



5/26/2017



Some Dam – Hydro News™ *And Other Stuff*



Quote of Note: "Well done is better than well said." --Benjamin Franklin

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*"Good wine is a necessity of life." - -Thomas Jefferson
Ron's wine pick of the week: 2014 Run Riot Pinot Noir "Central Coast"
"No nation was ever drunk when wine was cheap." - - Thomas Jefferson*



Dams:

(They ought to fix it so it can pass a PMF.)

Climate change erodes thin safety margins at Calif. dam

By Jeremy P. Jacobs, E&E News reporter, May 8, 2017, eenews.net

As catastrophe loomed at Northern California's Oroville Dam in February, Tom Stokely's mind drifted 140 miles north to another troubled behemoth. Stokely watched as nearly 200,000 residents were evacuated below Oroville when the emergency spillway America's tallest dam began to erode, threatening to unleash a 30-foot wall of water.

"I thought, 'Boy, they are a lot better off than at Trinity!'" Stokely said, referring to Oroville's cousin to the north, Trinity Dam.



Trinity Dam

"At least they've got an emergency spillway." Stokely, 61, is the former natural resources planner for Trinity County, where a 538-foot earthen monolith impounds California's third-largest reservoir. Like Oroville, Trinity plays a critical role in moving water from the wet north to farms and cities in the arid south. Due to this year's wet winter, it is 97 percent full. But unlike Oroville, Trinity Dam has no emergency spillway. And Stokely says the spillway it does have is woefully insufficient for a major flood, raising concerns of a catastrophic failure that would threaten some 3,500 people downstream. The dam is owned and operated by the federal Bureau of Reclamation, whose 2000 report confirms the shortcomings of the dam's spillway, often referred to as a "morning glory" or "glory hole." Located 25 feet below the dam's crest, the spillway is simply a hole the rising water flows into, where it is then funneled, uncontrolled, through a concrete tunnel and out a chute at the base of the dam.

Tom Stokely, a former natural resource planner for Trinity County, says an emergency spillway should be built at Trinity Dam. Photo courtesy of Stokely. "Trinity Dam cannot safely pass the probable maximum flood," the report said, "which is a [safety of dam] concern." A probable maximum flood, or PMF, is the largest precipitation event that could conceivably occur — making it an extremely rare event. But Reclamation has calculated that such a storm could cause inflows into Trinity's reservoir at a rate of up to 400,000 cubic feet per second, according to Stokely. That has never occurred, but during a 1996 storm, water rushing into the reservoir hit 308,200 cfs, causing water levels to rise rapidly. That peak inflow rate was "significant" because it was "about 10 times larger than the release capacity at Trinity Dam," the bureau report said.

The spillway and two small outlets have a total maximum discharge capacity of about 30,000 cfs. During the crisis at Oroville, operators were sending water rushing down its damaged primary spillway at more than 100,000 cfs. Jay Lund, director of the Center for Watershed Sciences at the University of California, Davis, said the difference between the potential inflows and discharge capacity at Trinity Dam is remarkable. "It is unusual for a dam, particularly an earth-fill dam, to have a spillway which cannot pass the probable maximum flood by a large margin," Lund said. Ron Stork of the nonprofit Friends of the River was more critical of the dam's design. Asked whether it is unusual for a dam to be built without an emergency spillway, Stork responded: "Only dams where the owner and regulator (if any) has the hubris to think they won't be needed."



B.F. Sisk Dam

Trinity isn't the only problematic Bureau of Reclamation dam. More than 300 miles south in Merced County, Calif., the B.F. Sisk Dam impounds the 2-million-acre-foot San Luis Reservoir near Los Banos. The 382-foot-tall dam is 3.5 miles long and, due to its central location, creates the main storage facility for the State Water Project and federal Central Valley Project south of the Sacramento-San Joaquin Delta. It also sits squarely on parts of the active Ortagalita fault and is less than 30 miles from two other active faults, including the San Andreas. The dam, completed in 1968, is operated by the state but owned by Reclamation — so California's safety watchdog doesn't have jurisdiction. And critics say the bureau has been delaying action at the dam for more than 30 years. The reservoir is now 98 percent full. If the dam fails, 800 square miles would flood as water tears north toward the delta — affecting up to 200,000 people and submerging the critical pumping plants that move water south. "We may just be one earthquake away from San Luis Dam becoming as big or a bigger catastrophe as Oroville," said Jonas Minton, former deputy director at the California Department of Water Resources. Studies in the early 2000s concluded that a slip of the Ortagalita fault could trigger a magnitude 7.1 earthquake. Todd Hill, chief of Reclamation's dam safety branch for the Mid-Pacific Region, said his agency is working toward releasing a corrective action study that will include several options for the dam and their costs. One potential solution is to raise the dam 15 to 20 feet, at a cost of hundreds of millions of dollars. He acknowledged the importance of shoring up the dam from seismic risk.

"The San Luis Reservoir is really the key point for the whole thing," he said, referring to California's water network. "Without San Luis, water doesn't go farther south from there." But Deirdre Des Jardins, a scientist for environmental groups, said Reclamation has moved too slowly. They've known about the problem since 1981, she said, when a 1,100-foot section of the upstream slope — some 400,000 cubic yards — slid nearly 200 feet. Des Jardins said the agency should lower the reservoir level 50 feet in order to safeguard against a disaster. That would significantly reduce its storage capability. "If an earthquake happens, it will slump, and it will flood 800 square miles of the valley," she said. "It's an enormous amount of water."
— Jeremy P. Jacobs

The Oroville crisis has focused attention on Trinity. The Trinity County Board of Supervisors has sent Reclamation a letter asking whether it would be "prudent" to construct a concrete-lined emergency spillway. The area's congressman, Rep. Jared Huffman (D), has also queried the agency. "There is one, and only one, release mechanism," Huffman told E&E News. "If something went wrong with that, and if it happened to go wrong at a time when lake levels are high and rising, that's the scenario you worry about." Reclamation officials emphasized that they have an adequate management plan in place. In particular, they point to winter operations restrictions aimed at ensuring there's enough room in the reservoir to accommodate peak inflows and flood events. And they note that Trinity's reservoir rises more slowly than Oroville's because its smaller watershed receives precipitation more as snow than as rain. "We do have peak inflows that exceed the spillway capacity — that's a fact," said Don Bader, manager of Reclamation's Northern California Area Office. "To alleviate that concern, we have this winter restriction which gives us the room necessary to withstand the PMF in these extreme events." But locals note that the restriction was developed 41 years ago, in 1976, and question whether it needs to be updated. And they note that if there is a lesson to be learned from Oroville, it's that dam catastrophes aren't always caused by one big failure, but rather by a series of escalating smaller problems.



