

4/10/2020



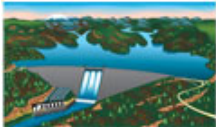
# Some Dam – Hydro News™ And Other Stuff



**Quote of Note:** *“The government is like a baby's alimentary canal: a happy appetite at one end and no responsibility at the other.” - Ronald Reagan*

**Some Dam - Hydro News → Newsletter Archive for Current and Back Issues and Search:**  
(Hold down Ctrl key when clicking on this link) <http://npdp.stanford.edu/>. After clicking on link, scroll down under Partners/Newsletters on left, click one of the links (Current issue or View Back Issues).

**“Good wine is a necessity of life.” - -Thomas Jefferson**  
**Ron's wine pick of the week: 2017 Three Wine Zinfandel "Red Label"**  
**“No nation was ever drunk when wine was cheap.” - - Thomas Jefferson**



## Dams:

(Sometimes dam removal makes sense.)

### **ON BOTH SIDES OF THE DAM**

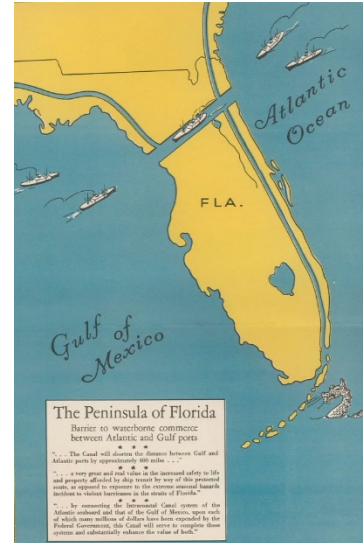
The Ocklawaha River was dammed in 1968. The flooded reservoir drowned over 7,500 acres of floodplain forest and 20 freshwater springs. Over 50 years later, people continue to fight for and against the existence of the dam.

By Stephanie Cornwell, Mar 24, 20w20, wuft.org

Marjorie Harris Carr's coffin was lowered into the ground with a bumper sticker reading “Free the Ocklawaha” in 1997. Last year, her granddaughter Jennifer Carr held a sign with the same words as Gov. Ron DeSantis spoke at the University of Florida about the state's pressing environmental issues. Carr hopes the fight to restore the



Ocklawaha River will not drag on another generation. **The Cross Florida Barge Canal was a dream that never happened**, a navigable waterway to connect the Atlantic Ocean to the Gulf of Mexico. The economic growth from a cross-peninsular canal promised something crucial to many Floridians —jobs. The Army Corp of Engineers started construction on the canal twice, once in the 1930s and again in the 1960s, and boosters believed the project would lead to growth and prosperity. **A visual of the planned, but never successfully completed, Cross Florida Barge Canal.** But construction of the canal came at a cost to the environment: The Rodman-Kirkpatrick dam was built on the Ocklawaha River, creating a 9,000-acre reservoir that caused destructive flooding to the surrounding forests, according to the Florida Department of Environmental Protection.



**State and federal powers met their match in Marjorie Harris Carr and the group she founded, Florida Defenders of the Environment (FDE).** In 1971, President Nixon halted construction of the canal, “to prevent potentially serious environmental damage,” read the front-page story in the New York Times that January. **But the dam was left behind**, along with its flood-pool that drowned much of the surrounding vegetation and 20 freshwater springs that once bubbled up in the forest. The water rose about eight to nine feet above its natural level, rotting the trees at their knees as the roots fought to breathe. **Many people wonder why the dam remained once construction on the canal stopped.** “It’s been 48 dam years. Let’s not make it 50,” wrote Jennifer Carr in her 2019 opinion piece on the “unfinished business in the Ocklawaha River.” **Every battle has two sides, and it’s not always black and white.**

**Many environmentalists want to take the dam down and let the Ocklawaha flow freely.** They want to give native fish populations and the forest a chance to grow back. But members of Save Rodman Reservoir, **a nonprofit dedicated to keeping the dam in place**, don’t want to see the collapse of Florida’s natural habitat either. They say draining the reservoir would displace many species that call it home, along with the people who recreate there. And many Putnam County locals don’t know life without the reservoir and the fishing it provides. Rodman is cited as one of the top bass fishing lakes in the United States. The miscommunication between bass fisherman and environmentalists might be the crux of the issue, according to University of Florida historian Steven Noll, co-author of *Ditch of Dreams*, a natural and political history of the Rodman controversy. Ecologists and those in favor of restoration, Carr explains, want anglers to realize that the banks will not disappear with the destruction of the dam. She believes that many fishermen have been given misinformation on what fishing conditions would be like without the dam.

“Both sides are using the same justification — they want to save the environment,” Carr says. “We all want to help the planet, but have different ideas of how to do that.” **Just as there are self-described environmentalists on both sides, there are anglers on both sides, too.** Erika Ritter grew up on the river; the Ocklawaha was her yard. She has fished there since she was 3 years old. She was a kid when the “Crusher Crawler,” a machine designed to flatten about an acre of forest an hour, started clearing trees. She stood in front of it in an act of protest. Erika Ritter, 12, stands in front of the Crusher Crawler, a machine built to successfully crush about an acre of forest an hour. Courtesy of Erika Ritter. Now, Ritter captains tours down the Ocklawaha for her pontoon boat business, “A Cruising Down the River.” **She doesn’t sugarcoat it for her passengers.** She tells them about the sea lettuce that clogs the waterways and the crushed plant matter that floats up and smells. “The water is tanned and stained,” she tells them. Whenever she sees officers from the Florida Fish and Wildlife Conservation Commission (FWC) she holds up a sign reading, “Bring back Striped Bass!” **“We’re trying to get our fish back, get that dam out of the way!” she yells.**



Ritter can only give these tours every few years, when the Rodman Reservoir is in a drawdown —a period of active maintenance when the water level is lowered from about 18 feet to 11 feet, releasing 65% of the reservoir's water. The drawdown brings the anglers, too, although there aren't enough bass for anyone to keep what they catch. It also exposes the springs, and the remains of the cypress and other tree stumps that once held up a forest. Ritter and Carr both

refer to these dilapidated stumps as tombstones — reminders of a project that was never completed.

