5/29/2015

Some Dam – Hydro News™

And Other Stuff

i

Quote of Note: *"Don't worry about avoiding temptation. As you grow older, it will avoid you."*
-- Winston Churchill

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"Good wine is a necessity of life." - -Thomas Jefferson
Ron's wine pick of the week: **2012 Mauritson Winery Zinfandel "Dry Creek Valley"**
"No nation was ever drunk when wine was cheap." - - Thomas Jefferson

Dams:

(An EAP is only good if it works, so test it!)

Responders test response to Holter Dam failure

By Karl Puckett, greatfallstribune.com, May 14, 2015

More than 100 emergency responders and other local, state and federal officials met with NorthWestern Energy representatives Thursday to test their response to a simulated failure of Holter Dam upstream of Great Falls near Wolf Creek, MT. Flooding or earthquakes typically are used as a cause of a dam failure in the periodic testing of emergency action plans. This year, for the first time, the cause was a bomb threat. "It's a reality, we could have a terrorist-type event, even just bomb threats," said Boyd Burnett, NorthWestern's emergency action plan coordinator. NorthWestern owns the 124-foot-high dam on the Missouri River 43 miles northeast of Helena. The reservoir is 27 miles long, and it stores 240,000 acre-feet of water. A failure would cause flooding in Lewis and Clark, Cascade, Chouteau, Blaine, Fergus, Phillips and Petroleum counties. Great Falls is 69 miles downstream. Maximizing early warning and reducing loss of life were the goals of the emergency action plan functional exercise.

It brought officials from numerous local, state and federal agencies to the Best Western Inn in Great Falls. "It's just a good chance for them to meet and work together," Burnett said. In a stress-induced atmosphere with time constraints, the participants acted out their roles, with each company or agency located in a separate cubicles.
Messages were relayed to the participants by phone or script and participants used a temporary pone system to communicate with other places. They sent out information over "Fakebook," which was displayed on a giant screen in front of the room. "It's just another opportunity to simulate real life," Burnett said. But Burnett also warned participants not to use real social media outlets to communicate information about the simulation. "Don't really get on your phone," he said. "There could be trouble." The Federal Energy Regulatory Commission requires the functional emergency action plan exercise every five years. "This is the highest level they require," said Karl Swanson, a civil engineer with FERC. Swanson traveled to Great Falls to monitor the simulation from Portland, where he works in dam safety in FERC's office of energy projects. The primary purpose was to test and improve coordination between emergency responders, Northwestern Energy, county law enforcement and emergency management agencies, state and federal agencies, the Montana National Guard and media. In the simulation, the dam blew up at 11:45 a.m. July 4, when the reservoir and river was filled with people recreating. Information dribbled into the sheriff's officials, fire departments, Weather Service folks, state and federal agencies and dam operators. They then went to work, making and taking phone calls, checking maps, and following the guidelines of the action plan. "A key part is identifying any main information they would need in an actual emergency," Swanson said.

(History on dam failure.)

Engineer to give presentation on 1924 Muck Dam failure in Saltville

swvatoday.com, May 15, 2015

Engineer to give presentation on 1924 Muck Dam failure in Saltville 0 comments

A presentation on the great Muck Dam failure on Christmas Eve, 1924, in Saltville will be given at the Museum of the Middle Appalachians in Saltville on May 17at 2 p.m.
Tom Roberts, P.E., regional state dam safety engineer for Western Virginia, will talk about the background, history and events leading up to the failure of the chemical waste storage pond in Saltville, known as the Muck Dam. He will also describe the consequences of that failure for the Palmer Town community located just beyond the dam's base. More than 651 million gallons of caustic sodium hydroxide (Drano) flooded into the North Fork of the Holston River and over Palmer Town. The community pulled together to rescue as many people as possible, but still there were 19 known deaths following the dam's failure. This was the largest failure of a dam in Virginia's history.

Roberts works throughout western Virginia inspecting dams, developing corrective action, and making improvements for public safety. A recent such corrective project was the near failure of the Laurel Bed Lake Dam on Clinch Mountain, preventing a catastrophic loss to the residents in the valley below. Roberts received an award for his presentation of this program at a national engineering conference in 2014. It is used as an educational tool for civil engineering students working in the area of dam construction and safety. A question-and-answer period will follow the presentation. Roberts' presentation is one of the monthly outreach programs provided by the Museum of the Middle Appalachians. These programs are free to the public. Donations are appreciated. For more information, contact the Museum at 276-496-5633 or museumoma@embarqmail.com.

(Dam proposal revived. Probably doesn't have much of a chance.)

Dam Proposal on the Weiser River Trail Calls for Sacrifice

The dam could wipe out the landscape but create more water security

By Jessica Murri, May 20, 2015, boiseweekly.com

From Paul Collins' small airplane, one can see where the Idaho Water Resource Board proposes to build a 283-foot earthen dam on the Weiser River. Everything beyond the mouth of the canyon would be flooded.