"It's basically true in any catastrophe," said Keith Groves, the Trinity County supervisor who represents the area. "There are little things that start triggering bigger things to happen." Such a nightmare scenario at Trinity Dam exists. The bureau's analysis identified an ancient landslide comprising about 23 million cubic yards in the hillside directly below the dam's left abutment. Reclamation has said there's been no movement of that mass in this century — and the dam is not directly connected to the landslide area. But if that area slips again, it could block the "glory hole" spillway's outlet below the dam. "An extensive slip could destroy the spillway chute and block the tunnel," Reclamation's report said. "If the tunnel became blocked while the spillway was discharging, the internal water pressures would exceed the design capacity and cause major damage

to the structure and surrounding rock." The agency concluded that that scenario is "significantly remote." But the mere possibility has many questioning whether more needs to be done in the face of a changing climate causing more intense storms, more rain instead of snow and faster snowpack melting — all of which will put new strains on Trinity Dam and others. "Fifty or so years after the big dam-building boom in California, we are now becoming aware of the risks that outdated designs and operational criteria pose," said Jonas Minton, the former deputy director at the California Department of Water Resources who oversaw the state's dam safety program. "And unlike deteriorating roads," Minton said, "a failed dam would have truly catastrophic impacts."

1976 disaster spurred U.S. safety program

Tucked into Northern California's remote and rugged mountains, the Trinity River is an integral part of the state's water infrastructure. After its headwaters in the Trinity Alps, the river dips south, shooting through narrow and steep canyons and picking up speed and tributaries in its nearly 3,000-square-mile watershed. Below the small town of Weaverville, the Trinity makes a U-turn, heading north and west for 165 miles until it flows into the Klamath River in Humboldt County. Much like the Klamath, the Trinity was a prodigious salmon and steelhead run, fed by the area's wet climate. The whole basin averages more than 55 inches of precipitation per year, with parts reaching upward of 80 inches annually. Reclamation turned to the Trinity in the early 1950s to expand its Central Valley Project, the complex system of dams and canals that delivers millions of acre-feet of water from the north to farms and cities in the arid south (Greenwire, March 27).
The Trinity River

Just 50 miles from the project's linchpin, Shasta Dam and lake, the agency in 1962 completed Trinity Dam. Using 30 million cubic yards of earth, the dam reaches 538 feet and has a crest almost half a mile long. At the time, it was the world's tallest earthen dam, and it impounded a long and skinny reservoir that holds almost 2.5 million acre-feet of primarily irrigation water — about double the river's yearly flow. (An acre-foot is nearly 326,000 gallons, or roughly a yearly supply for two California households.) The bureau then built a smaller dam, Lewiston, about 7 miles downstream. There, water is diverted and shot through an 11-mile tunnel under mountains into Whiskeytown Lake, then through another 3-mile tunnel and five hydropower plants to the Sacramento River, where it is then sent south to irrigators. When the system came online, it diverted up to 90 percent of the Trinity River's annual flow, decimating the fish runs. Six years later, Oroville would surpass Trinity Dam as the tallest earthen dam at 770 feet. But the designs of the Oroville and Trinity dams differ in important ways. Trinity lacks the large, concrete-lined primary spillway that cratered at Oroville this year. It is also missing an emergency spillway, like the concrete-lipped hillside that also began to erode at Oroville. Instead, Trinity has a relatively small outlet at the base and intake for its power plant. Its primary spillway — and safeguard against overtopping — is the glory-hole spillway 25 feet below the top of the dam. When the reservoir reaches that elevation, water crests the lip of the 54-foot-diameter hole and flows, uncontrolled, down a 20-foot-diameter shaft and tunnel and out the bottom of the dam. That spillway is designed to handle about 22,400 cfs. With the other outlets, the dam can discharge about 30,000 cfs, but that has never been tested because to test it would require dangerously filling the reservoir to the brim. Critics say that capacity is inadequate, and in 1974, winter storms boosted inflows and the reservoir almost overtopped the dam. If that were to happen, Reclamation estimates the reservoir would release 1 million cfs of water — an unfathomable amount to experts. Because it is an earthen dam, the effects would be magnified because water running off the top would erode the structure.

Rushing water would immediately wipe out the Lewiston Dam below and small communities like Weaverville. Up to 3,500 people would be affected, and parts of the valley would be under 250 feet of water. It would inundate the lower Klamath River and Native American tribes there before reaching the Pacific Ocean. The 1974 storms came close to top of the dam; the reservoir was filling faster than water could flow down the spillway.

Two years later, in June 1976, Reclamation suffered the largest dam failure in its history when the earthen, 305-foot Teton Dam in southeast Idaho failed, killing 11 people. In June 1976, the Bureau of Reclamation's Teton Dam in southeast Idaho collapsed, killing 11 and causing massive flooding. The agency developed a dam safety program after the disaster and in October of that year placed restrictions on the operation of Trinity Dam and reservoir.



Teton Dam

According to those guidelines, the reservoir must be kept at an elevation of 2,347.6 feet or less during the Nov. 1-March 31 flood season. That's about 22 feet below the lip of the morning glory spillway, and it creates about 360,000 acre-feet of storage space in case there is a flood. As the reservoir level rises, Reclamation is also required to discharge water at specific rates depending on how high it gets. In most years, the water doesn't reach the spillway. However, the agency's own analysis suggests the restrictions could be inadequate. The 2000 analysis notes that even with restrictions, the reservoir has "typically approached the spillway crest" in wet years "with the same relative frequency as before the restrictions." And it found that "even with the current restricted operation, the dam could be overtopped if a flood with the inflow volume to the reservoir exceeded 86 percent" of the probable maximum flood model.

Another 2009 bureau document concluded that the "threshold that overtops the dam is approximately 77 to 86 percent" of the PMF. Minton, the former California Department of Water Resources official, said such analysis could trigger greater restrictions from the state if Trinity Dam were under its jurisdiction. "If this dam were under the state Division of Safety of Dams, I believe it is likely that much greater attention would be given to its deficiencies," he said. That has led several to call for construction of a new spillway. In a March letter to Reclamation, the Trinity County supervisors asked for a presentation on the risks facing the dam. "Given the situation described" in that 2000 document, Chairman John Fenley wrote, "construction of a concrete lined emergency spillway on the right side of the dam would appear to be prudent." 'Hole in the roof' Reclamation's Bader said he "gets" the concern about large dams and their spillways after the Oroville incident. But he emphasized that the restrictions in place at Trinity are sufficient. Historically, Trinity reservoir fills more slowly than reservoirs like Oroville because the area receives more snow. Trinity also has a smaller watershed than Oroville and holds about a million acre-feet less. "You don't see those instantaneous peak inflows like you see at Shasta or Oroville," he said. Consequently, Bader said, the reservoir reaches the spillway only about once every 10 years, and the spillway has been analyzed for safety several times since the 2000 report.