When the dam was installed, the reservoir was flooded and cypress trees rotted to these stumps due to the higher levels of water. The stumps are only visible during the drawdown. "The fact that [the dam] is an ecological destructive force for something that is completely useless is even more ironically sad," Noll says. But the fishermen wanting to keep the reservoir are Floridians, too. To them, home is the sound of water flowing through the dam and the feel of a bump on the fishing rod. Richard Jones, a Putnam County resident, has been fishing at the Rodman Reservoir for 25 years. Rodman was a babysitter for his kids, a good way to pass the time and relax. He does not want to see the dam torn down. "This is an opportunity for families to come picnic and teach their kids to fish," he says. Carr doesn't believe recreation and conservation



need to be mutually exclusive. "Conservation needs to be made a priority," she says in her opinion piece. "The recreation part will fall into place, a.k.a. ecotourism." While dams can benefit society, they also can cause considerable harm to rivers, according to American Rivers, which has tracked removal of 1,722 dams nationwide since 1912. Increasing numbers of dams have been removed from U.S. rivers over the century, including 90 dams in 2019.

Carr and others fighting for a more free-flowing Ocklawaha are pushing for a partial restoration plan. The Florida Legislature crafted a plan in 1993 to remove as few facilities as possible to restore the river to near pre-construction conditions, but 27 years later, that plan still lacks funding and permits. Opposition for the plan led to a study in 2016 by the St. Johns River Water Management District to assess the possible effects that restoring the Ocklawaha would have on the St. Johns River in terms of nutrient deposits and destructive algal blooms. "Monitoring data indicate that the availability of nitrogen alone (i.e., without the addition of phosphorus) does not encourage algal bloom growth in the freshwater reach of the lower St. Johns River and therefore does not constitute an adverse environmental impact from restoration," the study found.

With these results, Carr states that the only thing stopping the restoration plan is political support and funding. In order to get the necessary funding and political support to carry out the plan, Carr and her team encourage Putnam county residents to attend county commission meetings. The FDE has also made several trips to Tallahassee to present the pros of the plan. Carr hopes that Gov. DeSantis will make the state's environmental issues a priority. The drawdown ended on March 1, and according to Carr, any new plants that sprouted will soon drown as water rises.

---

(A piece of history may bite the dust.)

### Historic dam in danger

#### An artifact of early industry, Penfield Pond faces uncertain future

By Tim Rowland, March 24, 2020, [adironackexplorer.org](http://adironackexplorer.org)

In the late 1820s, a couple of citizen scientists in upstate New York were amusing their friends with the latest technological parlor trick when they hit upon something useful. An electrically charged magnet, which could magically lift scraps of metal off the floor, was also capable of pulling shards of iron from a conveyor of crushed ore. Joseph Henry of Albany, who would go on

to become the first secretary of the Smithsonian Institution, perfected his electromagnet using iron of impeccable quality that was mined in Ironville, a dozen steep miles west of Lake Champlain's Crown Point.

That led Ironville mining entrepreneur Allen Penfield to wonder aloud if magnets might be used to simply and easily separate out the valuable iron from the rocky chaff. Henry thought so, and indeed they could. This shortcut replaced lengthy set of occult processes that had previously been used to separate iron ore. And it did something else, too. It made Ironville the first American community in which electricity had been put to an industrial task.



Today the scene of this accomplishment is remarkably well preserved by the Penfield Foundation, which maintains a collection of period buildings in Ironville on the shores of Penfield Pond. This 150-acre lake is also a popular venue for anglers, boaters, hikers and birdwatchers. It was created nearly two centuries ago when the industrialists dammed up Putts Creek at the head of a precipitous chasm whose falls from the mountains into the Champlain Valley produced an awesome amount of industrial muscle. Without Penfield Pond, the character of Ironville would be radically different, and a part of the living historical record would be lost.



But that appears unlikely to happen, because the pond's dam is failing, and the state has told the Penfield Foundation it must be removed. For the Penfield Foundation, fixing the dam is not an option, because it would cost better than \$1 million, a sum the board can't afford. "Don't call us a foundation—foundations have money," quipped trustee Susan Ross at a December meeting with Crown Point and Essex County officials. The board is made up of a small group of local residents with a profound love of history, but no access to the type of wealth required to fix ailing dams.

To raise money for the maintenance on its buildings they sell barbecued chicken and apple pastries. That raises enough money to putty up the church windows and pay the fuel bill, but not much more. Far worse, the trustees fear that, individually, the site that they have poured their heart and soul into over the years may wind up costing them everything. If the dam fails, they would be personally liable for the catastrophe visited on the downstream communities. Because of that they want the dam gone, even though to these historians it would be heart-wrenching to lose it. "Of course we want to save it, but then we come back to reality," said Penfield board member Kama Ingleston.

Breaching the dam would be highly unpopular in the community, and board members worry about how it would affect Penfield, which depends on the goodwill of its neighbors during its fundraising events. There are other considerations as well. Above the lake are registered wetlands and wildlife habitat; below the dam, on Putts Creek, is the fish hatchery that raises the trout that are stocked in a broad swath of Adirondack waters. But none of this has moved the needle on any state or private funding. A faint glimmer, and it is faint, of hope is that a purveyor of government grants or a corporation with strong ties to electricity—or maybe even the Smithsonian—will hear of Penfield's dilemma and come to the rescue. Not long ago, a descendant of Ironville mill patriarch Charles F. Hammond—and who happens to work for the electric vehicle company Tesla—dropped by for a quick tour, Penfield Foundation President Joan Hunsdon said. Today, Hunsdon says she wishes she had gotten his contact information. She would like a word with him.