The wind is calm, the propeller sputters and spins, and morning light streams through the little plane's sunroof. Paul Collins locks into his five-point harness and taxies out onto the short airstrip at the Weiser Airport.
"This plane has a short takeoff time," he tells me through our headsets, and he's not joking. By the end of his sentence, the bright yellow plane lifts into the air. We're flying in a bright yellow Aviat Aircraft Husky A-1C, a tandem-built taildragger in immaculate condition. Collins sits in a bright red leather seat in front of me and pushes the side window open mid-flight so I could take some (windy) pictures. As we fly over the Weiser River, he marvels at the 84-mile-long trail that winds alongside its banks from Weiser almost to New Meadows. We circle over the canyon, atop green hills spotted with sagebrush, yellow wildflowers and rocky cliffs. The river is a bright blue thread running throughout.
Collins' attitude suddenly changes. "It's so stupid," he says. "The whole idea of it. We're going to lose all this. I thought we won this fight 25 years ago, but I guess you can never know for sure."
Back in the mid-'90s, Collins was part of a group that turned the railroad bed along the Weiser River into a trail—the project became known as the Friends of the Weiser River Trail. That trail is in jeopardy of being 250 feet underwater due to a proposal from the Idaho Water Resource Board to build a 283-foot dam just a few miles upstream of Weiser. The dam would hold 750,000 acre feet of water, almost as much as Lucky Peak, Arrowrock and the Anderson Ranch reservoirs put

together. If the proposal comes to pass, the colorful canyon would be inundated. "The whole thing will be gone," Collins says. "And it'll just be a big sludge pit. They'll never be able to fill it. It's stupid. That's my attitude on it."

Welcome Aboard

Once the plane landed at the even smaller Midvale airport, a tour began for the inaugural Weiser River and Trail Appreciation Day, ferrying around 30 people in tour vans along the trail and riverbank. The Friends of the Weiser River Trail hosted the May 2 tour to talk pros and cons of the dam with stakeholders and decision makers. It drew a diverse group with a spectrum of opinions on the proposal. A handful of state senators and representatives including Sens. Bert Brackett (R-Rogerson) and Abby Lee (R-Fruitland) and Reps. Ryan Kerby (R-New Plymouth), Donna Pence (D-Gooding) and Phylis King (D-Boise), devoted their Saturday to the tour, as well as the chairman and two board members of the Idaho Water Resource Board. The supervisor for the Idaho Department of Fish and Game was there, as well as representatives from the Nez Perce Tribe and the Upper Snake River Tribes. A representative from Congressman Raul Labrador's office rode along beside members of several nonprofits, including the Weiser River Resource Council, the Idaho Organization of Resource Councils, Idaho Rivers United and the Idaho Conservation League. At the first stop, Idaho Water Resource Board Chairman Roger Chase addressed the crowd, explaining the necessity of the so-called Weiser-Galloway Project, which rests on three pillars: taking the strain off other important rivers and aquifers, satisfying water rights around the southern half of the state and augmenting runoff for salmon. "We see this as one of the possible solutions for the future," Chase said. Right now, 427,000 acre feet of water is released for salmon health—coming from the Snake, Boise and Payette rivers. If the dam is built, that water could come from the new reservoir instead. The Snake River Plain is especially in need some help, according to Chase. He said there is a 250,000 acre feet shortfall every year in the Snake River to meet water rights. Letting the Snake retain more of its water would help stabilize that shortfall and recharge the dwindling Snake River Aquifer.

Chase also explained how Idaho has given out more water rights than it has water, and that led to three days last year when the Swan Falls Dam on the Snake River didn't reach minimum flow requirements agreed on between the state and Idaho Power, flows necessary for Idaho Power to generate electricity. "We owe maybe 1,000 acre feet of water to Idaho Power now to make up for it," Chase told Boise Weekly. "We can do that occasionally but not all the time." He listed other tactics the state has taken to keep from running dry in a time of drought, including efforts to recharge the Snake River Aquifer and cloud seeding to create more precipitation. Still, it hasn't been enough to meet everyone's needs. Chase said the answer could likely be more water storage. The IWRB is looking at three projects in particular: building the Galloway dam, raising Arrowrock Dam or raising the Island Park Reservoir dam near Yellowstone National Park.
To flood this valley, the state would need to buy out 27 private property owners, but that's not many when looking to create a 13.5-mile-long reservoir. "I used to be a river guide," Chase said. "My friends say, 'We never thought we would see you advocating for a dam.' But you have to make tough decisions in times of water scarcity. There will be many reasons not to build this dam and many reasons to build it. We may have to sacrifice this free-flowing river." ICL Water Associate Marie Kellner is adamant the Weiser River not be "sacrificed," along with the wildlife habitat for sage grouse, deer and elk, quail, waterfowl and smallmouth bass. "We're in the era of [2014 documentary film] DamNation, which is all about how many places are deciding they don't want dams—not just because we care about the health of the river and the fisheries and the recreation benefits and the peace of mind that comes from a free-flowing river," Kellner said, "but also utility companies that own dams are deciding it's too expensive to retrofit them and move them into the 21st century and they would rather just remove them. Who is building dams in the 21st century?"

