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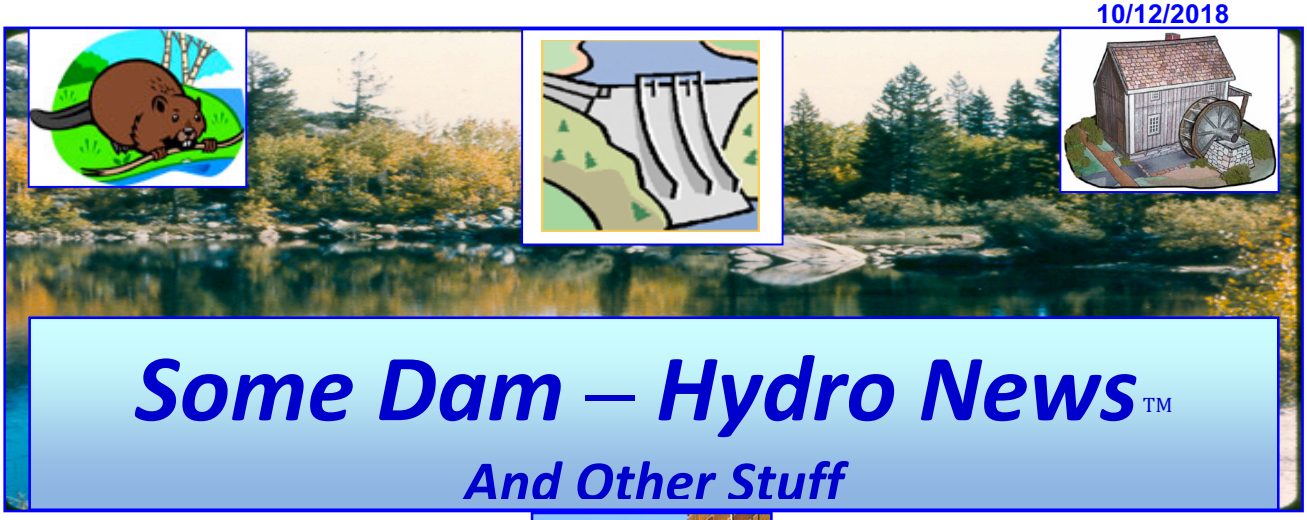

Some Dam – Hydro News™

And Other Stuff

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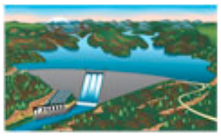
Quote of Note: *"Throughout history, people have never before expected to be as comfortable as people do today." - Jens Risom*

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 u***nder 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: **2015 Merriam Vineyards Merlot "Windacre"**
"No nation was ever drunk when wine was cheap." - - Thomas Jefferson

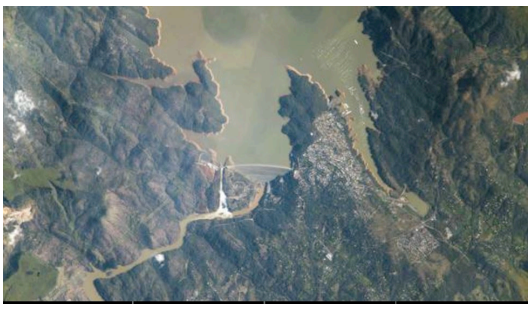


Dams:

(Oroville is always in the news.)

Oroville Dam Work Spillway Work On Target To Meet Nov. 1 Deadline

September 26, 2018, sacramento.cbslocal.com



OROVILLE, CA (CBS13) — Concrete placement on the Oroville Dam spillway is likely to meet the Nov. 1 public safety construction deadline despite some setbacks, the California Department of Water Resources said on Wednesday. One of the slabs in the middle chute of the spillway needed to be replaced earlier this month due to hot weather and high winds affecting its surface. That slab is one of 221 that have been placed on the spillway through the work process and DWR doesn't expect that to affect the schedule. That

middle chute is 95 percent compete as crews place slabs and walls on the chute. Only seven slabs remain and all 76 walls have been placed. The upper chute is 76 percent complete with 108 of 150 slabs and 14 of 50 walls placed. The Nov. 1 deadline isn't for all work. Work will continue on the emergency spillway past that date, and concrete curing, joint sealing and sidewall backfill will continue on the main spillway. One-way traffic controls from 6 a.m. to 6 p.m. are scheduled to continue on Oro Dam Boulevard between Glen Drive and Canyon Drive while the underground transmission line project continues. That's slated to end in mid-October.

Earlier this month, the cost of the project crossed the $1 billion threshold as unexpected excavation projects were found. The plan calls for the Federal Emergency Management Agency to pay for 75 percent of the repairs, with water project customers bearing the final 25 percent. FEMA has not said whether or not it would cover those costs.

(More fingers in the pie.)

Trump signs bill requiring independent inspection of Oroville Dam

By RISA JOHNSON | chicoer.com | Chico Enterprise-Record, September 28, 2018

OROVILLE, CA — President Donald Trump recently signed into law a bill which requires the Federal Energy Regulatory Commission to conduct an independent review of the Oroville Dam facility. The 2019 Energy and Water Development Appropriations bill requires that the licensee of the Oroville Dam request the U.S. Society on Dams to nominate independent consultants to prepare a risk analysis. That analysis will be considered with the next safety review of the dam in 2019. Congressman Doug LaMalfa, R-Richvale, issued a written statement in support of the action on Thursday.

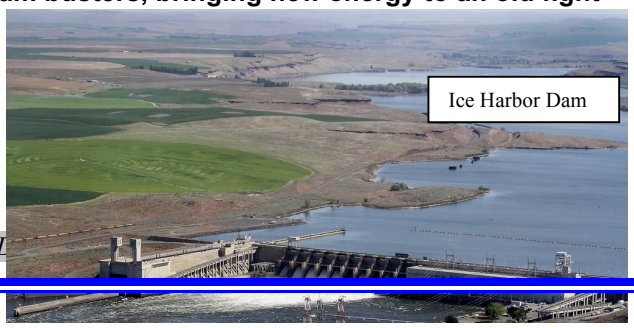
"The previous forensic report raised many concerns with regards to the safety and design of the Oroville Dam, but I believe a completely independent investigation is required in which there are no current or former employees of DWR involved," LaMalfa said. "That could be a conflict of interest, and ensuring that this process is thorough is absolutely necessary when it concerns the involvement of federal dollars and the safety of nearby residents." In February of 2017, about 188,000 downstream residents were ordered to evacuate after the main spillway was failed and the emergency spillway was used for the first time in history. Because of unexpected headcutting, there was concern that water could compromise the emergency spillway weir and send water crashing down on the communities below. An independent forensic review of the spillway crisis released earlier this year pointed to "long-term systemic failure" on the part of the state Department of Water Resources and the dam industry at large to address problems with original design and construction and insufficient maintenance and repairs. Design, construction and maintenance of state dams including Oroville's is overseen by the Division of Safety of Dams, which is a branch of DWR. A board of consultants, whose members were appointed by DWR, is reviewing the repairs to the dam, which is required by the California Water Code and the Federal Energy Regulatory Commission.