On the far side of Putts Creek and Penfield Pond, Champlain Area Trails maintains one of the most historically remarkable trails in the Adirondacks. As it ascends the hemlock-studded gorge past an ongoing collection of waterfalls and pools, the trail passes the monolithic remnants of two other dams and the foundations of industrial warehouses. At one point a short spur leads to

Stoddard's Rock, a vantage point from which the famed 19th century ADK groupie Seneca Ray Stoddard shot a photo of the thriving town going full blast in 1874. In the foreground is a rock the size of a coffee table, marking the exact place the landscape photographer was standing when he set up his camera. The rock is still there, and on a plaque is the photo that he took that day, depicting a narrow valley hard at work.

Ironville today is a national historic district, with a dozen buildings still standing that have connections to the glory days of iron mining. The crown jewel is the Penfield Homestead, the nearly 200-year-old home of mining pioneer Allen Penfield, which is now a museum bursting with artifacts and stories. The most significant is told through a replica of the electromagnet that changed the face of industry. The computer age prides itself for rapid advancements in technology, but in this respect the opening of the 19th century wasn't bad either. It was at this point that 2,000 years' worth of electrical-related observations began to be put together in a way that changed civilization. The Italian physicist Luigi Galvani had created an electric current by wiring together two disparate metals and a frog. His rival, Alessandro Volta, discovered the frog was optional. This allowed him, in 1800, to invent a crude battery using copper, zinc and brine, an invention that went by the unromantic name of a Voltaic Pile.

In 1820, Danish scientist Hans Christian Ørsted figured out that these electrical currents created magnetic fields, and four years later British scientist William Sturgeon wrapped a 7-ounce piece of horseshoe-shaped iron with wire, fed it with an electrical current and amazed his friends by using his electromagnet to briefly lift a nine pound chunk of iron from the ground. On this side of the pond, Joseph Henry was doing much the same thing. But it was Henry who came up with one of those trifling yet enormously consequential advancements that today are scarcely given a second thought: He insulated the wire. That prevented the current from leaking into the iron and weakening the magnet. Henry's other advantage was in the excellent quality of his iron, which was derived from the mines at Penfield. This ore, magnetite, was naturally magnetic. When Henry wound it with insulated wire charged by a Volta-inspired battery, it created a substantial and sustainable electromagnet capable of lifting 750 pounds of metal. This fascinated a Vermont blacksmith named Thomas Davenport, who, after visiting Penfield in 1833, sold his brother's horse to buy one of Henry's magnets. A year later he used it to create the first electric motor. Thus, every electrically powered device today traces its pedigree to a small mining community in the Adirondack Mountains.



That history, Penfield partisans believe, is worthy of recognition, and makes their community perhaps the most significant venue in the story of electricity that no one has ever heard of. It is ironic, of course, that the carbon belched from industrial stacks had a hand in the changing climate that now threatens Penfield Pond. The dam was compromised by the aftereffects of Hurricane Irene in 2011, and with each powerful new storm, fingers are crossed—in more ways than one. After the Halloween storm in 2019, Essex County inspectors knew that the region would be eligible for millions of dollars in federal disaster assistance. They scurried to the Penfield dam to see if there was some new, claimable damage. There wasn't.

In 2016, the New York Department of Environmental Conservation declared the Penfield Pond dam "unsound" based on the damage from Irene. The DEC is requiring action, and, according to an email correspondence, "as the dam owner, the Penfield Foundation is responsible for determining whether the dam will be removed or fixed to meet safety standards. The dam owner recently notified DEC that it is planning to remove the dam." That decision, said foundation member Dave Hall, was made after multiple attempts to find grant money for repairs. "We just haven't had any luck," he said. "To take it out would be a lot cheaper." But not cheap. The consulting costs alone could be prohibitive. And environmentally speaking, the dam has nearly 200 years' worth of sediment behind it, material that can't legally be cut loose downstream. "It's

going to be quite a bit of money to fix it or remove it," said Jim Dougan, director of Essex County Public Works. On the Penfield board, where a "youngster" is defined as a person in his 40s, it's become impossible to recruit new blood, in part, because no one wants the liability. One board member has already resigned because of it, and Hunsdon said those who remain watch nervously every time a large storm is forecast. "We will raise the ire of the surrounding area" if the dam is breached, Hunsdon said. "But it's scary. We're historians, we aren't in our positions to worry about dams. We try to go forward, but this gets heavier on our shoulders each day."

(There's always another way.)

## New Fork dam plan pitched

Staff report, Mar 22, 2020, [jhnewsandguide.com](http://jhnewsandguide.com)

The Bridger-Teton National Forest, Wyoming has propose modifying the existing dam structure at lower New Fork Lake, increasing the amount of water storage by lowering the outlet approximately 5.5 feet. "Lowering the outlet structure would effectively increase the amount of water actively stored at New Fork Lake without increasing the surface area of the existing lake," the forest announced in a prepared statement. The 5.5-foot difference would equate to about 8,000 acre feet of new water storage. The inlet between upper and lower New Fork lakes would also need to be dredged so the lakes still connect during times of low water. Construction is slated for 2022 or 2023. The New Fork project is currently in the early "scoping" stage of the National Environmental Policy Act and comments are due in by April 24.



Upper and Lower New Fork lakes

(Here's a straight forward opinion.)

## Hartgen: No One Wants To Be Labeled an Un-woke "Salmon Racist"

BY STEPHEN HARTGEN, Mar 29, 2020, [magicvalley.com](http://magicvalley.com)

# Opinion:

Dam removal on the lower Snake River below Lewiston is once again in the news, with so-called "experts" like river enthusiasts, journalists and columnist Jim Jones all jumping in feet first to support breaching. But it's mostly speculation. There's little

evidence dam breaching would actually restore salmon runs. Indeed, factors like changing ocean temperature and fish migration patterns, ocean predators like orcas and seals, as well as Indian tribal net takings, are huge factors in the salmon's declines. But these aren't on the dam-breachers' radar, who've now taken to citing arm-chair journalists as their "authorities" for the pro-breaching argument. Former Supreme Court Justice Jim Jones, (*Idahopoliticsweekly*, Jan. 20), cites an article by hook-line-and-breacher Rocky Barker, a retired Idaho Statesman reporter, on how the only solution to saving the salmon is to breach the lower Snake dams. Journoes rarely know, much less report on, the full range of discussion on any topic. That's why they're journoes after all, often with preferred agendas. They do this on many topics, from politics to environmental issues, to sociology, to history, so why not just leave out the "rest of the story" on salmon recovery?