Building Dams

The Weiser River Trail was created in 1997 and spans 84 miles along the river, reaching from Weiser to New Meadows. The idea of damming the Weiser River has been around for decades. Last fall,

Kellner decided it was time to take action after the Federal Energy Regulatory Commission granted the state a permit to start feasibility studies for the dam. "You don't apply for something like that unless you're prepared to spend the money to do all of those studies," she said, listing off studies for environmental and operational analysis, geological structure and dam designs. Kellner's not convinced that the reservoir could remain full, as lakes around the southern half of the state struggle to hit normal levels. The Weiser drainage is at 80 percent of normal to date for a water year, but its snowpack is at zero, meaning there's no more snow runoff for the rest of the summer. The hits are even more extreme in the Bruneau and Owyhee basins, where the Bruneau River is expected to flow at 19 percent of average. Obtaining that FERC permit, though, starts a three- to five-year process that will, by the end, determine if the dam is a good fit. About $2 million has already been spent on the dam proposal, according to Cynthia Bridge Clark, an engineer with the Idaho Department of Water Resources and the project manager for the Galloway Dam project. Bridge Clark said the Idaho Legislature appropriated another $2 million in the 2014 session.

To answer Kellner's question on who is building dams in the 21st Century, Bridge Clark said, "All the western states are currently looking at dam proposals." The Weiser River dam would cost around $500 million. It would be an earthen dam, similar to Lucky Peak. That raises concern among residents of Weiser, according to Don Anderson, of the Weiser River Council. Standing on the trail near the river, trying to imagine a dam that would reach taller than the U.S. Bank Building in Boise, Anderson expressed concern over the construction. He said the canyon walls were made of basalt and volcanic tuff—not the sturdiest of anchors. "I live about a mile-and-a-half away from where the dam face would be," Anderson said. "If something was to go wrong, I'll be one of the first to know about it." He made the comparison between this proposed dam and the Teton Dam disaster of 1976, when an earthen dam built on the Teton River breached, killing 11 people and causing up to $2 billion in damages. "Hey, that's a cheap shot," said Chase, interrupting Anderson. There was a heated moment between the man representing the Weiser River Resource Council and the chairman of the Idaho Water Resource Board. Anderson apologized, but the tension lingered as the next speaker took over. Overall, Kellner was happy with the turnout —and with the differing opinions. "If we just brought people together who were opposed to the project, we're not really moving forward the dialogue; we're just rallying among our own," Kellner said. "Here, both parties can hear each other's concerns." Should the dam be built, Bridge Clark said it would probably take up to 10 years before it is in place. Kellner would rather see the money used on the dam to go toward helping water users practice more sustainable options. Collins—the pilot—would rather not see his favorite trail 250 feet under. Anderson would rather not live at the base of a dam. However, as Chase said at the beginning of the day, sacrifices need to be made. Whether it will be the natural environment or a dam meant to improve water security remains to be seen.

(Let's get together and fix a dam!)

3 Vermont towns vote to replace broken dam

May 20, 2015, wptz.com

THETFORD, Vt. —Three Vermont towns have voted in favor of an $850,000 project to replace a broken dam. The Valley News reports residents from Thetford, Fairlee, and West Fairlee voted Tuesday to replace the dam at Lake Fairlee. The Maine resident who owns the dam has to sign it over to the towns in order for construction to start this summer. Town officials who have collaborated on the issue for more than three years say the decision ultimately came down to taxes. The dam's failure would cause the waterline to recede and lakefront property values to suffer, resulting in non-lakefront homeowners to pay the difference. The cost will be split between the three towns, with Thetford paying the most at $482,000. The prices are based on equalized values of lakefront property.

(This doesn't sound good.)

Entergy warns of potential dam failure near Conroe

yourhoustonnews.com, May 21, 2015

Entergy Texas Inc. notified local authorities Thursday afternoon about the potential for dam failure at the Lewis Creek Reservoir off of FM 1097 near Willis. The persistent rainfall in the surrounding area has caused extensive saturation of the soils that make up the reservoir dam, according to an Entergy release.
Advertisement

Montgomery County Office of Emergency Management received a call from Entergy providing notification of the potential dam failure. Local emergency response agencies are at the site conferring with Entergy officials. State officials also have been contacted. Entergy is reducing the water level of the reservoir to reduce the stress being applied to the its dam. The company also is taking other measures to prevent further dam deterioration, according to Entergy. MCOEM Homeland Security Planner Miranda Hahs said officials will continue to monitor the situation and coordinate with state and local officials. “We encourage all citizens of Montgomery County to sign up for Code Red Emergency Alerts in order to receive all county emergency notifications,” Hahs stated in a release. Residents can sign up for Code Red by visiting www.mctxoem.org and clicking on the code red icon.