The reservoir also illustrates the competing interests facing Reclamation on dam management. In the last two years, the agency has drafted a new long-term plan for managing water below the reservoir and restoring fish populations on the lower Klamath River. As part of those negotiations, contractors that receive water from the Central Valley Project suggested relaxing the operation restrictions, which would allow the reservoir to fill to higher levels and thus increase water deliveries. Bader said the bureau re-evaluated the restriction last year and — once again — said it was necessary for safety. "What we are learning this year is that it certainly is necessary," Bader said, adding that the reservoir may reach the spillway later this month but shouldn't pose a threat to the top of the dam.

Reclamation has also recently begun releasing water under the terms of a fish restoration agreement. Just last week, outflows ticked up to 11,000 cfs, lowering the reservoir level slightly. This year, the lake is projected to crest near the lip of the spillway — either slightly below or over, Bader said. "We're going to reach the lip, and that's the extent of it," he said. "And that's a full lake. We like that." That has done little to alleviate concerns that a more-than-40-year-old model may be outdated as the climate warms. "If the climate is changing, the norm is not the norm anymore," said Groves, the county supervisor. "If we got 12 to 14 inches today, we'd be topping the reservoir, and we'd be in real trouble." That has led Rep. Huffman to call for systemwide review of dams to update safety protocols in light of climate change. "This is not an administration that likes to say those words," he said, "but we have to get real about this." And the Democrat said emphasis should be placed on fixing places like Trinity, not new projects. "We've been having the wrong conversation about California water," he said, "all this overreaching stuff about water grabs, endangered species fights and new facilities. But the truth is, we need to be taking a hard look at our existing infrastructure." Stokely, the former county planner, had another way of putting it. "They need to focus on what they've got," he said. "It's kind of like they have a hole in the roof and they are out buying a Ferrari."

(Don't think she likes this dam.)

Another View: NID needs to re-think Centennial Dam

May 11 2017, auburnjournal.com



When I lived in Grass Valley in the 1970s and 80s, I thought NID was a good organization. I thought working for them would be a good job because they seem to work outdoors in our beautiful Sierra foothills. Thirty-five years later I have a different perspective from across the Bear River. When NID proposed the Centennial Dam on our Bear River, I took another look at what is called a public utility district. I have been attending board meetings, reading their website, and watching. When you are a hammer, everything

looks like a nail. And when you are an engineer for NID, every river is a water conveyance, and every water conveyance is an opportunity to divert, store, or sell water.

NID is good at getting water to their customers. They are not good at landscape management, public relations communication, creative watershed management, fisheries management, recreation planning, financial planning, cultural resources, or river ecosystem enhancement and sustainability. Times have changed and an enlightened, environmentally aware population who values living here in this beautiful place demands more. I get the impression that most of the people who work at NID are engineers, equipment operators and administrative personnel. The elected board members seem to be a doctor, two farmers, a nurse and teacher, and an environmental scientist. That seems to work when no one is watching and everyone is getting their water. Now NID has decided to take a big billion dollar step into the California Water Wars to impound as much water as possible before it runs out. This has left NID sorely lacking. They have spent 8.9 million dollars of their ratepayers and taxpayers money on a dam proposal without first completing a financial feasibility study, an environmental impact statement and report, or acquisition of water rights for the impoundment. They are running people out of their homes and taking away recreational opportunities from people whom they don't even represent without even visiting the areas.

They are trying to preclude Placer County Planning Department from making Bear River Park part of the Comprehensive Park and Trails Plan for the next generation of Placer County residents. All while believing that they know more than the rate payers and out of district citizens. In fact one of the board members came out with a letter proclaiming it to be "The Truth about Centennial Dam." If NID wants to move into the new climate change reality, they need to let go of the old ways of environmental exploitation and top down patriarchal rule.

The first step may be to become more transparent by live-streaming all their meetings and becoming more open minded toward the people they serve. In fact they may need to understand that above all else, they are in public service. We are their bosses. It has become apparent that NID lacks the wisdom, the vision, and the creativity to manage the living ecosystems and landscape level watersheds that they are currently trying to destroy. In spite of the fact that fisheries and wildlife biologists, botanists, hydrologists, soil scientists, foresters, landscape architects, fuels and fire prevention specialists, and archaeologists exist, it is apparent that none of them work for NID. And if they did, a dam would not be the first option proposed to stabilize the water supply and ensure water quality. If you are a hammer, everything looks like a nail. *Dianna Suarez, Colfax*

(Do we need to fix this?)

Reclamation Announces Safety of Dams Drilling Program at Prosser Creek Dam

13 MAY 2017, BY MACIEJ HEYMAN, military-technologies.ne

TRUCKEE, Calif. – The Bureau of Reclamation will be performing a Safety of Dams drilling program at Prosser Creek Dam to evaluate the ability of the dam to resist large earthquakes. Prosser Creek Dam and Reservoir, part of Reclamation's Truckee Storage Project, are located on Prosser Creek about 1 mile east of Truckee, California, and 27 miles west of Reno, Nevada.



Prosser Creek Dam is located in a seismically active area. The drilling program will help analyze the potential loss of strength, known as liquefaction that could result in a dam failure during an extreme earthquake. Reclamation will continue drilling at Prosser Creek Dam throughout the summer of 2017 to collect additional data which will be used to assess the likelihood of liquefaction and response of the dam. Currently, Prosser Creek Reservoir is being held at approximately 9,000 acre-feet of storage and 5701 feet of elevation for flood control purposes. The low reservoir elevation is not related to the potential dam safety concern and is expected to begin rising as the spring runoff season develops.

(What a sight! The dam is as old as me.)

Iconic Hoover Dam lights up in turquoise for lung health

The Associated Press, MAY 12, 2017, miamiherald.com

BOULDER CITY, Nev. - The iconic Hoover Dam near Las Vegas was lit up in turquoise in honor of National Women's Lung Health Week. The Las Vegas Review-Journal reports (<http://bit.ly/2pG1CQw>) that the National Historic Landmark changed colors for two hours Thursday night.



The Hoover Dam opened in 1936, generating the first electric power produced by the dam

(A little can become a big leak.)

Crews work to fix hole in Eastvale Dam

Apr 21, 2017 - wpxi.com

BEAVER FALLS, Pa. - A leak found in the Eastvale Dam on the Beaver River is forcing crews to work around the clock to keep the dam operational. According to the Beaver Falls Municipal

Authority, a hole was found in the bottom of the dam Monday. Initially, engineers were concerned the dam could be in danger of collapsing.