Dam-breach advocates ought to know better, including those who grew up in Southern Idaho, on an irrigated farm made possible only due to agricultural water use and storage. Neither Jones nor Barker gives so much as a seal flipper to the economic devastation dam breaching would have. Jones cites a figure of \$17 billion spent so far (\$17 billion!) on salmon recovery and seems to acknowledge that it's been pretty much wasted money. Most of this has gone into tribal pockets, so-called "habitat improvements" and reams of studies, but with almost no gain in actual



recovery. So they now throw the fish, rods and reels back into the river, **saying nothing but dam breaching will work.** Not shown by the evidence. No “Which Was To Be Proved,” as lawyers say.

A little research would maybe modify this anti-agriculture view. A new study by University of Washington shows that killer whales, known as orcas, prefer larger salmon as food, **thus reducing the returning numbers dramatically.** (U of Washington, Dec., 2019). **Sea lions (Once themselves considered “endangered.”) prey on salmon** along the lower Columbia and devastate returning salmon stocks (Washington Dept. of Fish & Wildlife, June, 2019). And tribal fishing, both by dip nets and gill nets, is immune from politically-correct mention, much less seriously discussed by dam-breach advocates. (In another example of lefty virtue-signaling, notice how journoes never, ever scrutinize a protected/privileged

minority group. Must be they’re afraid of being worked out as “salmon racists.”)

**This goes on regularly as “tribal” fishermen routinely sell salmon out of the backs of their pickup trucks** along riverside highways, often at “scale down” prices to tourists and costal-city yuppies. Doesn’t look like species preservation, which the tribes claim is their motive. Nor do breach advocates cite the fact that **80 percent of returning salmon are already hatchery-raised**, not “wild” returnees. (US Fish & Wildlife Service, 2/28/16.) **So, what would be the price of breaching?** Dam breaching would cost the nation over \$2.3 billion, says a new study and would negatively affect the environment by adding to trucking rail and storage costs, as well as threatening thousands of acres of Idaho farmland. A recent study says about 14 million tons of Northwest wheat, destined for Asian markets, is barged through the Snake/Columbia system annually; it would take some 35,000 additional railroad cars (350 trains of 100 cars each) or 135,000 trucks to move the barged products.

**Nor would breaching definitively increase salmon numbers; even the most ardent salmon advocates don’t make promises as to the likely recovery numbers.** They just say that everything else has been tried. It’s like saying prison doesn’t rehabilitate criminals, so let’s just let ‘em all out. Moreover, **breaching would also deprive the region of consistent power generation**, and would surely increase costs for millions of Northwest homes and businesses. (FCS Group, Jan. 2020.) **Nor do they even mention the issue of flood control;** it wasn’t many decades ago when Western water basins routinely inundated farmlands and communities across the region.

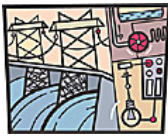
The dams’ power generation lights close to a million Northwest area homes, and the transportation costs of truck/rail would increase pollutant emissions by 1.3 million tons a year, as well as increase farmer storage and transportation costs by 50-100 percent, likely bankrupting numerous farms in the region, the study found.



Monumental Dam

A draft Environmental Impact Statement published in February reached the same conclusion, that **dam-breaching would not likely solve the salmon issue and would have widespread negative impacts** on the region’s power generation, flood control and overall economy. (US Army Corps of Engineers, draft EIS, Feb. 28.) **But these likely impacts of dam-breaching are ignored in the narrative** that nothing is left but breach-breach-breach. Rather than relying on biased opinions by pseudo-experts and biased journalists, dam-breach advocates should show more balance and skepticism. **Dam breaching isn’t going to happen, not now and probably never.** Maybe that’s

what's got dam-breachers so riled up, **but that's the real world**. Still, you know a scale has been scraped when prominent writers cite arm-chair reporters as sources and ignores pertinent and readily-available real numbers.



### **Hydro:**

(Oops!)

### **LOOK: Eagle-eyed fans spot 'Hydro Flask' and water bottle in a 'Little Women' scene**

By Gillan Lasic, March 31st, 2020, pop.inquirer.net

Maybe we'll have to wait if the editors or producers of Little Women will resolve this by digitally editing it out of the scene just like HBO did with that Game of Thrones episode.



(Guess they're having a fire sale.)

### **PG&E sells Narrows Hydroelectric Facility to Yuba Water Agency**

**PG&E and Yuba Water began negotiations for the sale in December 2017 and reached an agreement in September 2018.**

Apr 1st, 2020, Yuba Water Agency, waterworld.com

MARYSVILLE, CA, APRIL 1, 2002 -- Pacific Gas and Electric Company (PG&E) has sold its Narrows Hydroelectric Project to Yuba Water Agency. Escrow closed and the sale finalized March 31, 2020, on this facility in Nevada County, which includes the 12-megawatt Narrows No. 1 Powerhouse located on the Yuba River below Englebright Dam, along with



associated water conveyance and infrastructure and 23 acres of land, for \$507,500. Narrows 1 has been generating clean, renewable energy since its construction in 1942.