Crews are working around the clock to make necessary repairs to the dam, but efforts are being hampered by the continuing rainfall, according to Entergy officials. A preventive water release into Lake Conroe to lower the reservoir level is in progress in an effort to reduce the stress being applied to the dam. Thus far, the dam has not failed, and the nearby Lewis Creek power plant is fully operational. A number of steps are being implemented to prevent further dam deterioration, including the installation of berms to minimize further slide movement, the installation of more than eight acres of protective covering to protect areas of concern from additional rainfall, and 24/7 monitoring of the soil by geotechnical engineers. Entergy is working closely with local emergency management officials to ensure the safety of nearby residents and businesses.
Entergy Texas Inc. delivers electricity to more than 426,000 customers 27 counties. It is a subsidiary of Entergy Corporation. Entergy is an integrated energy company engaged primarily in electric power production and retail distribution operations. Entergy owns and operates power plants with approximately 30,000 megawatts of electric generating capacity, including nearly 10,000 megawatts of nuclear power, making it one of the nation’s leading nuclear generators. Entergy delivers electricity to 2.8 million utility customers in Arkansas, Louisiana, Mississippi and Texas.

Hydro:

(Go where the cheap, renewable power is!)

CenturyLink's new data center runs on water

Hydroelectric power is more reliable than wind or solar, which are dependent on weather

By Lucas Mearian, Computerworld | May 14, 2015. computerworld.com

Communications and data services provider CenturyLink has opened a new data center that gets 85% of its power from nearby dams.
The three-story 50,000-square-foot data center, located in Moses Lake, Wash., will ultimately support up to 30 megawatts (mW) of electrical load on the site, with an initial ramp of 8mW of hydroelectric power. The facility, which is owned by Server Farm Realty and

leased to CenturyLink, is powered by the Wanapum Dam and Priest Rapids Dam on the Columbia River.

The new facility will be used to support cloud and disaster recovery services, which CenturyLink said is bolstered by a more reliable renewable energy source than wind or solar, which are dependent of daylight or weather conditions.

CenturyLink has opened a hydroelectric powered data center powered by two dams, the Wanapum Dam (above) and the Priest Rapid Dam, both on the Columbia River.

"CenturyLink's new low-cost power data center services provide many benefits to our customers, including a highly resilient solution coupled with power costs and efficiency metrics that rank among the best in the industry, and the facility serves as an excellent disaster recovery location," David Meredith, senior vice president of CenturyLink, said in a statement. The central Washington climate also allows significant use of free-air cooling, driving even lower power use, according to the company. CenturyLink operates 55 data centers in North America, Europe and Asia. "The central part of Washington state is one of the geographies in which I see substantial potential for further growth as a data center hub," said Kelly Quinn, a research manager with IDC. "Its potential stems from the area's abundance of natural, power-generating resources, and its relative immunity from natural disasters."

CenturyLink also recently announced its first deployment of solid oxide fuel cells (SOFCs) from Bloom Energy to power a multi-tenant data center in southern California. Solid oxide fuel cells work by coating an electrolyte with special inks that act as an anode on one side and a cathode on the other. An electrochemical reaction using air and natural gas then passes through the electrolyte releasing energy.

(Nothing is as efficient as hydro, but this will make it more efficient!)

In the spin: Cabinet Gorge Dam nears completion of power generators

By Rob Chaney, missoulian.com, 5/16/15

CABINET, Idaho – Alongside the overlook of Cabinet Gorge Dam sits a rusty hunk of steel that looks like it once propelled an ocean liner. There's another one several hundred feet below on the roof of the powerhouse. It's still shiny, but it bears the cavitation scars from decades of turning Clark Fork River water into electricity. Rotor No. 3 sits inside the powerhouse, waiting to be lowered into Turbine Unit 1. It gleams like next year's speedboat. "We're taking down 1952 technology and screaming into 2015," dam operator Terry Heyne said as he headed three stories down into the Cabinet Gorge Dam powerhouse. "This is one of the only times we get to see this far inside." Cabinet Dam at full production generates about 270 megawatts of power, up from 230 megawatts before the renovation. Ten miles upstream, the Noxon Rapids Dam puts out 500 megawatts. The pair are Avista Corp.'s biggest hydroelectric facilities in its network, which stretches from Washington to Montana. Turbine Unit 1 is the last of Cabinet Gorge Dam's four generators to get rebuilt. The project will cost about $12 million. The new 125-ton rotors can adjust the pitch of their blades,