(Orcas are back in the news.)

Controversy heats up over removal of Lower Snake River dams as orcas suffer losses

Orca champions have joined forces with dam busters, bringing new energy to an old fight to take down the Lower Snake River dams

By Lynda V. Mapes, Seattle Times environment reporter, September 22, 2018, seattletimes.com



ABOVE LOWER GRANITE DAM, Garfield County — The combine tracks are still fresh in this wheat field, like the marks in a just-vacuumed rug. The waters cruised by orca whales hundreds of miles away seem impossible to imagine, amid these waves of gold, rather than blue. Yet the Snake River winding through these fields connects the critically endangered killer whales to this dryland wheat country. The river is home to some of the salmon orcas need: chinook, swimming home to the mighty Columbia and its major tributary, the Snake.

Now, a decades-long battle to take down the dams is finding new energy. The dam busters are seizing on a new star witness: mother orca whale Tahlequah. She swam with her dead calf through the Salish Sea for weeks in July, in a searing vision of loss watched around the world. Then came J50, a 3-year-old orca wasting away, the third orca dead in four months. The losses galvanized orca champions now joining forces with those who have long wanted the dams gone because they hurt salmon. A new hybrid social movement is stirring. The word orca has become its own hashtag. Restaurants and markets have yanked chinook. Tahlequah is turning up in street art. On Friday, mourners staged an orca funeral procession in downtown Seattle, wearing black and white as they marched to the federal building, where they remembered Tahlequah and her calf and rallied for dam removal.

- Controversy heats up over removal of Lower Snake River dams as orcas suffer losses
- Highway 520 bridge to reopen after closure in both directions due to police activity
- GOP leaders call for state Rep. Matt Manweller to resign after latest sexual misconduct allegation
- San Francisco is cracking down on tent camps. Will Seattle do the same? VIEW
- Teens arrested in connection with fatal drive-by shooting in Burien identified through school surveillance footage

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Pressure is also coming from changing power markets and shipping trends for wheat and other products, undercutting the benefits of the Lower Snake River dams and the reservoirs they create. The dams have staunch advocates who say they are part of the economic lifeblood and way of life in the Northwest: wheat growers that use the waterway to get their crop to market, and farmers that use irrigation from one of the dams to grow grapes, apples and other crops. They also include barge and tug companies, ports, utilities — and their backers in Congress. But each time an orca has died this summer, Ken Balcomb, founding director of the Center for Whale Research, has called for dam removal. Time is running out for the whales, now down to 74 animals and at grave risk of extinction, who need more food fast.
“We are looking at the twilight of this population,” he said.

Hydropower, some irrigation and an inland seaport

A tugboat twirls in the lake that once was the Columbia River, and a tanker truck used by the U.S. Army Corps of Engineers to haul juvenile salmon past the dams is all shined up for display. This recent rally for the dams in Kennewick drew more than a thousand people. At dozens of booths sponsored by utilities and agribusiness, dam boosters celebrated the benefits of the Federal Columbia River Power System — hydropower, irrigation and flood control.

First built beginning in the 1930s, the dams create hundreds of miles of slack-water reservoirs, including behind eight dams on the Columbia and Lower Snake that provide about 4,300 megawatts of power, enough to light about four cities the size of Seattle. The reservoirs also create a seaport in Lewiston, Idaho, 465 miles from the Pacific. At a recent congressional field hearing in Pasco, at the center of dam country, schoolchildren kicked things off outside city hall with a sweet-voiced rendition of “Roll on Columbia Roll On,” as a giant American flag, unfurled from a public-utility-district bucket truck, flew. In a morning of testimony Marci Green, president of the Washington Association of Wheat Growers and a sixth-generation farmer, was among those praising the dams, particularly barging on the waterway to get wheat to market. “Barging is one of the lowest cost, most environmentally friendly modes of transportation we have,” Green said.

Yet transportation on the Lower Snake has been decreasing over the years, as products increasingly move by truck and rail. Total tonnage shipped on the Lower Snake River dropped 37 percent in less than a decade, as of 2016, continuing a long-term trend.

Even as the waterway and the whales endure their own declines, the agency that sells power from the federal dams is struggling, too. Booming production of natural gas, and a surge of renewable energy, including wind and especially solar power out of California, has created an unprecedented glut of cheap power throughout the West. That's a problem for the Bonneville Power Administration (BPA), which sells electricity from the federal network of dams.
BPA used to cash in on the wholesale market, especially in the spring, as rivers swell with runoff, and Californians turn on their air conditioners. California's surge into solar-power generation has cratered the lucrative sales BPA used to count on. Today BPA sells power for about $34 a megawatt hour, while the price for the same amount goes for $20 on the wholesale market. Tightening the revenue squeeze is the agency's worry that its customers under long-term contracts, including public-utility districts around the region and Seattle City Light, will flee BPA's higher prices when those contracts expire in 2028.

As both demand for its power and revenues plummet, the agency has blown through its cash reserves and hiked its rates four times in 10 years. But its problem remains and is basically pretty simple, said BPA deputy administrator Dan James. "They have choices," James said of Bonneville's customers. "Who ever thought California would be offering us power in the daytime?" The utility is slashing costs, including its fish and wildlife program intended to address damage done by the federal hydropower dams all over the region. In the 1990s NOAA Fisheries listed the first Northwest salmon and steelhead under the Endangered Species Act. Eventually 13 stocks in the Columbia River Basin were listed as threatened or endangered. By now federal agencies spend $500 million a year on fish and wildlife programs to make up for environmental damage caused by the dams.

For more than 20 years, federal judges have called for an overhaul of dam operations on the Columbia and Snake rivers to boost salmon survival. For the fifth time the issue is back in federal court, and once again, a judge has called for federal agencies to take a hard look at the removal of Lower Snake River dams. Those dams have long been a target because of the challenge they pose to fish. Shipping also has been in a steady decline on the waterway, and the dams provide only about 5 percent of the region's power, which today is easily replaced, if it's needed at all. The dams provide no flood control and irrigation takes place only at Ice Harbor dam, nearest the Columbia. The issue, initially regarded as a long shot for zealots, is gaining traction among a wide range of citizens and scientists as a sound business decision and necessary ecological choice to help save the orcas and the salmon they depend on — and even help shore up BPA.