The Narrows Project was marginally economic for PG&E and is far from PG&E's regional hydropower headquarters. Yuba Water, however, is a natural buyer as the agency also owns the nearby Narrows No. 2 Powerhouse just upstream. For decades, the two entities closely coordinated the operations of these facilities, including the flows. "We appreciate the partnership we've had with PG&E," said Curt Aikens, general manager of Yuba Water Agency. "Our acquisition of the Narrows 1 facility really complements our other hydropower assets, but most of all, it enables our agency to continue to provide reliable flows for salmon and steelhead in the lower Yuba River." PG&E and Yuba Water began negotiations for the sale in December 2017 and reached an agreement in September 2018. As required, the Federal Energy Regulatory Commission and California Public Utilities Commission have approved the sale, which is unrelated to PG&E's bankruptcy. There will not be any impact to PG&E employees as a result of the sale.





## Water:

(There were floods before we heard the term – climate change.)

### **Extreme spring in 1913: Flooding, storms affected region, nation**

By Peg Siciliano, Special to the Record-Eagle, Mar 22, 2020, [recordeagle.com](http://recordeagle.com)

Long before modern tragedies like the Australian wildfires or Superstorm Sandy, 1913 went down in history as a year of extreme and dangerous weather. Northern Michigan witnessed buildings swept off of their foundations, a dam breached, railroads washed out, and ships stranded on Manitou Island. In March devastating floods swept east from Nebraska; November brought the massive “White Hurricane,” which impacted the entire Great Lakes basin.



Traverse City, Mich. while not in the eye of either storm, was sideswiped by both. Even today the whole nation benefits from policy changes hastened by these disasters. March 23-26, 1913, a perfect storm of terrifying weather pummeled the Midwest. Several days of heavy rain fell on partially frozen ground, leading to extensive flooding. The rain was followed by below freezing weather and snow, adding to the suffering. Approximately 650 people died, with more than a quarter million people left homeless. While the most dire consequences were felt well south of Traverse City, Grand Traverse County did suffer damage. Overnight from March 24-25 the city was pounded with what the Grand Traverse Herald called “the most terrific rainstorm in years,” and “the worst which pioneers of the region can remember.” Asylum Creek (today Kid’s Creek) flooded the city’s west side, filling houses with water and washing away outhouses. Some houses were surrounded by 2 to 3 feet of water. The Grand Traverse Herald reported that “The stream in the area of Fifth Street was assuming the proportions of a river and the high terrace is all that kept it from flooding the residential section. Many buildings adjacent to the creek have been undermined and are in unsafe condition.”

Three of the four railways then coming into Traverse City, and many roads, were washed out. Coroner E. B. Minor and Sheriff G. Allen Smith navigated around such challenges as they traveled to Kingsley to investigate the area’s one fatality. “The sheriff states that he never drove over worse roads, for in many places they were near impassable ... The water was 4 feet deep and the current was so swift that it almost took the horses off their feet. The cut that had been made by the water was several rods wide and they had to remain in the rig until it could swing around so they could jump to the bank. And Dr. Minor unhitched the horses and let them swim ashore and they secured a chain and dragged the wagon out by this means.” Engineer John Hawthorne had drowned while on duty at the Mayfield Dam. The dam was swept away when the flood excavated a 10-foot deep, 150- foot wide break under a railroad embankment. Creek water rushed through, roiling into the dam’s mill pond and breaking through the dam. Debris piled onto the power house, sweeping it, with the unfortunate Hawthorne inside, off its foundation.

The following November Traverse City was again brushed by disaster, this time, the White Hurricane of 1913. An extratropical cyclone that combined whiteout blizzard conditions with hurricane force winds, it raged Nov. 7-10, surging eastward from Lake Superior. Much of the Great Lakes basin endured 90 mile-per-hour winds and waves as high as 35 feet. There were a dozen major shipwrecks, an estimated 250 lives lost and more than \$5 million in damages (equivalent to \$117 million today). This event remains the most devastating natural disaster to ever strike the Great Lakes.



However, much like with the March floods, Traverse City itself was relatively unscathed. The Nov. 11 Herald's only mention of local damage noted that "A live wire was blown down on Washington Street yesterday. Men were sent to guard it until the current could be shut off." The Nov. 13 Herald noted area impacts that were more bothersome than tragic: "Owing to the severe storm Saturday night, the Grange play was not the success which was hoped. However, six dollars was cleared to go towards buying a kerosene stove." The paper further reported that

in Bartlett "The many friends of Iva Zue were very disappointed last Saturday because they could not have their party on account of the storm," and in Fife Lake "The wind and snow storm Sunday did considerable damage to windmills and corncribs." The paper also reported that numerous church services had been canceled and schools closed. Damage in Traverse City was so markedly less than that suffered elsewhere that the Grand Traverse Herald trumpeted the city's charmed location: Traverse City seems to have been the favored spot during the recent storm which swept the lake front and once again the citizens may congratulate themselves upon the face of their residence in a region that is tempered by a large body of water and is at the same time more or less protected from the long sweep of the lake winds and the terrific cold of the inland cities. Reports from other places indicate that, without exception, more damage was done than was incurred here.



Even on the county line road west of the city, there are drifts across the road which make traffic almost impossible. From 1- to 2- or 3 feet of snow fell in almost every other section of the state, and yet here there was barely enough to make more than a few respectable drifts after the entire fall had been accumulated to form these drifts ... simply another proof that while Traverse City is neither Florida nor Alaska, it has many advantages, in climate at least, which neither of these places can boast. These 1913 events had enduring influences on modern disaster preparedness. The country improved management of its waterways, and increased federal support for comprehensive flood prevention. Modern systems of shipping communication, weather prediction, and storm preparedness all fundamentally changed after the events of November 1913.



### **Environment:**

(Here's an over the top article. If this right, the Court will straighten it out.)

### **The Trump Plan to Decimate California's Salmon**

March 30, 2020 Kate Poole, nrdc.org

These are challenging times for California as we face the current public health and economic crisis. As we fight this pandemic in global solidarity, we must continue our local efforts to protect our environment. Those efforts are sorely needed as the real-world impact of the Trump Administration's new biological opinions on the operations of the Central Valley Project and State Water Project is becoming clear.