which fine-tunes the relationship between how much water moves through the system and how fast the turbines spin. The older ones could move too, but not with the precision current metalwork can supply. Avista continuously tweaks power production at the dams to save or spend its water reservoir. When solar or wind farms are contributing lots of megawatts, the price Avista can get for its hydropower goes down. So it banks some by adjusting the flow of water through the turbines. "When the wind is blowing or the sun is shining, we're selling what's most efficient for our customers," said Avista spokeswoman Mary Tyrie. At the dam, that involves a delicate balance between keeping the river flow at its legal level while not squandering power generation opportunities. The 208-foot-high dam cost $47 million when it was built in 1952. The turbines were replaced the first time in 1993. When Unit 1 is done, it will house the third set of power generators the dam has used. When it all gets put together, each turbine weighs about 795 tons. The Clark Fork River can send all that spinning 120 revolutions a minute.

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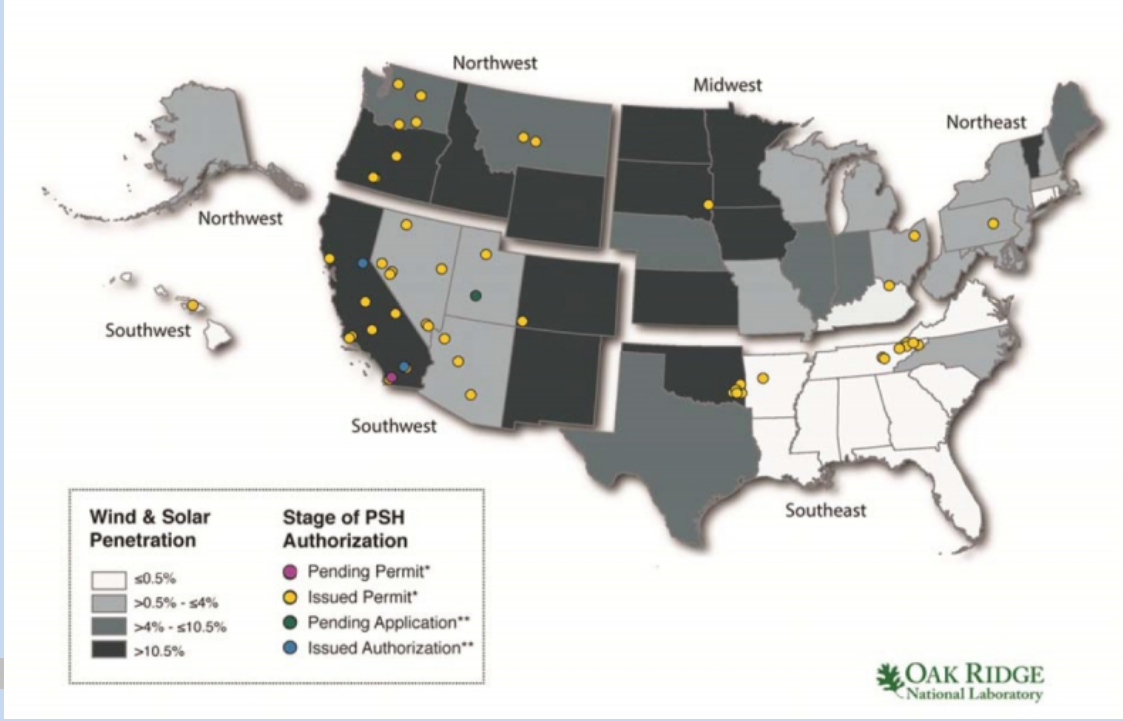
Interrupting its flow with dams caused a number of consequences for the Clark Fork River drainage. It blocked migratory fish from moving upstream, and prevented sediment from flowing down to replenish the delta of Lake Pend Oreille. Avista operates Cabinet Gorge and Noxon Rapids under the Clark Fork Settlement Agreement, which was signed in 1999. It was essential to approving Avista's subsequent 45-year license with the Federal Energy Regulatory Commission to operate the dams. And it brings 26 public and private organizations together with Avista to manage the effects the dams have on the surrounding environment in western Montana and northern Idaho. For example, water that doesn't go through the turbines spills over a line of eight gates on top of the dam's arced wall. That's created another problem that's getting fixed this year. "When we open the gates, the water comes down in a cohesive stream that entrains a lot of air," said Nate Hall, Avista's Clark Fork Terrestrial Program leader. That plunge hammers bubbles of air into the water as dissolved gas. Under certain conditions, the water below the dam can have 135 percent of the normal amount of dissolved gas in solution. High levels of dissolved gas hurt or kill fish, from eggs to adult stages. As part of its relicensing agreement, Avista has been working on ways to reduce the problem. Its answer involves placing steel knobs on the spillways just below the floodgates to "roughen" the water. The knobs disperse energy from the water flow, like twisting a spray bottle from "stream" to "mist." "This year, we're going to do two more gates," Hall said. "The goal is to try and make all the spill benign."