Orcas in peril

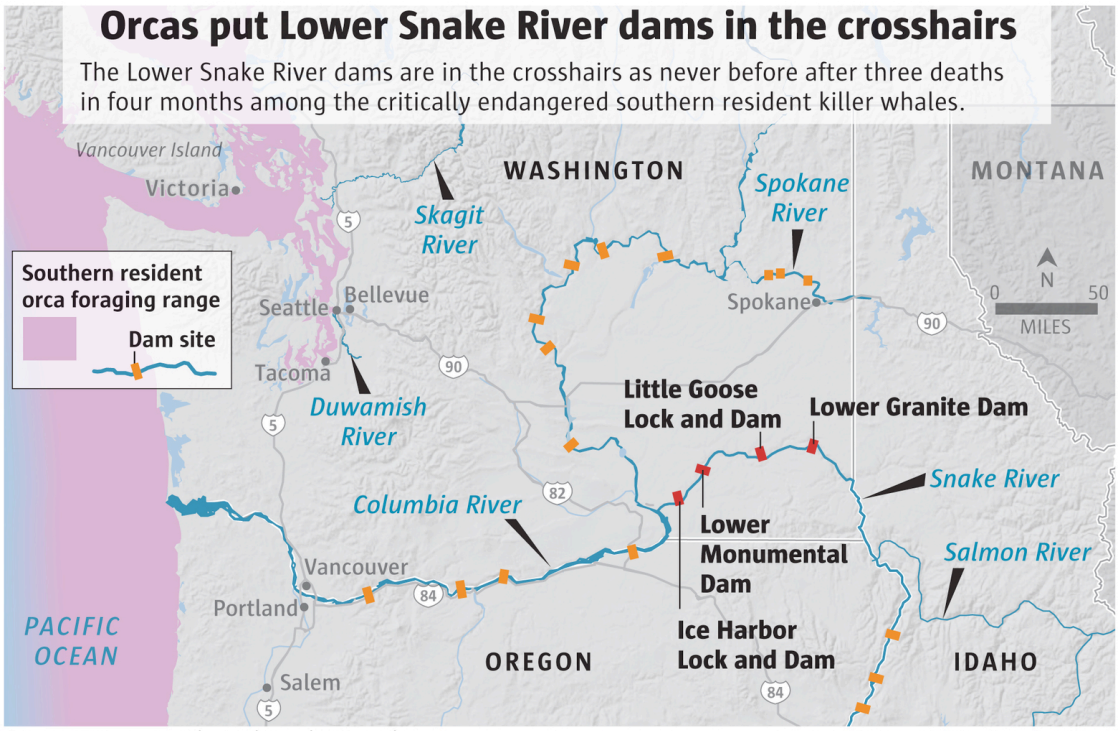
The critically endangered southern resident orcas eat primarily chinook, and some of their diet is born — and too often dies — right in Lower Snake River dam country. The Columbia and its tributaries was once the biggest salmon producer in the world, teeming with some 16 million fish. Today only about 1.1 million salmon come back to the river. They are smaller than they used to be, and mostly hatchery fish. The billions of dollars spent to improve salmon passage at the dams has been partly successful, with an average of 97 percent of baby salmon migrating down river surviving as they pass each dam. But a whack is still taken at each of the eight dams. Then come predators in the slack reservoirs and the estuary before baby salmon even reach the sea. Salmon still struggle for survival in the Columbia and especially the Snake, that much farther, and four more dams upriver from the sea. Climate change is adding to those long-standing problems, up-ending the ocean food chain, and raising reservoir temperatures to lethal levels for weeks at a time — killing salmon before they can get home to spawn. In good years, wild-chinook returns to some Columbia tributaries, such as the Yakima and John Day, as well as the upper Columbia, are on target for recovery. But the rate of returning wild chinook from out-migrating baby Snake River chinook is still below what's needed to prevent extinction, let alone recover the species.

That's bad news for the orcas that depend on Columbia and Snake River chinook, amid a myriad of other fish runs they target throughout their seasonal year, in a wide-ranging foraging pattern that scientists are just now discovering. Research tracing the DNA of fish caught by the southern resident family of orcas that cruise West Coast and trans-boundary waters of the Salish Sea shows that orcas mill offshore from the mouth of the Columbia each spring, eager for the nutrition of calorie-rich chinook. The whales need these fish to carry them until the summer runs from the Fraser River. They also depend on chinook from rivers all over Puget Sound. Orcas are suffering unreliable and insufficient food across their migratory range. To be sure, they face other problems, including vessel noise and toxins. But lack of adequate food makes everything worse.

Orca task force to speak

Beyond dam-boosting towns and dam-removal rallies in Seattle and Portland, another far more near-term solution to get more food to the orcas is quietly emerging. Negotiations are now underway among Gov. Jay Inslee, Bonneville and tribes to increase the amount of water spilled over dams on the Columbia and Snake, to help young fish in their migration to the sea. Spill already has been shown to be among the best ways to boost salmon survival. Turning up the volume of spill is likely to be among recommendations expected Monday in a draft report from the governor's task force on orca recovery. Whether the task force eventually also will recommend dam removal on the Lower Snake is yet to be seen — but Inslee has instructed to keep it as an option during negotiations all summer.

Multiple federal agencies years ago concluded dam removal on the Lower Snake would actually deliver the biggest benefits for salmon. But James, the Bonneville deputy director, said BPA still



Sources: Esri, nwcouncil.org; cbr.washington.edu MARK NOWLIN / THE SEATTLE TIMES

needs the Lower Snake River dams in its empire of energy generation to help balance power supply and demand. It's an old argument contested by many amid new market stresses, and ecological decline stark as dead baby whales. "It's a new day," said Rebecca Miles, executive director of the Nez Perce Tribe, which advocates freeing the Snake. "To have the orca in peril, I hate to see it," Miles said. "But it shakes up this cause even more, it makes people think. You have to connect it to the cycle of life, you see all the species connected."

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(Controversial.)

Data collection begins toward raising Shasta Dam

By STAFF REPORTS | September 21, 2018, chicoer.com

REDDING, CA — Geologists are beginning take core samples to collect data for a proposal to raise Shasta Dam by 18 1/2 feet. The Bureau of Reclamation says the samples will be taken over the next few months from on, around and deep within the dam, in order to characterize concrete and geology conditions. The federal government has been studying the idea of raising the dam and enlarging Shasta Reservoir on and off since the 1980s. But the state of California, environmental groups and the Winnemem Wintu Tribe have been and remain opposed.

State officials say raising the dam would violate state law because it would inundate a portion of the McCloud River, a protected river under state law. It would also flood sites sacred to the tribe. Despite that, $20 million for preliminary work was approved by Congress in March in the Water Infrastructure Improvements for the Nation Act. The bureau has said it expects to award construction contracts by December 2019. The current proposal to raise the dam would add space for an additional 630,000 acre-feet of stored water, according to the Bureau. It claims that would improve water supply reliability and reduce flood damage. It also said it would improve water temperatures and water quality in the Sacramento River below the dam for anadromous fish survival by increasing the deep pool of cooler water at the bottom of the lake. The total cost of the project is estimated at $1.4 billion in 2014 dollars. More information is available at https://www.usbr.gov/mp/ncao/shasta-enlargement.html

(Lotta dams need fixing.)

Our nearby dams worked after Florence. But someday they won't.