Authority General Manager Jim Riggio said crews continue to build a coffer to control the flow of water and the dam is no longer in danger. Riggio said there is no risk to people nearby, but engineers likely won't be able to examine what's causing the leak until next week and a permanent fix could take months. Residents said they are keeping a watchful eye.



"Hopefully they're doing something about it and they're making the right choices down there," said Eastvale resident Mike Benson. Beth Fosnaught, another resident, said, "It's kind of scary now thinking after all these years this happens. What if it's not fixable? What are we going to do?" A spokesman for the Beaver Falls Municipal Authority said the coffer is now high enough to withstand any rain that could come through this weekend. While individual data on dams is not available due to security concerns, Pennsylvania was given a C- for its dam report card.



Hydro:

(If water runs downhill, it's hydro potential.)

Hydropower from city water? Denver Water to install groundbreaking technology

denverite.com, by Andrew Kenney, May 11, 2017

Denver Water will be one of the first utilities in the world to embrace an idea that seems so obvious you'll wonder why it's not more common. A \$330,000 prototype project will install ten hydrokinetic generators within the Denver metro water system, harvesting electricity from the shallow, slow-moving water of the South Bolder Canal above Ralston Reservoir. What's remarkable is that they don't require dams — and other utilities are even using this technology to capture energy from water inside of municipal pipes.



There are a number of companies experimenting in this space, but Denver Water's going with a company called Emrgy, which I profiled earlier for Headwaters Magazine. Emrgy says its ace is its frictionless, low-maintenance magnetic gearing system, which is sourced in an Office of Naval Research project.

Atlanta already is using the technology to capture excess water pressure within water pipes. Eventually, the turbines could be deployed in rivers and other flows without building dams, according to CEO Emily Morris. One day, it could be useful in wind turbines, she said. Each of Denver Water's ten new generators will be rated for 10 kilowatts. The study will begin this summer and last into the fall, and could be continued into 2018 and 2019. Eventually, the power from the generators could be used by the water utility or even sold to the electric grid. "There are thousands of miles of canals in the United States, particularly in the Southwest, so the opportunity to tap the flow of water in those canals to generate electricity has generated a significant amount of interest from other stakeholders," according to Denver Water.

The project also is getting \$270,000 from the Bureau of Reclamation and \$240,000 from Oak Ridge National Lab, according to Denver Water.

(Pumped storage is the answer for many.)

Soaring Energy Needs Drive Demand for Pumped-Storage Hydroelectricity

By Rohit Bhisey - May 12, 2017, tmrresearchblog.com

San Francisco, California, May 12, 2017:

As most of our contemporary day-to-day conveniences depend on power, the increscent demand for electricity has opened a window of opportunity for the global market for pumped-storage hydroelectricity. The report, titled "Pumped-Storage Hydroelectricity Market – Global Industry Analysis, Size, Share, Trends, Analysis, Growth and Forecast 2017 – 2025" offers key insights into the competitive landscape, growth drivers, and challenges faced by the market.



A pumped-storage hydroelectric system is deployed in the power industry for load balancing and peak shaving. Water is transferred from one reservoir to another, which are at different elevations. When the demand for electricity is low, the surplus energy can be used to pump water to an upper reservoir. Moving water back uphill, the turbine functions as a pump. When there is a high demand for electricity, the stored water can be released through turbines.

With growing inclination towards the adoption of solar and wind power, the need for pumped-storage hydroelectricity is escalating. An extensive numerous ancillary services such as voltage control and load balancing are offered by pumped storage hydroelectricity. These systems can not only function as suitable spinning reserves, but also restoring an electric power station to operation by eliminating the need to rely on an external transmission network. As more people tend to prefer stable supplies of energy, the demand for pumped-storage hydroelectricity is slated for significant growth. The pressing need for alternative energy sources that are more reliable and feature black start capabilities has also been fueling the market. Technological advancements, necessity of spinning reserves, and demand for reactive power generation are some other factors driving the growth of the market.

On the contrary, the presence of large water bodies and the variation in heights of the two reservoirs can restrict the growth of the global market for pumped-storage hydroelectricity. Nevertheless, the impact of these restraints can be reduced by incorporating man-made alterations as to the topography, achieving the desired height and size measurements. Geographically, the global market for pumped-storage hydroelectricity could be segmented into Europe, Latin America, North America, Asia Pacific, and the Middle East and Africa. Europe is expected to emerge as the leader of the global market for pumped-storage hydroelectricity. Italy, the U.K, Austria, and Switzerland are some of the major contributors of the European market. Asia Pacific bears considerable opportunities for growth, thanks to the growing consumer base, insatiable need for electricity, and rapid growth in industrialization and urbanization. Latin America, backed by the growth of Brazil, and the Middle East and Africa are also slated for promising growth. A number of governments are encouraging the deployment of pumped-storage hydroelectricity via investments and policies. Currently, more than 290 pumped-storage hydroelectricity plants are in operation worldwide, with a capacity of almost 150 GW.

(Too expensive to operate, huh!)

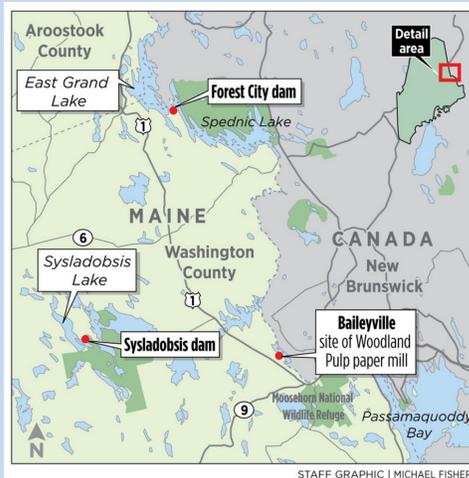
Panic flows over the future of 2 dams in eastern Maine

BY COLIN WOODARD, STAFF WRITER, 5/13/17, pressherald.com

A pulp and paper company's effort to surrender two eastern Maine dams has triggered panic in rural communities bordering the lakes they regulate and interventions from the Canadian government. Woodland Pulp, which owns the dams and the pulp mill in Baileyville, notified federal officials in late December that it wishes to abandon ownership of the dams at Forest City and Sysladobsis Lake – both in the St. Croix River watershed – because it has been operating them at a significant loss. The company says it is in negotiations to give the larger of the dams – the one straddling the border between Maine and New Brunswick at Forest City – to an undisclosed third party. But if that deal does not come together, filings with the Federal Energy Regulatory Commission show, the default remedy would be to leave the gates on the United States' side of the dam open, causing the water levels in East Grand Lake to drop by 6 feet, a potential disaster for local communities.