(Hope we see more!)

Get Pumped about Pumped Storage

April 27, 2015 - energy.gom



Hydropower plays an important role as the backbone of America's electrical grid. It is highly flexible and can rapidly respond to fluctuations in the demand for electricity with pumped storage. Often described as "giant batteries," pumped storage hydropower (PSH) plants account for the bulk of utility-scale electrical energy storage in the United States and worldwide. According to the newly-released Hydropower Market Report, the existing 21.6 GW of PSH capacity make up 97 percent of U.S. utility-scale electricity storage. With their ability to provide a wide range of ancillary services such as the ability to change output based on grid needs, PSH plants help ensure grid reliability. PSH uses pumps and turbines to draw energy from the power system and pump water into higher elevation reservoirs. This energy is returned to the power system as the pumped water is released into lower elevation reservoirs to generate electricity during periods of high electrical demand.

Pumped storage also supports the integration of variable renewables into the grid. More than 50 pumped storage hydropower projects, which function as large storage systems for other clean energy sources such as wind and solar, are in the various stages of planning and development, adding to the strength of our electric grid. This map (above) from the Hydropower Market Report lays out the active PSH projects in the Federal Energy Regulatory Commission licensing process as of December 2014. These projects may add up to an additional 39 GW of total installed capacity, enough to power more than 17 million American homes. The map also displays a base layer showing the fraction of total installed generating capacity in each state that is attributed to wind or solar. Because PSH is flexible and can support the integration of additional clean energy resources, pumped storage projects can help realize hydropower's untapped resource potential in America. To learn more about the many facets of hydropower in addition to pumped storage, please visit the Water Power Program website.

FERC to Change Rule on Hydropower Fees

May 18, 2015, rtoinsider.com

The Federal Energy Regulatory Commission proposed Thursday to change when it assesses annual charges to hydropower operators that are not state and municipal entities. Under FERC's Notice of Proposed Rulemaking, the charges would start two years from the effective date of a project license, exemption or amendment authorizing new capacity — not when construction on a project commences (RM15-18). The revisions would eliminate the need for licensees and exemptees to notify FERC of construction starts in order to invoke the fees. FERC also no longer would have to contact the entities to elicit the information. FERC said the change would provide certainty as to when the charges would go into effect and improve administrative efficiency.
The fees apply to projects exceeding 1.5 MW of installed capacity. Original licenses, relicenses, exemptions and amendments adding new capacity generally require that construction start within two years of the date of issuance. The changes would mean that charges will be assessed regardless of when the projects commence or whether or not FERC has granted an extension. FERC predicts that an average of 5.2 licensees and/or exemptees annually will end up paying annual charges before the start of construction. On average, 10.6 entities are expected to be affected by the rule change.

(Old hydro site needs some fixin'.)

W. Mich. community looking for ways to improve dam

wwmt.com, May 19, 2015

UNION CITY, Mich. (NEWSCHANNEL 3) - A hazardous rating has a community in Branch and Calhoun Counties looking to improve the Riley Dam. On Monday, Newschannel 3 went to Union City, where the dam that supplies power to the village is in need of upgrades. The dam has powered

the village of Union City for nearly 100 years, and the Village Council is now looking into safety improvements to make sure it's still here for 100 years to come.

It's been a village landmark since 1922, churning out energy for nearby Union City. "We are a generator, a local utility," said Village Manager Jim Campfield, who says safety at the dam is a top priority. "We are rated a significantly potential hazardous dam and dyke, which means we really want to stay on top of our [emergency action plan], because there is always the possibility of a breach," he said. The village regularly updates its emergency action plan in case the dam were ever to breach, impacting the bridge down river. "If you have a higher risk downstream, you have to have a plan," Campfield said. The action plan is updated yearly, but the Village Council is now looking into the need for improvements. "Any deficiencies they find they will be making further recommendations, we know we have some...the other thing is upgrades, we have gone through very few upgrades," Campfield said. "Normally, any upgrade lasts 80-100 years." The village says no one right now is at risk, but there is always room for improvement to preserve this piece of history. "Our dyke is fine but we'd like to make it better and safer," Campfield said. While you may see dams like Riley Dam all over Michigan, it is only one of 10 in the state that produces energy.

(Great graphic! Free money.)