BY MARTIN DOYLE AND LAUREN PATTERSON, September 26, 2018, newsobserver.com

This dam in Marlboro County blew out during Hurricane Florence. It is one of about a dozen dams that broke after the storm soaked South Carolina, flooding many communities in the Pee Dee region. Photo by Sammy Fretwell, The State

Over the past week, rivers in North Carolina have broken previous flood records, many of which were set by Hurricane Matthew just two years earlier. Hurricane Florence dropped two to three feet of rain, causing major flooding along the Cape Fear, Lumberton, and Neuse rivers. The Cape Fear River alone carried enough water to fill an Olympic size swimming pool every two seconds—destroying property and highlighting the limits of our country's infrastructure. Upstream of the flooding on the Cape Fear and Neuse rivers are large dams operated by the U.S. Army Corps of Engineers, an agency that came under scrutiny for how it operated dams during the 2011 Mississippi and Missouri river floods. The Army Corps must balance keeping reservoirs full enough to provide drinking water, hydropower, navigation, and recreation with keeping reservoirs empty enough to assist with flood control.

We spent the past few years building a database to understand how their reservoirs balanced this two-fold task across the nation. We learned that these competing purposes become particularly problematic in the Southeast in the late summer as the need for stored water is highest and the risk for hurricanes is greatest. To balance these needs, the Army Corps develops "water control plans" that lay out how empty or full reservoirs should be. The Army Corps records reservoir water levels, inflow, and outflow to show how dams operate in real-time. These data let us see that reservoirs operated according to their water control plans up until Florence flooding began. As Florence began dumping rain, these reservoirs captured the flow of rivers upstream of the

dam and stopped releasing water downstream to reduce flooding. At the peak of flooding, both Jordan and Falls dams had more than doubled the amount of water stored prior to Florence. Water levels continue to rise in both reservoirs, storing water that would otherwise add to the deluge downstream. Although simple in concept, this infrastructure represents a staggering achievement of engineering and planning.

But it's important to recognize a few key aspects of Army Corps dams. In times of drought, the Army Corps can be criticized for not diverting from its water control plans to store more water for water supply. Events like Florence are a good reminder that these reservoirs have multiple purposes, and shifting off their plans could create incredible flood risk. Although these reservoirs are performing as intended, there are limits to infrastructure. There have been and will be floods that these dams will not be able to store. Even the gargantuan Glen Canyon Dam risked flooding in 1983. All infrastructure has limits and at some point there will be a flood that is simply beyond the capacity of any dam, including Jordan and Falls lakes.

Climate change matters and it will push the limits of our infrastructure. A warming climate allows more precipitation to be held in the atmosphere, increasing the potential for high intensity precipitation, and appears to create conditions that make 'stalling' hurricanes like Florence, and what Texas saw with Harvey, more likely. The Army Corps' infrastructure operated and performed incredibly well during Florence. However, the efficacy of this, and all water infrastructure, will be challenged in the future. We can rely on it only so much, and likely need to begin expecting floods for which this infrastructure is ineffective. *Martin Doyle is the director of the Water Policy Program at Duke's Nicholas Institute for Environmental Policy Solutions and professor of river science at the Nicholas School of the Environment. Lauren Patterson is a policy associate at the Nicholas Institute.*

(Anything old usually needs attention, even you.)

Old age, neglect and a changing climate are rendering US dams dangerous

Heather Mongilio, Oct 01, 2018, ehn.org

In the face of more frequent and intense rainfall, dam failures are becoming the norm. What can be done with the underfunded relics?

Annapolis, Md.—DJ Buckley spent most of his afternoon on Aug. 3 picking up branches and debris out of the Annapolis Harbor. After the Conowingo Dam opened 17 floodgates due to rising water levels, built-up debris came washing through into the harbor. "I can't remember a time when I've seen that much in here," Buckley said. The debris in the harbor led Maryland Comptroller Peter Franchot to call out Pennsylvania for the amount of garbage and branches in the Susquehanna River, which flows through the Conowingo Dam and into the harbor.

The incident leads to more questions about dams in the U.S. While the Conowingo opening up its gates does not constitute as a failure, as storms become more intense due to the changing climate, there will be more overtopping at deficient dams, Mark Ogden, technical specialist with the Association of State Dam Safety Officials, told EHN.

Just this month in North Carolina, a dam at the state's retired Duke Energy plant failed, spewing ash and coal into the Cape Fear River. That dam had an emergency action plan, but the majority of the state's high-hazard dams do not.

That's not unusual. Approximately 30 percent of the country's 15,498 high-hazard dams do not have emergency plans. Add in the age and lack of maintenance of many dams, and a flooding disaster is just waiting to happen. And in many places it has happened—according to the

Association of State Dam Safety Officials, failures have occurred in every state, with at least 173 failures between 2005 and 2013. "If you have more intense storms, more frequent storms then those deficient dams can't handle that. And you're going to see more problems where dams are under stress due to the high waters levels or the overtopping," Ogden said.

High hazards, low funding

There are more than 90,000 dams in the U.S., according to the National Inventory of Dams, which is kept by the Army Corps of Engineers. Approximately 15,500 of them are classified as high hazard, meaning in the case of failure, at least one life could be lost. According to the Association of Dam Safety Officials, the average age of dams in the U.S. is 56 years old. By 2025, seven out of 10 dams will be 50 or older. It would take approximately $22 billion to rehabilitate the most critical dams, according to the Association. While the Army Corps keeps track of the amount of high, significant and low-hazard dams in the country, the individual hazard potential for each dam is not available for the public, Kathryn Van Marter, a spokeswoman with the Federal Emergency Management Agency, told EHN in an email. But of the 15,498 high hazard dams in the country, 4,861 do not have emergency action plans or an emergency action plan is not required. Take Rhode Island: 79 of its 96 high hazard dams do not have emergency action plans.

"With the changing climate and the more intense rainstorms that we're getting, a lot of these dams were never designed to handle the kind of water we're going to be getting in the years to come," David Chopy, chief of the Office of Compliance and Inspection for Rhode Island, told EHN. But Rhode Island is not alone. Alabama, Georgia, Florida, North Carolina and New Mexico have more high hazard dams without an emergency action plan than dams that do, according to the National Index of Dams. In Georgia, Indiana and Missouri, the majority of the dams are not required to have such a plan. That's just for high-hazard dams. There are also nearly 12,000 dams in the U.S. that are considered significant hazard, which means that they wouldn't cause potential loss of life, but they can cause economic and environmental distress if they fail. There are seven states that have more significant-hazard dams without emergency plans than dams that do. Dams in Rhode Island are required to be inspected every two years if they are high hazard and every five years for significant hazard dams, Chopy said. But whether the dams are fixed after inspection is up to the owners.

The dam situation in Rhode Island is representative of dams across the U.S. Most dam owners are private and funding is a concern, Ogden said. Chopy said the lack of funding was the reason most of the high hazard dams in the state do not have an emergency action plan. "They're not cheap to fix, and a lot of the owners are private property owners, and they don't have that kind of money to fix the dams. Even the ones that are owned by public entities, the cities and towns and the state, it's difficult to come up with that money to fix the dams," he said. Every state but Alabama has some type of regulatory plan that allows for dam inspections, Ogden said. There is a statewide dam inventory to identify and document dams that might be high-hazard, Alabama Department of Economic and Community Affairs spokesman Josh Carples told EHN in an email.