And it is not pretty. This past week, the National Marine Fisheries Service (NMFS) released its estimate of how salmon are likely to fare in the Sacramento River below Shasta Dam under the Bureau of Reclamation's planned water operations this year. Under the most optimistic scenario evaluated by the Fisheries Service (managing to NMFS' recommended instream temperature of 53.5° F), the federal agencies predict that almost 50% of salmon eggs and fry incubating below Shasta Dam will die, with the upper end of their estimated range predicting almost 75% will die. Under the alternative scenario, where Reclamation tries to stretch out cold water releases from Shasta Dam for a longer period of time (managing to a higher instream temperature of 56° F that is not adequate for salmon), the agencies predict that a mean of 75% of salmon eggs and fry will die, with an upper end estimate of 90%.

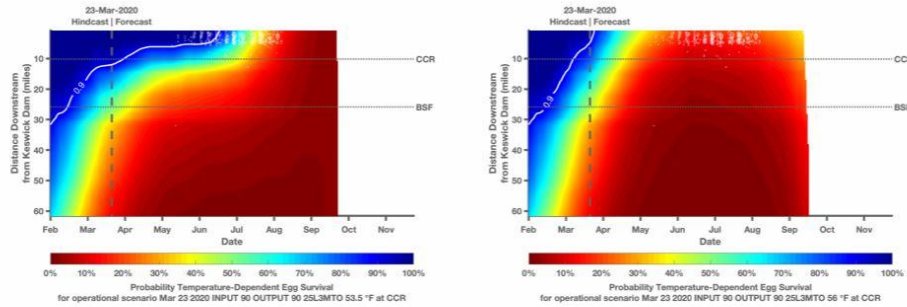


Figure1: Estimated temperature-dependent egg survival produced by the NMFS temperature mortality model under the two Mar 23<sup>rd</sup> 2020 scenarios. Note that plots are using 2012-2018 redd distributions.

Table 1: Estimated temperature-dependent egg mortality under different scenarios assuming a 2012-2018 spatial and temporal redd distribution using RAFT water temperature predictions.

Scenario	Mean (%)	Median (%)	Lower (%)	Upper (%)
MAR_23_2020_INPUT_90_OUTPUT_90_25L3MTO 53.5 °F CCR (Drier/ Warmer)	47.34	46.47	20.36	73.22
MAR_23_2020_INPUT_90_OUTPUT_90_25L3MTO 56 °F CCR (Drier / Warmer)	74.95	82.92	1.31	90.66

NMFS graphic depiction of those estimates:

These numbers are devastating for endangered winter-run Chinook salmon, which only spawn and rear below Shasta Dam. NMFS has identified winter-run salmon as one of the most highly endangered species in the country, and this critically endangered species is just beginning to rebound from the battering that it suffered during the 2014 and 2015 drought years, when Reclamation's mismanagement of Shasta Dam killed 79% (2014) and 85% (2015) of the young salmon, nearly wiping out the population of this species with a three-year life cycle. Reclamation's continuing reckless management of Shasta Dam not only risks the existence of winter-run salmon in the wild, but also threatens spring-run and fall-run Chinook below Shasta Dam. Fall run chinook provide the backbone of the salmon fishing industry up and down the west coast, and fishermen suffer greatly when poor freshwater management decimates the population of these "king" salmon.

And here's the real kicker: The federal government claims that this wholesale slaughter of salmon below Shasta Dam is entirely permissible under the Trump biological opinions. The new biological opinions eliminated the requirement for NMFS to review and approve Reclamation's temperature management plan for Shasta Dam before announcing Central Valley Project water supply allocations, even though initial decisions in April and May are critical to preserving cold water for the summer and fall. This week, a CVP contractor admitted that, under the 2009 BiOp, the water

supply allocation probably would have been zero until Reclamation finalized a Shasta temperature plan. Instead, Reclamation has already announced water supply allocations that plainly jeopardize winter-run Chinook salmon. And the Trump biological opinion allows Reclamation to completely wipe out the population of young winter-run below Shasta Dam for three years running before having to “reconsult” with NMFS and think about modifying their approach. For a species that typically lives for three years, this is nothing short of a plan for extinction.



Of course, Reclamation could do something to improve salmon survival below Shasta if it chose to. Reclamation could release less water from Shasta Dam in the spring and summer, so that more cold water is available to support salmon spawning in the fall. But that means reducing water deliveries to its contractors, who divert millions of acre-feet from the Sacramento River and Delta to flood irrigate rice fields in the Sacramento Valley, and water the expansive acreage of nut trees in the San Joaquin Valley.

Sending a little less water to these contractors could mean the difference between a California with wild salmon or one without. But waiting for the Trump Administration to protect the environment would be a futile exercise. Fortunately, California’s State Water Resources Control Board already has the authority to require Reclamation to change its operations and protect salmon below Shasta Dam under Water Rights Order 90-5. The Board should act now to reject Reclamation’s current plan and demand a more protective plan for salmon, before too much water is released from Shasta.

This is one of the reasons why NRDC and our allies have gone to court to prevent these disastrous and unlawful biological opinions from being implemented: To protect our natural heritage and thousands of fishing jobs. We’re glad Attorney General Becerra and the State of California have also sued to challenge these biological opinions, and we hope the State joins with conservation and fishing groups to ask the court to stop the implementation this year of the Trump Administration’s plan for extinction.



### ***Other Stuff:***

(Ain’t this something. Let’s face it, you can’t do anything without affecting the environment. Most people don’t want to go back to the Stone Age.)

### **Climate change: Green energy plant threat to wilderness areas**

By Matt McGrath, Environment correspondent, 25 March 2020, bbc.com

Researchers found that over 2,200 green energy plants have been built within the boundaries of the Earth’s remaining wilderness. They say that around 17% of renewable facilities globally are located in protected regions. A further 900 plants are now being developed in key areas of biodiversity.

*Could synthetic fish be a better catch of the day?  
Rise in global wind speed to boost green power  
Electric car emissions myth ‘busted’*

The amount of renewable energy facilities in use around the world has essentially tripled over the last 20 years.



growing threat to key conservation areas, say researchers.