Montrose Hydroelectric Facility Gets Federal Grant

May 20, 2015, cbslocal.com

MONTROSE, Colo. (AP) – A new hydroelectric facility in Montrose is getting nearly a million dollars as part of a federal project to invest in water conservation and reuse projects in the drought-stricken West. The $900,000 grant for the Uncompahgre Valley Water Users Association was announced Wednesday. The money is coming from the Interior Department's Bureau of Reclamation. Interior Secretary Sally Jewell announced funding Wednesday for more than 60 projects in a dozen states. The Montrose project totals about $9.2 million. The project will install a 4.8 megawatt hydroelectric facility on an existing irrigation canal drop structure located on the South Canal. The power will be provided to the city of Delta.
The Montrose project includes piping 1,344 feet of canal, thereby allowing water to bypass leaking canals through a steel penstock.

(Hydro and wind working together.)

Second Largest Island in U.S. Goes 100% Renewable

Laurie Guevara-Stone, Rocky Mountain Institute | May 20, 2015 | ecowatch.com

Kodiak Island in southern Alaska is powered 99.7 percent by hydro and wind.

As most Alaskans can attest, energy in The Last Frontier is expensive. The average residential electricity rate of more than 18 cents per kWh is a full 50 percent higher than the national average, ranking among the highest in the country. That's in part because outside the 50 hydro plants throughout the state, most of Alaska's rural communities rely on imported diesel for their electricity. But the folks of Kodiak Island (pop. 15,000) in southern Alaska—powered almost 100 percent with renewable energy—have a different story to tell.

Kodiak Island in southern Alaska is powered 99.7 percent by hydro and wind. Although Kodiak Island, the second-largest island in the U.S., relied on hydropower for 80 percent of the electricity production, it was also burning 2.8 million gallons of diesel per year, at an annual cost of $7 million. In the face of climate change and high electricity costs, the board and managers at Kodiak Electric Association (KEA) set a goal of producing 95 percent of the community's electrical needs with renewable energy by 2020. They actually arrived there well ahead of time, and are now 99.7 percent renewably powered by wind and hydro.

Making the transition

The State of Alaska has a renewable energy fund created in 2008 by the Alaska Energy Authority to help finance renewable energy projects and reduce and stabilize the cost of energy. KEA received $16 million in grant money through the fund and $39.6 million through clean renewable energy bonds (CREBs). The CREB funds gave KEA a near-zero-interest loan for the project. The first step was to purchase three General Electric 1.5-megawatt (MW) wind turbines. The turbines were installed in 2009, which was challenging according to Kodiak Electric Association CEO Darron Scott. "There was not a lot of information back then on how to keep the grid frequency and voltage steady with an influx of variable wind power," Scott told Rocky Mountain Institute. "It was uncharted territory." But after a grid integration study, which assessed the technical and economic impacts on the grid, the first three wind turbines were installed.

Upgraded hydro for grid stability

A second modeling study was performed with real data from the first phase, and a second phase of three more wind turbines was proposed. But before installing the second phase of wind turbines, KEA wanted to upgrade the existing hydropower system. KEA felt that to ensure grid stability, the amount of wind power being put onto the grid had reached its maximum. The 20-MW, two-turbine Terror Lake hydroelectric plant was built in 1984, and forward-thinking engineers left an empty bay for a third turbine in case Kodiak's load grew. In 2011, Kodiak's peak load grew to more than 26 MW, and the increased load, along with a desire to rely on more renewables, led to the installation of a third 10-MW turbine. Besides covering peak loads, this turbine provided the necessary capacity and enhanced grid stability to allow more variable renewable power, like the three new proposed wind turbines, to come online. The new turbine also provided system redundancy, as the 30-year-old turbines require maintenance, which can now be done during low load seasons without switching to diesel.

A role for storage

For smaller electricity grids with quickly fluctuating demand and variable renewable energy inputs, a way to store the energy can be a great asset. In 2012, the three additional 1.5-MW wind turbines were installed, along with 3 MW of battery storage. The battery storage systems provide 30–90 seconds of bridging power when the wind output decreases, in order to ramp up the hydro system. Now, the Kodiak port wants to install a new 2-MW crane, potentially causing destabilizing power fluctuations leading to undesirable cycle of the batteries and the potential for consumption of more diesel to provide spinning reserve. Instead, KEA plans to add an additional flywheel energy storage system in about two or three months that will help compensate for the peaking crane loads. The PowerStore flywheel units from ABB will provide voltage and frequency support, will help manage the variable wind power and will mean fewer cycles through the batteries, extending the life of the battery systems.