Why dams fail

A dam failure, as defined by the Federal Guidelines for Dam Safety, is a sudden, rapid and uncontrolled release of water, Van Marter said. A breach is an opening in the dam that allows uncontrolled draining. Dams can fail a number of ways, Ogden said. Typically with a heavy flood, the spillway system will be topped, especially in dams that are poorly designed. Dams can be eroded by water, which would allow water to spill over. And other natural disasters, like earthquakes, can damage them as well. In addition, old dams weren't built to today's standards, Ogden said. The Army Corps of Engineers released the most recent safety guidelines for dams in 2014, but it notes that the federal organization has very limited control over repairs to non-federal dams. FEMA also has guidelines for dam safety. Ogden said dams might need upgrades that they might not receive. Others just might not be maintained, which makes dams more likely to fail. Others have seen an increase in hazard potential, Ogden said, due to added development around a dam.

Heading for heavier rains
University of Connecticut professor Guiling Wang told EHN that climate models predict heavier rains on a global scale. Wang, who published a 2017 article in Nature about temperature and precipitation, said that as the water cycle changes because of the warmer climate, the atmosphere can hold more water. The increase in extreme precipitation can come at the expense of light or moderate precipitations, which might explain why there will be periods of no rain followed by intense downpours, according to Wang's Nature article. However, the heavier rains are correlated with increased temperatures below a threshold. When temperatures reach above a threshold, there tends to be less rain. That can lead to more rain over a short period of time or rain that doesn't stop, she said. On a global scale, Wang said she expects to see rain increase by 2 percent to 4 percent. And it's likely to lead to flooding, something that's already happening.

Pollution pressure
The Association of State Dam Safety Officials has a list of resources for people who live near dams. Ogden said it's important for people find out if there's a dam nearby and if that dam has an emergency action plan. A good plan would have areas marked for flood risks and evacuations. "I think the big thing people should do is be aware," Ogden said. While hazard potentials are determined by loss of life or economic consequences following a failure, when dams fail or have to open floodgates, there can be environmental consequences. "Environmental impacts of dam failure can include transport of sediment excess downstream, habitat loss, severe bank erosion and scouring, and contamination of environmentally sensitive areas," Van Marter said.

Franchot called the debris in the Annapolis harbor a "catastrophe." Maryland officials also called on Exelon, the operators of the Exelon dam to help with cleanup efforts. "Parts of the Chesapeake Bay look like the aftermath of D-Day. It's disgusting," Franchot said. The Conowingo Dam is not a source of the pollution, Exelon spokesman Paul Adams told EHN in an email. "The debris currently in the Chesapeake Bay is a direct byproduct of record rain in the region," he said in the email.

It's clear that extreme rain and weather will come, and the debris that came through the Conowingo Dam is an example of why more pollution measures are needed, Maryland Secretary of the Environment Ben Grumbles told EHN. Immediately after the pollution in the harbor, the focus was on cleanup. But a longer term strategy will focus more attention to the entire watershed, Grumbles said. "It's clear that more precipitation, more runoff, more extreme weather is in store for the Bay and the tributaries to the Bay, so this is a shining example for the need for pollution prevention measures upstream and at the Conowingo Dam itself," he said

Hydro:
(Turning it into a pumped storage project.)

That's a big dam battery
By GREG WALCHER, 9/21/18, gjsentinel.com

This week I participated in a teleconference discussing Colorado energy issues. Over half of our state's electricity comes from coal. The oil and gas sector supports 213,000 jobs and contributes $25 billion to Colorado's economy. Still, a majority of our population longs for the day we wean ourselves, relying entirely on renewable

energy. That means wind and solar to most people. I've always thought it strange that renewable advocates dislike hydroelectric power, though rain and runoff are every bit as continuous, predictable, renewable, and free as the wind and sun. Dams and reservoirs have environmental impacts, of course, but so do wind machines and solar panels — both of which also have reliability issues. Now it seems, the former may be able to solve the latter's problem.

The main problem with wind and solar is simple enough; the wind doesn't always blow and the sun doesn't always shine — not always when we need it. So despite massive growth in wind and solar installations, meeting demand still requires coal and natural gas plants. That might change if we had the technology to store renewable energy, on a massive utility scale, which always brings the discussion around to batteries. Battery technology is slowly improving. Companies like LG, Sonnen, and especially Tesla, are marketing batteries that combine with home rooftop solar panels. Tesla's "Powerwall" is a rechargeable AC-coupled home battery that stores energy during sunny periods and discharges it on demand. Such batteries can supply a home during power outages for 7-8 hours. They are expensive ($5,000-10,000), but they work. So why don't utilities just install lots of them for commercial-scale use?

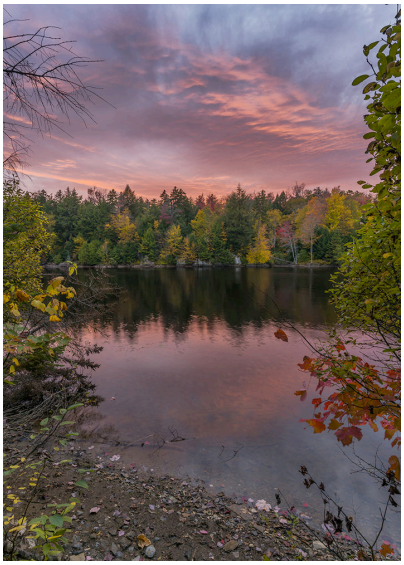
As one solar website explains, "The problem is that storing solar and wind power from commercial farms would require warehouses full of massive batteries, and at this size, a major problem becomes apparent — the bigger the battery, the higher the temperature. This makes the probability of dangerous situations … more likely." Nevertheless, lithium-ion batteries are being used with solar arrays in several large facilities. Perhaps the largest is Arizona's Pinal Central Solar Energy Center. A couple hundred Tesla commercial-sized batteries are paired with 258,000 solar panels on 257 acres of land, and can generate 20 megawatts. It is a $60 million project. What if such expenses were unnecessary, because we've had much larger and absolutely reliable batteries for decades? A seemingly unrelated technology involving hydroelectric dams may offer a simple solution. It is known as "pumped storage" and it has been around for generations. Pumped storage has long been understood to improve the economics of hydro-dams. Electricity costs more when demand is higher, so the grid experiences peak demand in the daytime and lower demand at night. So, water is run through generators during peak daytime hours when the power sells at a higher price, then pumped back up to the reservoir during the night when power is cheaper. There are numerous commercial pumped storage systems in the U.S., including the Taum Sauk plant in Missouri, Bath County in Virginia, and Raccoon Mountain in Tennessee. Water stored in an upper reservoir is released through the turbines during high energy demands, and pumped back into the upper reservoir overnight. That same technology is now being considered as a way to turn existing dams into giant batteries for solar and wind power storage, even at the nation's largest reservoir. The Hoover Dam Proposal aims to build a wind and solar-powered pump station 20 miles below the dam, to pump water back up to Lake Mead. Water stored in the lake can be released for power on demand, effectively turning the dam into a battery for solar and wind power. Pumped storage projects have always been constrained by geology, but especially by the federal permitting process, which can take a decade or more. Dams are always controversial because of their environmental impacts, but with already-existing dams, these issues were long since argued, litigated, and resolved. There are 1,756 hydroelectric facilities in the U.S. and another 80,000 unpowered dams, many of which could have turbines installed. They are the most reliable source of energy imaginable. The 50 oldest electric plants in the country are all hydroelectric generators, all of them over 100 years old. Los Angeles wants the Hoover Dam project completed by 2028. That will be debated for years, but in the end it will make sense if they are serious about renewable energy. Americans will also continue to invest billions in new battery technology, but in the end we may find we've had the batteries all along.
Greg Walcher is president of the Natural Resources Group and author of "Smoking Them Out: The Theft of the Environment and How to Take it Back." He is a Western Slope native.

