also at play. Over time, seawater that seeped through the concrete dissolved the volcanic crystals and glasses, with aluminous tobermorite and phillipsite crystallising in their place. These minerals, say the authors, helped to reinforce the concrete, preventing cracks from growing, with structures becoming stronger over time as the minerals grew. By contrast, modern concrete, based on Portland cement, is not supposed to change after it hardens – meaning any reactions with the material cause damage. Jackson said: "I think [the research] opens up a completely new perspective for how concrete can be made – that what we consider corrosion processes can actually produce extremely beneficial mineral cement and lead to continued resilience, in fact, enhanced perhaps resilience over time." The findings offer clues for a concrete recipe that does not rely on the high temperatures and carbon dioxide production of modern cement, but also providing a blueprint for a durable construction material for use in marine environments. Jackson has previously argued Roman concrete should be used to build the seawall for the Swansea lagoon. "There's many applications but further work is needed to create those mixes. We've started but there is a lot of fine-tuning that needs to happen," said Jackson. "The challenge is to

develop methods that use common volcanic products – and that is actually what we are doing right now.”

(With subsidies.)

These 3 states are leading the way toward a 100% renewable energy future

By Leah Marie Angelou, August 6, 2017, born2invest.com

As technology continues to evolve and political will and cost continue to improve, transitioning to renewable energy as the main power source has become even more possible. Many companies and cities in the United States have committed to shifting to using clean energy. These come amid President Donald Trump’s stance on renewable energy and backtracking from major climate change policies, including the Paris Agreement. Here are three



American states that are leading the way toward relying solely on renewables for their energy needs:

California

California has set its sight toward being renewables-reliant by 2045. Earlier last month, the California Assembly Utilities and Energy Committee approved Senate Bill 100 (SB 100), bringing the state a step closer to its goal of a renewable energy future. If passed as a law, California would be mandated to transition to using 50 percent renewables by 2030 and 100 percent by 2045. It would also set limits on the state’s use of hydrocarbon over the next decades to hit its green energy target, Forbes reported. Today, 33 percent of California’s energy is imported, six percent of which is from coal. It is also the third largest oil and gas-producing state, which suggests the transition would not be an easy task at all, as it would have to change its energy infrastructure and systems. Only 25.5 percent of California’s energy mix is from renewables, 36.5 percent is from natural gas, and 10.2 percent from large hydropower.

Massachusetts.

Another state planning to create a bill that would gear it toward 100 percent renewable energy by 2050 is Massachusetts. The state ranks second to California as a leader in the renewable energy revolution. The ranking was determined by each state’s record of energy efficiency, as well as clean tech investment from private investors, per EcoWatch. Data from the U.S. Energy Information Administration said one-tenth of Massachusetts’ utility-scale net electricity generation comes from clean energy sources. The state aims to increase wind capacity to 2,000 megawatts and solar capacity to 1,600 megawatts by 2020.

Hawaii

Hawaii is currently the only state required by law to transform itself into a renewable-energy-powered by 2045. In 2015, it set its goal to transition fully to renewables. While it was a historically fuel-dependent state, the island has substantial sources of renewable energy. Hawaii generated 35 percent of its energy from solar in 2015. It has a potential for utility-scale onshore and offshore wind power, and it uses biomass and hydroelectric power, per US EIA.

Other countries that are now running on almost solely renewables include Costa Rica, Iceland, Albania, and Paraguay. China has also set its eye on leading the world in a renewable energy future.



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