“If you look at the reason why there are people in this border area of Maine and Western New Brunswick, it's all because of the lake, everything is reliant on the lake,” said Forest City fishing guide Dale Wheaton, longtime proprietor of the family sporting lodge founded by his father, legendary guide Woodie Wheaton. “If you couldn't get access to the lake, it would destroy all the



traditional (boat) landings and entirely shake up the ecology of the area. It would just be a matter of time.” His brother, seasonal resident Arthur Wheaton, agrees. “We're looking at a damming situation that's been in place for well over 125 years, and you can't just wipe that out overnight,” said Wheaton, a retired executive of Remington Arms and president of the Woodie Wheaton Land Trust, which preserves lakeside land. “People have invested a huge amount of time and effort in their cabins, and to have the lake drop and leave them with a rocky front yard – it would knock the tar out of them.” David Townsend, a retired University of New Brunswick law professor who serves as president of the area's transnational lake association, the Chiputneticook Lakes International Conservancy, said the impacts of leaving the gates open would be extensive and far reaching in a remote region where the economy

depends on outdoor recreation. “There would be a lot of bare shoreline showing that would hurt the aesthetics, boat launch ramps that were no longer usable and a collapse in property tax assessments for lots that would cease to have waterfront,” Townsend said. “It would be devastating.”

The Forest City dam has long controlled water levels in East Grand Lake, which is Maine's eighth largest lake at 16,000 acres and straddles the border with New Brunswick. The dams were built to help regulate water levels feeding two hydroelectric dams farther downstream that power the Baileyville paper mill. The other dam to be surrendered is much smaller: a 250-foot wide, 9-foot-high earthen embankment that impounds the 5,400-acre Sysladobsis Lake, a popular recreational area for the Passamaquoddy Tribe, which owns half of the shoreline. The tribe's historic preservation officer, Donald Soctomah, and the U.S. Bureau of Indian Affairs have written FERC to express concern about tribal archaeological sites that might be exposed to erosion or looting if the lake levels fall.

Dams are expensive to maintain and operate, particularly those regulated by the federal government, which can require the construction and upgrading of fishways, the management of historical properties and archaeological sites, and regular monitoring of lake and stream environment, and wildlife species. FERC's 2015 economic analysis of the Forest City dam estimated its operation boosts hydroelectric production at Baileyville's downstream power dams by 543 megawatt hours a year, but at a cost of \$221,203 – more than eight times that of simply buying the energy from alternate suppliers. A FERC spokesman, Craig Cano, said the agency couldn't discuss the projects because they are a "pending matter." Dozens of residents and camp owners have protested the permanent opening of the Forest City dam's gates in filings with FERC, the regulator that will determine what happens to all of the dams. The Passamaquoddy Tribe, the Province of New Brunswick and the U.S. National Marine Fisheries Service all have expressed concerns, the latter over how the opening of the gates would affect spawning fish runs. Local residents say the Thoroughfare, a passage connecting East Grand Lake and North Lake, could become impassable.



The Maine Department of Environmental Protection said in its letter to FERC that it was concerned about the likely impacts on recreation, navigation, fish passage and aquatic habitat. Even Canada has become involved, as the Forest City dam straddles the border and water levels on the St. Croix River are subject to international treaty requirements dating to 1909. "This is a shared jurisdiction, not a river in the middle of Maine like the Kennebec," said David Alward, the Canadian counsel general for New England. "Whatever the outcome, it is paramount that Canada's concerns be taken into account before a decision is taken." Residents say someone needs to continue to operate the gates at the Forest City dam, which are raised and lowered seasonally to help fish and loons spawn, to control flooding, and to ensure summer recreational access. "These gates have been actively managed for years and years to help the economic, aesthetic, or aquatic environment," Townsend said. "It's a wonderfully rich and lavish environment for everyone, human or animal, and all that will change if the gates are removed." A spokesman for Woodland Pulp said the company shares people's concerns and is in negotiations with a potential new owner that could take over management of the Forest City dam. It is not our goal to dewater East Grand Lake and disadvantage shoreland property owners or any of that," said Woodland's communications manager, Scott Beal. "We think this dam needs to stay right the way it is and the water levels where they are, but should be under somebody else's ownership." Federal regulatory procedures, however, require the company to submit a surrender application that would leave the gates open, he said, in order for it to start the path toward relinquishing control of the dams. Over the past two decades, Woodland had exhausted all other remedies – getting the dams removed from federal licensing requirements via regulatory, court and Congressional action – but was unsuccessful.

"The only remaining option for us was to surrender the dam, though we worked hard to avoid that," Beal said, noting that the three dams were a drain on revenues for the company, which is owned by Hong Kong-based International Grand Investment Corp., and employs 300 at Baileyville producing hardwood pulp at a mill previously owned by Domtar. A sister company also owned by International Grand produces paper tissue products at a new mill opened last year that employs 80. Beal said that while it was going through the process of delicensing the dam, it was in the midst of a parallel effort to turn ownership over to an unnamed third party. "If we're successful in our efforts, we'll be able to set aside our application for surrender with the commission and be filing an application to transfer the license instead," he said. "What the new owner would do – comply with the FERC orders, seek to become not FERC regulated – I don't know." Local residents hope the deal comes together, but wish they could engage with the potential suitor about various management issues ahead of any transfer. "We would like to help

and to make sure the dam continues to be operated much as it has before,” said Townsend, who owns a camp on the New Brunswick side of East Grand Lake. “That would sound wonderful to us.”

(They never let up.)

Nine decades later, High Rock Dam still changing Yadkin River

By Josh Bergeron, May 14, 2017, salisburypost.com

SALISBURY, SC — The unprecedented storm still holds records today. When a tropical cyclone centered itself over western North Carolina in 1916, rivers and creeks swelled, roads and bridges were washed away, dozens died and a number of local companies closed after the storm knocked out power across the region. Onlookers at a nearby Yadkin River toll bridge watched as fully uprooted trees, house roofs, farm animals and at least one moonshine still floated by in the floodwaters, a 1916 Salisbury Post report stated. In Salisbury, more than 600 people were temporarily without jobs after the Kesler Mill and Salisbury Cotton Mill closed because the storm knocked out power lines coming from a plant south of Charlotte, on the Catawba River, the Post said. It would take weeks before conditions fully returned to normal.