(Great scenery.)

Treasured reservoir in peril

Court ruling affects Green River dam

By Andrew Martin | News & Citizen, Sep 27, 2018, stowetoday.com



A court decision could spell the end for a treasured body of water, the 653-acre Green River Reservoir, VT and the isolated, pristine 5,110-acre state park surrounding it in Hyde Park. Two years after Morrisville Water & Light appealed state-imposed conditions regulating how it operates three dams in Lamoille County, an environmental court judge has finally issued a ruling in the case. On Tuesday, Sept. 18, Judge Thomas G. Walsh issued his decision — a mixed bag of good and bad for both Morrisville Water & Light and the Agency of Natural Resources, the state agency spearheading the drive to impose stricter standards on the Morrisville utility's hydro facilities.

Walsh ruled in Morrisville's favor in terms of how much water the utility allows to bypass its dams in Morrisville village and Cadys Falls on the Lamoille River. But, he sided with the state agency in limiting the amount of water Morrisville can draw down from the Green River Reservoir each winter, a condition that the utility says will make the Green River dam unprofitable, and possibly unsafe. "At Green River Reservoir, it was disappointing. The limited drawdown really makes it uneconomic for us to operate it," Craig Myotte, general manager of the Morrisville utility, said Tuesday. He and his staff have repeatedly said over the last few years that they won't operate the dam at a loss, and they've raised the possibility of draining the reservoir and decommissioning the dam as a possible solution. That would eliminate one of the most extraordinary outdoor locations in Vermont. It wasn't all bad news for the Morrisville utility, though.

"We were pretty happy with Cadys Falls and Morrisville; they ended up accepting our recommendations" at those two dams, Myotte said. The two Lamoille River dams account for 9 million of the 10 million kilowatt-hours of electricity that Morrisville generates at its three hydro facilities each year. The other 1 million kilowatt-hours are generated at the Green River dam. State officials don't appear pleased with any portion of the ruling. "We're still in the process of reviewing the decisions," Matt Chapman, general counsel with the Agency of Natural Resources, said on Tuesday. "On the whole, we're generally disappointed with it." Chapman and other agency leaders had no specific comments to make at press time; they were still reviewing Walsh's ruling before deciding whether to appeal. The appeal deadline is 30 days after Sept. 18, the date of Walsh's decision.

Reservoir in peril

Over the past five years, Myotte and his staff have repeatedly stated that, if they are not allowed to perform a significant drawdown at Green River Reservoir each year, then the facility becomes unprofitable. They normally draw down up to 10 feet of water every winter, and use that water flow to produce about one-third of the hydro dam's total electricity output. Morrisville had proposed to limit its drawdown to 6 feet each winter, but Walsh ruled in favor of the state-proposed drawdown of just 18 inches. Morrisville says that could cut the dam's electricity output by up to 300,000 kilowatt-hours, nearly one-third of the annual output, making it unprofitable to continue operating. It has also raised the possibility that not drawing down water levels several feet every winter to allow room for spring runoff could lead to safety concerns at the dam, but no safety study has been done yet.

"I don't know what we're going to do yet, but we have to figure that out," Myotte said Tuesday. In the past, the utility has raised the possibility of transferring ownership of the dam or decommissioning it and draining the reservoir, a move that would shock the more than 10,000 visitors the park draws each year. The future of the Green River Reservoir and the surrounding

state park has been a topic ever since Morrisville and the agency have been at odds. But state officials don't appear to have any plans for what to do if Morrisville really does decide to decommission the dam or turn it over to someone else. "We will be looking for them to say what the next steps will be before planning further," Chapman said.

All about water flow

Morrisville Water & Light's standoff with the Vermont Agency of Natural Resources ended up in environmental court when the utility appealed the water quality certificate issued by the state agency in August 2016. The certificate lays out how Morrisville should operate its three hydro facilities. The agency's comments are part of Morrisville's relicensing of the three hydro dams with the Federal Energy Regulatory Commission. For the two dams on the Lamoille River, the main point of contention was how much water should be allowed to bypass each facility. Allowing more water to bypass the dam allows for a healthier river and better aquatic habitat downstream, but it also cuts into Morrisville's hydropower output. For the Green River Reservoir, the main sticking point was how far Morrisville should be allowed to draw down the reservoir's water level every winter. Walsh did favor parts of Morrisville's proposal for operating the dam at Green River Reservoir, but he sided with the state on sharply limiting the drawdown of the water level every winter.

State officials think drawdowns of several feet expose too much aquatic habitat to Vermont's extreme winter temperatures, so the agency's proposal allowed for only an 18-inch drawdown each winter. Morrisville had countered with a maximum drawdown of 6 feet, but Walsh wrote that "does not sufficiently support high-quality aquatic habitat," and sided with the state agency instead. For the two dams on the Lamoille River, Walsh determined that the bypass flows, measured in cubic feet per second, proposed by Morrisville comply with current Vermont water quality standards. For the Morrisville village facility, the utility was proposing a minimum bypass flow of 43 cfs, more than triple the 12 cfs required by the utility's old license. The agency's water quality certificate proposed a minimum flow of 70 cfs and also requested that 1 inch of water be allowed to spill over the dam at all times for aesthetic purposes. Walsh ruled that the state conditions "exceed what is necessary to comply" with Vermont's water quality standards. He made a similar ruling for the Cadys Falls dam, where Morrisville is not required to bypass any water under its current license. The utility proposed a bypass flow of 65.5 cfs, a sharp increase but still less than the state's proposal of 100 cfs. The same aesthetic clause was included in the state's proposal for the Cadys Falls project, but Walsh again decided to adopt Morrisville's proposal instead. "That was the other big benefit, not asking for any aesthetic flow over the dams," Myotte said.

Whitewater exception

Walsh included one other condition in his ruling: The existing recreational use of whitewater rafting on the Green River below Morrisville's dam must be allowed to continue. For that reason, three scheduled releases of at least six hours must be held each year to allow for whitewater rafting on the river. That shows the court "recognized that this (the Green River) is a very valuable whitewater boating resource," said Bob Nasdor, northeast director for American Whitewater, one of the organizations that filed a cross-appeal in the case. "Scheduled releases can draw over 100 people. It's just a beautiful river that provides whitewater boating opportunities that are unique to the region," Nasdor said. "I think overall this will result in a better managed river and preserve a recreational resource."