Solar installations require lots of land. Now researchers say that often these solar, wind and hydro schemes have been built in areas of environmental significance and pose a threat to key natural habitats.

Green energy facilities are often much larger than fossil fuel power plants, with wind and solar needing areas of land up to 10 times greater than coal or gas to produce the same amount of energy.

The team mapped the locations of around 12,500 of these installations. They found that more than 2,200 were built in wilderness, protected regions and key biodiversity areas. Some 169 were found in strictly managed protected areas



Hydro facilities in Africa and Asia can significantly alter the landscape

where no development activity at all should occur. "Energy facilities and the infrastructure around them, such as roads and increased human activity, can be incredibly damaging to the natural environment," said lead author Jose Rehbein, from the University of Queensland, Australia. "These developments are not compatible with biodiversity conservation efforts."

The researchers say that energy projects like solar farms often necessitate new roads, and the people who come in to service these installations sometimes build settlements near them. Western European countries are the worst offenders at the moment, with Germany having 258 facilities in key conservation areas. Spain has similar numbers of installations, while China has 142.

One big concern from the researchers is the likely expansion of the demand for renewables particularly in Africa and Asia. The researchers say the number of active renewable energy facilities within important conservation lands could increase by 42% over the next eight years. In countries like India and Nepal, for example, hydropower is seeing a real boom. Nepal has over 100 facilities within protected areas, while India has 74 under development in important conservation zones. "In most cases it's just weak planning," said Dr James Allan from the University of Amsterdam, a senior author on the paper.



In the Selous world heritage site in Tanzania, the government has just given the go ahead for a massive dam

"So in the Selous world heritage site in Tanzania, the government has just given the go ahead for a massive dam, a huge hydropower project which will really destroy a large area of that national park." Over the past 18 months, there has been a growing concern about the extinction crisis being seen around the world and much research has been published linking it to climate change. But while many developing countries are doing their best to tackle rising carbon emissions through switching to renewable energy, the irony is that they are increasing the threat to species when these facilities are installed in protected areas. The authors

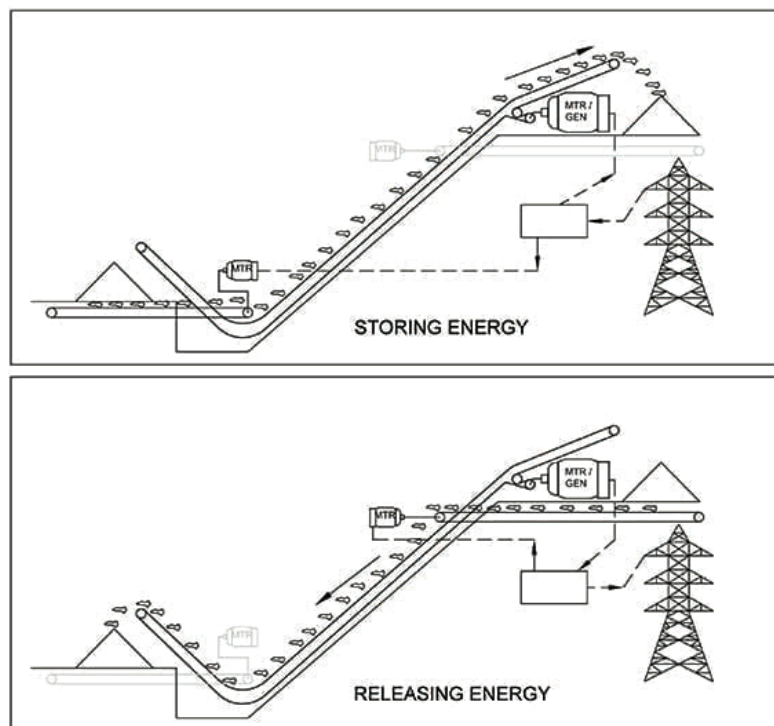
of the report say that greater care must be taken when planning and permitting renewable facilities. "If we let these developments go ahead, the biodiversity will be gone long before climate change starts affecting it," said Dr Allan. "We acknowledge that there is a risk that we will harm some sceptics, but anyone who reads the work will understand that we are not saying that renewables are bad, we just need to put them in the right places." The study has been published in the journal, Global Change Biology.

(The article says it's comparable to hydro pumped storage, but it's not. You can build 2,000 hydro PS, but you couldn't use this system for capacity projects which you'll need to impact a large energy transmission system.)

## Conveyor Energy Storage: A Battery and Pumped Hydro Alternative

A new conveyor-based system offers an alternative energy storage technology. The heart of the system is a reversible conveyor belt that converts between electrical energy and gravitational potential energy by transporting bulk granular materials between two stockpiles at different elevations. The U.S. Department of Energy reported that the total solar energy production in the U.S. increased from 28,924 GWh in 2014 to 96,147 GWh in 2018. During the same time period, it said the total energy produced by wind in the U.S. increased from 181,655 GWh to 274,952 GWh. Grid operators must keep the supply and demand for energy in balance. Traditionally, operators balanced supply and demand for electricity by modifying the supply to match demand. However, wind and solar generators cannot change the energy they supply as easily as conventional coal and gas power plants. To balance the supply and demand for power, many grid operators with large solar and wind assets are utilizing energy storage facilities to increase the demand for power when the supply would otherwise outstrip demand.

Currently, there are four commercialized energy storage technologies deployed in the U.S. They are pumped hydro storage (PHS), compressed air energy storage (CAES), advanced battery energy storage (ABES), and flywheel energy storage (FES). As of June 2018, 94% of U.S. energy storage assets were PHS. PHS commands a huge market share because unlike ABES its lifetime is measured in decades instead of years. PHS technology was proven more than a century ago, and the cost per MWh stored and dispatched are lower than all its competitors. PHS systems require large volumes of water that are not readily available in all regions of the world. Conveyor Dynamics Inc. (CDI) has developed a new energy storage system analogous to PHS, but instead of transporting water between reservoirs, the conveyor energy storage (CES) system stores and releases energy by moving bulk granular material between stockpiles. Like PHS, CDI's system utilizes low-cost and proven equipment that has been deployed for decades. The company expects the CES system to provide a competitive alternative to PHS in arid regions of the world.