Water rushed down the Yadkin River at speeds of tens of millions of gallons per minute — a rate not seen since the historic storm — according to data provided by Salisbury-Rowan Utilities. Despite the historic nature of that storm, its flood levels are not the highest numbers measured by river gauges near Salisbury. That flood occurred before the construction of High Rock Dam, built in 1927. In the nine decades since the dam’s construction, flood levels on the Yadkin River near Salisbury have topped 1916 several times. In 1972, for example, the flood topped 1916 levels by 3.5 feet. In 1987, river levels reached a height 4 feet higher than 1916. More recently, a flood in 2003 topped the historic 1916 levels by more than five feet. River levels rose so high that water covered transformers on utility poles near Salisbury-Rowan Utilities’ pump station on Hannah Ferry Road. The city of Salisbury in 2003 shelled out \$450,000 to relocate the transformers. Salisbury-Rowan Utilities also spends about \$200,000 per year for consultants who analyze ways to protect the city’s water intake, pump station and Grant Creek Wastewater Treatment Plant — all of which have been subject to flooding. The cause of rising flood levels since the 1916 event can be tied directly to the construction of High Rock Dam and steady deposits of sediment into the area, said Salisbury-Rowan Utilities Senior Engineer Jeff Jones.

In the 90 years since High Rock Dam’s construction, the river has dumped massive amounts of sediment where it meets High Rock Lake. The result: acres of new land, more severe flooding from less severe storms and a water intake that’s threatened by the possibility of sediment flowing in. “Really, the only thing the reservoir does for us is a detrimental impact with the accumulation of sediment and increased flood levels,” Jones said. “If you’ve got a cup with a certain amount of water and then you put so much dirt in that cup, it will just shift the water higher.” But flooding and sediment buildup are not the only ways High Rock Dam has altered the Yadkin River. The dam also has altered water quality, said Yadkin Riverkeeper Will Scott.

History

More than 90 years ago, the site of what would be High Rock Dam buzzed with activity as laborers moved into the area to help build the facility. At the time, the reservoir created by the dam was projected to become the second largest artificial lake in the South. In 1927, workers closed the dam’s lower gates as construction neared completion. Water filled the basin that would become High Rock Lake. Three other dams were completed downstream — Narrows Dam in 1917, Falls Dam in 1919 and Tuckertown Dam in 1962. As High Rock Lake filled, sections of

creeks closest to the Yadkin River flooded. People on St. Mathews Church Road suddenly had waterfront property. Stokes Ferry Road, once far inland, now crossed High Rock Lake. Dr. L.L. Williams of Richmond, Virginia, toured High Rock Lake in 1928 to investigate the potential for malaria and proclaimed the new reservoir “the cleanest new lake I have ever seen,” according to a Salisbury Post report at the time.

A miniature delta

The lake Williams toured in 1928, at least its northern end, looked noticeably different than modern-day High Rock Lake, according to maps and aerial photography. The earliest map available of where the Yadkin River meets High Rock Lake shows a relatively unimpeded stretch of water. Over time, the river created new land near the Wil-Cox bridge. Then, an elevated portion of the river bottom grew into a new island near Buck Steam Station. Later, even larger islands formed south of Buck Steam Station — about 10 miles upstream from High Rock Dam. “Given a long enough time, it will fill up all the way to the dam, but that will take a very long time,” Jones said. Riverkeeper Scott likened the creation of land inside the Yadkin River and High Rock Lake to a “miniature delta,” something more commonly seen at the point where rivers release water into the ocean. As the river dumps its contents into High Rock Lake, sediment also builds up near the Salisbury-Rowan Utilities’ water intake. At a certain height, sediment can fall into the intake, damaging equipment used to pump an average of 8.5 million gallons of water per day, Jones said. In severe instances, the sand could cover up the city’s intake.

Because of that threat, a company mines sediment from the Yadkin River bed that’s later used in asphalt, Jones said. When mining stops, it poses the potential for major problems. “After there was no sand mining from 1984 to 1988 and a really bad drought in 1987, there had to be ditch dug by hand from a channel on the north side of the river to our intake on the south side,” Jones said. “There were men walking around the water intake on sand.” Salisbury-Rowan Utilities’ models show the Yadkin River dumps 200,000 tons of sediment into the High Rock Lake area per year. Sand mining only removes a portion of the total. High Rock Dam, initially used to power an aluminum smelter, “fundamentally changed the entire way the river functioned,” said Gerrit Jöbsis, who works for the nonprofit group, American Rivers.

‘A choice about how we use the river’

Sediment accumulation is one issue, but there’s another problem Scott said he is concerned about. For years, the Yadkin River and High Rock Lake have been considered environmentally impaired, according to the N.C. Department of Environmental Quality (DEQ). The department considers High Rock Lake impaired for several water quality indicators. A 2016 assessment of North Carolina’s river basins ranked the Yadkin highest in turbidity, meaning it’s the cloudiest or haziest in the state. The report also shows the Yadkin contains the highest concentration of nitrogen and phosphorous, which are found in fertilizers. Chlorophyll and pH are other parameters for which High Rock Lake does not meet water quality parameters. High levels of nutrients such as phosphorous and nitrogen can lead to the growth of large amounts of algae, Scott said. In turn, large amounts of algae can lead to spikes and crashes in the amount of oxygen in water, he said. Those spikes can lead to fish kills.

Oxygen levels in water above and below High Rock Dam are low, too, he said. I think dams are a choice about how we want to use the river,” Scott said. “It’s about prioritizing things like power generation over things like water quality.” Because of noted issues, High Rock Lake has been the subject of many studies related to water quality, according to DEQ. Nutrient monitoring has been conducted because of poor water quality in High Rock Lake. A committee of people was also formed to study water quality issues. There’s also a statutory requirement to reduce nutrient levels in High Rock Lake. Without dams at High Rock Lake and locations to the south, Scott said, the river would be able to naturally process nutrients like phosphorous and nitrogen. Water quality would be significantly improved, he said. Natural rapids would also exist in locations where High Rock Lake currently sits, he said. Jöbsis said dams often decrease the diversity of aquatic life because of water quality effects and other items. “In a natural river system, you will have the right

balance of aquatic life and the bacteria and micro-organism needed to process nutrients,” Jöbbsis said.

An economic engine

Fishermen, however, see benefits from nutrients that pile up in High Rock Lake. “The quality of the fish is amazing,” said local fisherman Glenn “Butch” Hudson. Hudson said he’s aware of at least one 12-pound bass and several 8- or 9-pound bass caught in the Yadkin River basin during the previous year. Fishermen see the river differently than environmentalists, he said. “Comparing the Yadkin Riverkeeper to recreational boaters, we say fertile and they say dirty,” Hudson said. “The Yadkin is what’s considered a very fertile river. People into bass fishing know there’s a lot of nutrients and good stuff for the fish to eat.” Scott agrees that nutrients coming into the river can be beneficial for fish. At a certain point, however, nutrients such as nitrogen and phosphorous lead to algae blooms that kill fish. Hudson, Jöbbsis and Scott all said some fish and aquatic life previously found in High Rock Lake or the Yadkin River have become scarce or nonexistent. Before the construction of Yadkin River dams, for example, American shad routinely migrated from the Atlantic Ocean to Wilkesboro to spawn, Jöbbsis said. Construction of dams now means such fish can migrate only so far.