What's next?

Myotte planned to confer with lawyers on what to do about Walsh's ruling.

Any appeal by Morrisville Water & Light, the Agency of Natural Resources or any of the other involved parties would send the case to the Vermont Supreme Court, where Myotte expects the case would be tied up for three to five years. One organization that filed a cross-appeal in the case, the Vermont Natural Resources Council, is "very concerned with the judge's ruling," said Jon Groveman, the council's water program director. His organization thinks Walsh's ruling could set a dangerous precedent of allowing hydro facilities as a protected use under Vermont's water

quality standards — something Morrisville argued for. Groveman considers that a “radical shift” from past policy. So, his organization is now “considering all our options, including whether or not it needs to be appealed to the Supreme Court,” Groveman said.

If no one appeals the decision, Myotte believes Morrisville will receive its new license from the Federal Energy Regulatory Commission sometime in 2019. That license could be good for 30 to 50 years, he said; Morrisville’s old federal license expired in April 2015 and the utility has been operating under its grandfathered conditions since then. Myotte and his staff had asked for 10 years to implement all the changes required by the conditions of the new license, but Walsh ruled that four years would be sufficient.

(Every little bit counts.)

Other hydroelectric projects

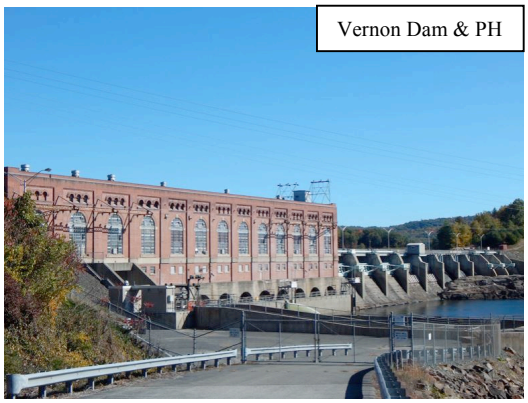
Sep 26, 2018, highlandnews.net

Construction was completed in August on a hydroelectric generator at the Oliver Roemer Water Filtration Facility at Lytle Creek, a joint project of the Valley District and the West Valley Water District. The 400-kilowatt plant cost $4.36 million. The plant will generate 2 million kilowatt hours per year and reduce carbon dioxide emission by 3.7 million pounds per year. It will pay for itself in 8.5 years. A ribbon-cutting ceremony for the project is scheduled for 9 a.m. Saturday, Oct. 13, at the Roemer plant, 3010 N. Cedar Ave., Rialto, said Ron Merckling, the Valley District’s manager for water use efficiency and external affairs. The $2.97 million Waterman hydro-generating plant is the largest of the new projects, generating 3.5 million kilowatt hours and $386,000 of revenue per year. It will save 6.6 million pounds of carbon dioxide per year. It is a joint project between the Valley District and the city of San Bernardino. A ribbon-cutting ceremony is planned in November or later but no date is set.

(Better safe than sorry. Everybody should have a good EAP.)

Great River Hydro plans for dam failure

By Susan Smallheer, Brattleboro Reformer, September 28, 2018, berkshireeagle.com


Vernon Dam & PH

WESTMINSTER, MA — Great River Hydro LLC officials told emergency planners and fire chiefs along the Connecticut River Tuesday they needed to prepare their communities "for the worst" in the event of a collapse of one of their dams. Emergency management planners from towns along the Connecticut were introduced to a set of interactive "inundation maps" that with the click of a mouse, show how much of Bellows Falls, Westminster, Putney, Brattleboro and Vernon - and their New Hampshire neighbors - would be under water in the event of a dam failure. Jud Donaghy, chief dam safety engineer for Great River, said the emergency planning is part of Great River Hydro's license with the Federal Energy Regulatory Commission. Great River purchased the network of hydro dams on both the Connecticut and Deerfield rivers from TransCanada in April 2017. The scenarios outlined by Donaghy were astounding: in the event that the biggest dam in the Great River network, the Moore dam on the Connecticut between Littleton, N.H., and Waterford, Vt., failed, the release of the water behind it would trigger the failure of all the dams downstream in a cascade effect. Only Moore, Comerford and Wilder dams are "high hazard," and carry the potential to knock out the hydro dams downstream from them. Bellows Falls and Vernon do not have that potential, he said.

On the Deerfield River, three Great River dams that have the "high hazard" designation are Somerset, Harriman and Sherman, which is located just over the state line in Massachusetts. He said the impact of a Harriman failure would be nothing short of a massive calamity for the tiny town of Readsboro, whose residents would be inundated in a matter of minutes with a wave of water more than 150 feet deep. The interactive maps, which were unveiled during a meeting at the Vermont State Police barracks Tuesday night, will also give planners an idea of how much time emergency crews have to evacuate people before the water arrives. While he admitted he was sketching the stuff of nightmares for emergency planners, he stressed that Great River was spending great time and resources on the dams' maintenance, to make sure nothing like what was outlined would ever happen. There were two different scenarios outlined for each dam, a "sunny day" catastrophe, or a storm scenario. But he said there were conditions beyond their control - a tremendous storm, or an earthquake, which could weaken or destroy a dam. Great River does have a "robust security system" for the dams, according to Matthew Cole of Great River Hydro.

He said the Teton dam failure in Idaho in 1976, which killed 11 people and about 30,000 head of cattle, had triggered the planning for dam failure, he said. The interactive maps will replace a book of maps that showed town and regional emergency planners just how bad it could get. Any planner with the internet will be able to access the special inundation maps, he said. "We hope never have to use them," he said, noting Great River Hydro employees do annual drills and emergency planning. Brattleboro Fire Chief Mike Bucossi said the new maps would be invaluable in helping do the emergency planning for Brattleboro. A portion of downtown Brattleboro would be inundated under some dam failure scenarios, he said. He said the flooding would be worse than during Tropical Storm Irene, which hit southern Vermont hard. "For preparing people, this will be huge," he said, noting he needed to study the maps more closely.

Susan Hammond, chairwoman of the Rockingham Select Board, said the session was very helpful to understand the impacts on the town. Donaghy said that while Irene had a major effect on many of the towns along the Connecticut and Deerfield rivers, dam failure and the sudden release of millions of gallons of water would be far worse. Donaghy said Great River was working to improve communication with not just state emergency planners but local towns. Donaghy and Cole, along with other Great River officials, are holding a series of meetings along the Deerfield and Connecticut rivers. In addition to sessions in White River Junction and Bradford, there will be a session at the Readsboro School in Readsboro on Oct. 9 at 5:30 p.m. There will be a similar session on Oct. 11 in South Deerfield at the Deerfield Town Hall

(People who know what to do when there's too much water.)