1. The conveyor energy storage system utilizes a motor-generator scheme similar to technology employed at a pumped hydro storage facility. When energy is to be stored, the motor-generator drives a conveyor to move bulk granular material from a lower stockpile to an upper stockpile. When energy is to be supplied by the system, the motor-

*generator is driven by the conveyor as the bulk granular material is transported from the upper stockpile back to the lower stockpile through gravitational force. Courtesy: Conveyor Dynamics Inc. (CDI)*

Figure 1 shows the operating principle of the CES system. The heart of the system is a reversible conveyor belt that converts between electrical energy and gravitational potential energy by transporting bulk granular materials between two stockpiles at different elevations. The reversible conveyor is driven by an electric motor-generator controlled with a four-quadrant inverter drive. To store energy the reversible conveyor receives ore from feeder conveyors below the low-elevation stockpile and discharges the material onto the high-elevation stockpile. To release energy, the conveyor reverses direction, receives material from feeder conveyors under the high-elevation stockpile, and discharges this material onto the lower-elevation stockpile. Rapid changes to the power generated or stored by the system are possible by changing the belt speed of the conveyor within seconds. If the CES is operating in the storage mode, increasing speed will increase the power demand and decreasing speed will reduce the power demand. If the CES is operating in generation mode, increasing speed will reduce the generated power, and reducing speed will increase the generated power.

### **Technical Feasibility**

CDI has designed some of the largest incline and decline conveyors in the mining industry. In 1988, the company designed and commissioned a large incline underground conveyor at the Palabora mine in South Africa that was 1,065 meters long and gained 295 meters of elevation. This conveyor consumed 6,277 kW of power while transporting 6,495 metric tons per hour (t/hr) of copper ore.

*2. This image shows a portion of the Los Pelambres regenerative conveyor in Chile. The largest conveyor at the site is 5,967 meters long and has a 535.8-meter elevation change. Courtesy: CDI*



In 2000, CDI designed and commissioned three large decline conveyors at the Los Pelambres mine in Chile (Figure 2). The largest was 5,967 meters long and lost 535.8 meters of elevation. Today, this single conveyor generates approximately 9 MW while transporting 9,900 t/hr. As a base case for analysis, a CES system was modeled featuring a 1,200-meter-long conveyor, transporting 15,000 t/hr of material between two conical stockpiles, each with a maximum height of 33 meters. When charging, the material gains 325 meters of elevation, and when discharging, the material loses 290 meters of elevation. This system can store 120 MWh of energy and produce 10 MW peak electrical power output. The storage capacity of the CES system is limited only by the size and geometry of the stockpiles, and the difference in elevation between them. The power the system develops is a function of the rate of bulk material transported.

#### Cost and Efficiency

In the CES system, the elevation loss is always less than the elevation gain, because the distance from the bottom of the lower stockpile to the top of the upper stockpile is greater than the distance from the bottom of the upper stockpile to the top of the lower stockpile. This is a major source of inefficiency in the CES system. To minimize this elevation difference, luffing discharge pulleys can be utilized at both ends of the conveyor so that material always discharges at the lowest possible height, following the top of the growing storage stockpile. With conventional conveyor technology, the base CES system would have a roundtrip efficiency of approximately 60%. This efficiency would increase to about 70% using low-rolling-resistance rubber belts and low-friction idler rollers. The system efficiency can be increased further by conveying on steeper grades using one of several high-angle conveying technologies. The angle chosen for the base case is typical for conventional large mining conveyors, but with advanced high-angle conveyors, it is possible to convey bulk materials vertically.

#### Comparison with Commercialized Alternatives

The range of efficiencies that commercialized energy storage systems have achieved are:

- PHS = 76%–85%
- CAES = 42%–55%
- ABES = 60%–95%
- FES = 85%–87%

FES systems are mainly used for power management rather than energy storage, so they would not normally compete with CES applications. The only competing commercialized technology the CES system is likely to outperform from an efficiency perspective is CAES. For a PHS, ABES, or CAES system of similar size to the CES base design, the CES system is likely to cost less than the other options.

The cost of constructing a CES system depends heavily on the amount of civil work required on the site. CDI estimates that a typical total project cost for a medium-duration (0.5 hr to 2 hr) 120-MWh CES system able to generate 10 MW of power would be approximately \$25 million dollars. On a per-kW basis, this represents \$2,470/kW. For comparison, the International Energy Agency reported in March 2014 that the initial investment cost of commercialized systems was in the following ranges:

- PHS = \$500/kW–\$4,600/kW
- CAES = \$500/kW–\$1,500/kW
- ABES = \$300/kW–\$3,500/kW

Although costs may have decreased since that time, it remains likely that a CES system is comparable in cost to existing technologies on a kW output basis. On an installed-storage-capacity basis, the CES system costs approximately \$208/kWh. Where feasible, PHS is still the clear winner, costing less than \$100/kWh, but in arid regions of the world, the CES system is a competitive, reliable alternative to ABES systems. Typically, ABES systems cost \$750/kWh to \$2,000/kWh. The CES system is a relatively low-cost method of storing a large amount of energy without the environmental impacts and geographical limitations of PHS. On an installed-storage-capacity-per-kWh basis, it is one-quarter the cost of comparable battery systems and at least comparable on a cost-per-kW-output basis. The CES system could provide a robust and reliable



low-cost alternative to PHS in arid regions of the world where steep natural topography is present. ■



This compilation of articles and other information is provided at no cost for those interested in hydropower, dams, and water resources issues and development, and should not be used for any commercial or other purpose. Any copyrighted material herein is distributed without profit or payment from those who have an interest in receiving this information for non-profit and educational purposes only.