“If the Yadkin were completely unimpeded, we probably would have ocean species in the river today,” Hudson said. For all the environmental effects of High Rock Dam, however, there are many economic benefits, he said. It’s an economic engine, he said. “Without the dams, you don’t have the jobs, you may not have the water to drink, you don’t have the recreational opportunities,” Hudson said. “It’s an economic engine, no doubt, for the area.” The shores of High Rock Lake, for example, are speckled with neighborhood and commercial developments such as Tamarac Marina.

Cutting-edge technology

Until recently, dams on the Yadkin River, including High Rock Dam, were owned and managed by Alcoa, which declined to comment for this story. The company in February completed the sale of its four Yadkin River dams to Maryland-based Cube Hydro, which plans to make improvements that could alleviate some water quality concerns. One notable improvement will be the addition of technology that will improve oxygen levels in the water, said Neal Simmons, Cube Hydro’s vice president of research and development. Through a partnership with General Electric, the company plans to install a completely new turbine design that will allow air to be injected back into water when it’s discharged from High Rock Dam, Simmons said. “This set of blades has no equivalent anywhere in the world,” Simmons said. “It’s really going to be cutting-edge technology.” Increasing the amount of dissolved oxygen will generally be beneficial for aquatic life downstream from High Rock Lake, said Simmons and others in interviews. In its current state, runoff from farms dumps nutrients into the Yadkin River, which creates algae blooms that consume oxygen, he said. Aquatic life needs oxygen in water to breathe.

Simmons called the new technology “a knob that can be pressed to improve the ecosystem.”

Sediment buildup is more difficult to address, he said. “We don’t have as many knobs to turn, there,” he said. Simmons said Cube Hydro’s general philosophy is to find dams and renewable energy resources that have lacked needed investment and make upgrades and efficiency improvements. He said dams on the Yadkin River haven’t received significant upgrades in recent years. One such efficiency improvement will be more constant flows of water discharged. Under Alcoa’s ownership, Yadkin River dams might run during the week, but wouldn’t discharge water during the evening or weekends. “We are



committed to sending water down through the system rather than pond and release,” he said. Scott, the Yadkin Riverkeeper, says Cube Hydro “is saying all the right things.” He’s waiting to see how the company follows through on its plans.

(Our dams are fine.)

Dam fine in June Lake

BY SARAH REA — 14 MAY, 2017, thesheetnews.com

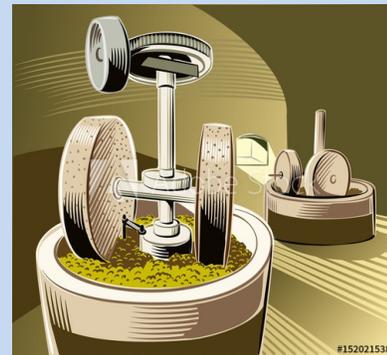
Representatives from Southern California Edison (SCE) reached out to local media sources this week to assure residents living in areas beneath the agency’s dams that SCE is taking precautions to ensure that water levels remain safe despite predicted record runoff. Rudy Gonzales, Government Affairs Representative for SCE, told The Sheet on Wednesday that there is “no increased risk to people who are living in the June Lake area” which sits below three dams as part of the Rush Creek Hydroelectric System—Gem Lake, Agnew Lake, and Waugh Lake all have dams which were built in 1917, 1916 and 1925, respectively.

Gonzales said that, people living in the vicinity of Rush Creek should expect to see increased water flow as a result of spring runoff, which is projected to reach 200 percent of normal this spring. SCE is installing several pumps next week to Gem and Agnew Lakes via helicopter as a redundancy measure, Gonzales said. “We don’t anticipate needing the pumps,” said Gonzales, noting that their installation is merely a “precaution.”

(A good use of waterpower!)

Old mill for the production of olive oil.

By serghi8. stock.adobe.com



Hatfield Hydroelectric Project

5/16/17, lacrossetribune.com

The current owner of the Hatfield Hydroelectric project, Black River Partners, WI, is planning significant construction work along the project’s power canal for 2017. The goal is to strengthen earth sections of the canal to allow the canal water elevation and the back-watered lakes of Buckhorn and Emerald to be returned to normal. A full draw down on the canal will be required to safely accomplish this work. All work will proceed under the direction of the Federal Energy Regulatory Commission and in consultation with various resource agencies including the DNR.



The draw down will begin the week of July 10 and be completed by mid-August at which time the work can begin. Once the work is completed they expect to immediately begin the refill process and anticipate achieving the historical normal full canal water elevation by mid-November. The proposed canal work and associated draw down will not affect Lake Arbutus.



Water:

(Now, we have too much water.)

US breaks rainfall record in April (Report)

By Staffs, 9 May 2017, francehebdo.fr

Near record amount of April showers drench US last month.

Perhaps a more appropriate description this year might be, "Heavy April showers bring record flooding." All that rain helped shrink the drought footprint for the contiguous U.S. to the lowest level since the nationwide Drought Monitor program began in 2000. It also caused loss of life and extensive property destruction in many communities.



Climate by the numbers

April

Last month, the average contiguous U.S. temperature was 53.8 degrees F, 2.7 degrees above the 20th-century average. The month ranked as the 11th warmest April in the 123-year period of record, according to scientists from NOAA's National Centers for Environmental Information. Much-above-average temperatures spanned the East, with record warmth in the Mid-Atlantic and Ohio Valley. The average precipitation total for April was 3.43 inches, 0.91 inch above the 20th-century average, making it the second wettest April on record. Much-above-average precipitation fell across the Northwest, Central Plains, Mid-Mississippi Valley, Great Lakes and Mid-Atlantic.