Know Your Madisonian: As flooding, hurricanes increase and intensify, policy adviser testifies to Congress on problem

Sep 28, 2018, madison.com, by KELLY MEYERHOFER, STATE JOURNAL

Larry Larson is used to meetings being canceled or cut short. As senior policy adviser for the Madison-based Association of Floodplain Managers, Larson travels to Washington, D.C., once or twice a month to provide recommendations on flood mitigation policy to Congress and federal agencies. A meeting Larson had earlier this month on Capitol Hill with the U.S. Army Corps of Engineers was canceled because of Hurricane Florence. In August 2005, Larson's discussion with FEMA officials on levee policy was cut short because of Hurricane Katrina. Larson, a Dane County resident since 1967, has testified to Congress on flood policy at least 30 times. In the last decade, he's noticed members of Congress talking more about flood

mitigation than ever before. “Because this stuff keeps happening over and over again and they realize we have to do something to stop it,” he said.

How did this national group get started? And why is it located in Madison instead of near a coast?
There were about six of us that started it in 1977, the six Midwestern states in FEMA’s Region V. I was the Wisconsin representative working for state Department of Natural Resources at the time running the state’s floodplain management and dam safety program. FEMA was planning to meet Region V representatives in St. Paul. We had our meeting and 19 states showed up. That’s when we realized this is not a Region V issue, it’s a national one. I volunteered to be executive director of the group until I retired from DNR in 1997 after 30 years there. At that point, the group said we need you to work for the Association of State Floodplain Managers. And I said, “OK, guess where the office is going to be?” So that’s why we’re housed here in Wisconsin.

Is the Association of State Floodplain Managers the go-to organization for Congress to get recommendations on fixing flooding-related problems? We’re probably the biggest (group) because we have 18,000 members and 50 percent of our members are at the local level. (Those members) might be, for example, the city of Madison employee issuing building permits or development permits and considering flood hazards when they do that.

How do you help local government? In 1999, we set up a certification program for floodplain managers. There are now 10,000 certified floodplain managers in the United States. That has probably done more to improve managing flood risk in the nation than anything else because all of a sudden you have that local person ... making those decisions on how development occurs. They set the rules. Some of them do it well. Some of them ... have problems. We try to help them do it in a way that not only makes their communities more resilient but also protect the public, public safety and reduce property damage at the same time.

And how does working with local government tie into your meetings on Capitol Hill?
The Department of Transportation builds bridges across floodplains. (The U.S. Department of Housing and Urban Development) gets as much money in disaster relief as FEMA does. There’s the EPA, the Department of Agriculture, the U.S. Geological Survey. There’s 26 federal agencies that impact flooding one way or the other. Over the years, I probably have met with all of the agencies. We don’t ask for money. We don’t take positions on specific projects. We look at the policies and try to improve it. We have a credibility in Washington now where they call us to testify.

What is hurricane season like for you?
What’s interesting is that we’re almost having hurricane season here in Wisconsin now. We had a little bit of that this summer, didn’t we? It is not at all ordinary for us to have a 14-inch rainfall, which we had in parts of Dane County this year. That’s way off the charts. We’re getting these systems that just sit here and dump water. We don’t design for those kinds of rainfall events. We’re seeing more and more of these in Wisconsin and along the coasts. That will continue to happen. You can argue about what’s causing it all you want, but the reality is we have to adapt to it.

What do people misunderstand or fail to understand about flooding in terms of policy?
To me, the 500-pound gorilla in the room is the Disaster Relief Act. It’s the perverse incentive that leads locals in some states to do the wrong thing because their view is they want development because it brings us taxes. But it will flood and the federal taxpayer will bail them out. The bigger the disaster, the larger percentage of federal money you get for public assistance.

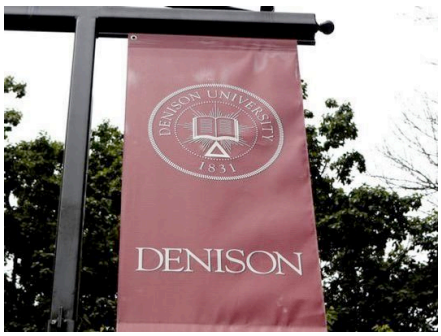
Where are places that are doing flood mitigation right?
Milwaukee Metropolitan Sewer District has a very active program, for example. They have a goal to buy out 100 percent of the houses in the 100-year-floodplain. And they’re about 80 percent of the way there. When a flood goes through, it never makes the news because nobody’s there. There are ways to do this but it takes progressive thinking on the part of the communities.

Other Stuff:

(Something to think about!)

DU program: 'Where in the World Will Our Energy Come From?'

Special to The Sentinel Oct. 3, 2018, newarkadvocate.com



Denison University's Anderson Lecture Series welcomes Professor Nathan S. Lewis presenting, "Where in the World Will Our Energy Come From?" at 8 p.m. on Thursday, Oct. 11, in Swasey Chapel (200 Chapel Drive). What would it take for the world to get away from fossil fuels and switch over to renewable energy? It takes more than willingness to buy a Prius or to have solar panels installed on your roof. If we want to use wind, solar thermal, solar electric, biomass, hydroelectric and geothermal energy, it will take a lot of planning, and willingness on the part of governments and industry.

It takes investment, a favorable price per unit of energy, to get anyone to produce alternative energy, and plenty of resources to create those energy sources. Lewis, a professor from the California Institute of Technology Division of Chemistry and Chemical Engineering, Beckman Institute and Kavli Nanoscience Institute, will discuss these and other hurdles — technical, political, and economic — that must be overcome before the widespread adoption of renewable energy technologies. Lewis has published over 500 papers, presented hundreds of public and technical lectures in the area, and is responsible for training a preeminent cohort of globally leading researchers in the solar fuels field. Lewis is the Editor-in-Chief of the leading journal in sustainable energy research, "Energy and Environmental Science," and is a distinguished advisor to industry, government, academia, as well as national and international media on the role of R&D in clean energy innovation. He is a holder of the Princeton Environmental Award, the American Chemical Society Award in Pure Chemistry, and was the highest ranked scientist/technologist, at #17 overall, in the Rolling Stone magazine's top 100 "Agents of Change in America."

(Gotta be PC.)

5 Most, Least Diverse States

WalletHub considers race, religion, politics, and more

By Arden Dier, Newser Staff, Sep 18, 2018, newser.com

NEWSER) – The same three states leading the country in racial diversity also lead the pack when it comes to socioeconomic, cultural, economic, household, religious, and political diversity, according to WalletHub. The site considered a host of metrics from race and language to educational attainment for its ranking of all 50 US states. The five most and least diverse of the bunch, with a score out of 100:

Most diverse:

1. California: 70.9
2. Texas: 70
3. Hawaii: 69.7
4. New Jersey: 69.4
5. New York: 69.2

Least diverse:

1. West Virginia: 58.3
2. Maine: 58.4
3. Vermont: 59.8
4. New Hampshire: 60.8
5. Montana: 61

Click for the full list: https://wallethub.com/edu/most-least-diverse-states-in-america/38262/

or see state school systems ranked here: http://www.newser.com/story/262642/5-us-states-with-best-worst-school-systems.htm

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