Year to date

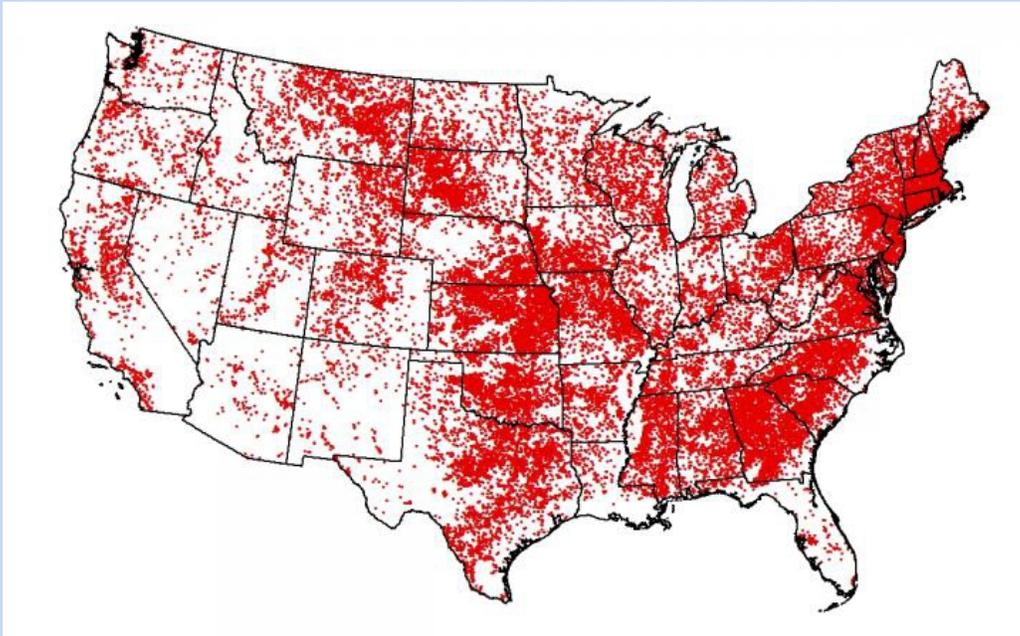
The year to date (January through April 2017) average temperature was 43.7 degrees F, 4.5 degrees above the 20th-century average. This was the second warmest January–April, behind 2012. The total year-to-date precipitation for the Lower 48 states was 11.46 inches, 1.99 inches above average, making it the fifth wettest YTD period on record.



Environment:

(Some people have strange values.)

Fish should figure in to fate of nation's aging dams



This is a distribution of the 49,468 large dams for the conterminous USA. view more
Credit: US EPA, 2006

As nearly 75 percent of the nation's largest dams approach the high maintenance years, safety and economics figure large in decisions to fix or replace. A recent study by Michigan State University (MSU) researchers makes a case to consider how those dams affect the streams and fish that live in them. Big dams -- many approaching 50 years old -- span the United States. In some areas, like the northeast, there are many and close together. In other areas like the southwest, dams are sparser and further apart. It's not just the presence of a single dam that can affect streams by increasing or decreasing flows or fragmenting streams and creating dead ends for fish. The group showed that multiple dams throughout watersheds can have cumulative effects on a stream and its fishes. This underscores the fact that effects of dams could affect habitats and fish miles away from a single dam.

The report, published in the May edition of the journal *Science of the Total Environment*, also shows how several aspects of streams and dams must be examined and considered to understand a dam's role in an ecosystem, said Arthur Cooper, the paper's primary author and a research assistant in the Aquatic Landscape Ecology Lab. "This study advances our ability to understand the effects of dams as a landscape-scale disturbance, providing information vitally needed to prioritize dam removal and management, informing policy and decision-making to improve and conserve the nation's stream resources," Cooper said. Barton Dam in the Huron River in Ann Arbor, Michigan. The group scrutinized 49,468 of the nation's dams - those considered the largest and used for a wide variety of purposes, like hydropower, flood control, water supply and irrigation. By looking at how those dams affect different groups of fishes, it became clear dams benefit certain types of fishes while negatively influencing others. In particular, some trout and darter species that prefer fast-flowing streams and streams lined with gravel, or that are considered generally intolerant to human disturbances, decline in numbers with dams. But the widespread changes in stream flow and the creation of lake-like environments formed by reservoirs above dams are associated with more sunfish in some regions of the U.S. And Cooper said this isn't just about streams closest to the dams. Dams and their reservoirs deliver a cumulative effect, leaving their mark on streams further upstream. "Dams have not only fragmented large rivers themselves, but their main tributaries are also truncated by dams,"

Cooper said. "This is analogous to a tree having its trunk cut in half and many of its main branches removed."

Cooper said this information has been used in a national assessment of stream fish habitats conducted in support of the National Fish Habitat Partnership. Along with other disturbances to stream habitats such as urban and agricultural land use, mines, and point-source pollution, the group is working to identify the condition of and threats to streams nationally. Besides Cooper, "Assessment of dam effects on streams and fish assemblages of the conterminous USA" was written by associate professor Dana Infante, the leader of the aquatic lab and a member of MSU's Center for Systems Integration and Sustainability; Wesley Daniel, Kevin Wehrly, Lizhu Wang and Travis Brenden. "This study offers new insights into the variable effects that dams can have on stream fishes," Infante said. "This information is important for stakeholders who may be working to conserve stream habitats, considering dam removals, or planning development of new dams. So that others can benefit from the tremendous amount of information assembled for this project, all dam metrics that we calculated are publically available through this publication." Partners are using this information to prioritize where and how to protect or restore streams. Managers involved in dam removal decisions throughout large regions could also use this information to compare locations for dam removal that would have the greatest ecological benefits. ### The work was funded by U.S. Fish and Wildlife Service and U.S. Geological Survey Aquatic GAP Program with support from MSU and the Michigan Department of Natural Resources.



Other Stuff:

(Silly putty.)

This Is the 'Best' Emoji

Who among us can't relate to the grimace?

By Jenn Gidman, Newser Staff, Apr 26, 2017, newser.com

(NEWSER) – "We all feel like gritting our teeth in a straight line sometimes," writes Leah Fessler at Quartz, which is exactly why she has deemed one emoji above all others "the best." The "grimace"—which Emojipedia also lists under the labels of "eek," "foot in mouth," and "awkward"—was added to the Emoji 1.0 list of approved emoji in 2015, and since then, Fessler has been impressed with its "versatility" and its status as "sheer human poetry." Not only does this particular facial expression allow us to mitigate stress by venting our anxiety "in a low-key way," it tamps down annoying Pollyanna-ish levels of enthusiasm that many (especially women) feel pressured to exude. The grimace is "a small way to dispense with unnecessary facades," Fessler writes.



Other advantages of the grimace: It can accompany requests for favors—it's a "light-hearted way to acknowledge the burden being imposed," she notes—as well as offer a nonconfrontational way to say "sorry not sorry," enabling one to be truthful "with a dose of playfulness and self-deprecation." In the end, though, the emoji's appeal may be much more meta. "We are all the awkward, anxious, shameless grimace emoji," Fessler writes. "It's time we start admitting it."



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