Economic stability

The financial rewards of the project have been great. According to Scott, the community is saving. Electricity rates have gone down, and are now 2.5 percent lower than in 2001. "The stable electricity rates have also brought in more construction, expanded the fishing industry, and brought in more jobs and tax revenue," Scott told RMI. And, at least one seafood company is capitalizing on the renewable energy to promote its sustainable salmon, as its salmon production plant is powered by wind energy. The State of Alaska has a goal of reaching 50 percent renewable energy by 2025. Kodiak Island is providing a great example of how to reach and even go beyond that goal. "There are many communities in Alaska with significant microgrid

achievement," George Roe, research professor with the Alaska Center for Energy and Power, told RMI, "and there is local, national and global potential for building on Alaskan hard-won experience such as that in Kodiak." In fact, the Alaska Energy Authority and KEA won the 2014 State Leadership in Clean Energy Award for their renewable energy programs. "Both the Alaska Energy Authority and the Kodiak Electric Association are putting into practice five principles that I believe are in our national interest," said Alaskan Senator Lisa Murkowski in a congratulatory speech. "And those are to make energy abundant, affordable, clean, diverse and secure." Kodiak went beyond its reliance on hydropower, adding different renewable resources and storage, making its electrical system more reliable and secure and a model for other communities looking to add variable renewable sources to their grid.

Water:

(Right now, if it's wet I'd take it any way I could get it!)

Is rain enough to store away for the future?

bakersfieldnow.com, 5/15/15

BAKERSFIELD, Calif. (KBAK/KBFX) - The rain has fallen, but of course it was not enough to make a meaningful impact on the drought. "We need seven times as much rain as we had now," said Kern River Water Master Dana Munn. "Mother nature is not giving us the water we need." Some people have been asking if the water that we have seen these last couple of days is being stored. Munn said it really was not enough to store, but he explained the difference between groundwater storage, and surface water storage for when we do get enough water. "You fill a jar full of marbles, you can still pour water into that jar and store water in between spaces, that's ground water storage, except it's the sand water in the ground below our feet," said Munn. "Surface water, like dams, you see the water, it's just flowing out of the gates of the bottom of the dam, you don't have to pump."

He said surface water storage is easier, since the water does not have to be pumped. But, groundwater can be more beneficial. "The best thing about groundwater storage is once it goes down to the dam, it doesn't evaporate. Dams, you get evaporation," Munn explained. Munn said that the real problem with water storage surprisingly comes in the wet years. He said when our dams are full, they cannot hold any more water for future use. Munn said right now our dams are too dry. He said the Isabella Dam is especially far below where it should be. "Really, what we need is snow in the Sierras during the winter, that gives us a considerable amount of storage in addition to dams," said Munn. The problem doesn't end there. Across the state, we have lost the ability to store and ultimately drain water from the Delta. Munn said after environmentalist stepped in to protect endangered species, water use for that area was lost. "We've lost that supply, so we've got to do something to recapture other supplies," said Munn. He said if we ever go back to wet years, we will need more ways to store that water. "We need more dam storage, we need additional reservoir on the San Joaquin," said Munn.

(Too much in the wrong places.)

Central U.S. hit by floods after tornadoes

AUSTIN, TEXAS | BY JON HERSKOVITZ, May 17, 2015, reuters.com

Thunderstorms and floods battered several central U.S. states on Sunday after a tornado series hit large parts of the area a day earlier, cutting power lines and damaging structures. Parts of

Texas, Oklahoma, Arkansas, Tennessee and Kansas were either under a flash flood watch or flash flood warning on Sunday morning as thunderstorms battered several central states, the National Weather Service said. Parts of the town of Mosby, Missouri, with a population of about 200 people and located some 25 miles northeast of Kansas City, were being evacuated due to flooding on the Fishing River that has shut roads, the Clay County Sheriff's office said on its Twitter feed. The flood warnings come after there were 29 reported tornadoes on Saturday that hit states ranging from Louisiana to Wyoming, the weather service said. Texas and Oklahoma were the hardest hit but there were no reports on Sunday morning of major damage or deaths. Thousands were without power due to the storms. "We haven't had any injuries reported as of this morning," Oklahoma Department of Emergency Management spokeswoman Keli Cain said. The damage in Oklahoma was mostly in the southwestern and northeastern parts of the state, she said. The National Weather Service has also issued a flash flood watch for parts of south-central Pennsylvania.

(Here too much water, CA not enough. In case you wondered, 3 million gallons per minute is 6684 cfs.)

Millions of gallons per minute released at Wesley Seale Dam

kristv.com, May 19, 2015

CORPUS CHRISTI - Recent rains have brought our combined lake levels to almost 50 percent capacity. Now the City of Corpus Christi is releasing water from Lake Corpus Christi into the Nueces River. Why? First, the city needs to ensure Wesley Seale Dam is not damaged by keeping the lake full. More water is coming into the lake due to huge amounts of rainfall. The second reason is a mandatory monthly water release ordered by the State of Texas designed to keep fresh water moving into our bays and estuaries.

More than 3 million gallons is being released every minute the gates are open at Wesley Seale Dam. The last release of this size was in October 2013. Water releases will continue through the end of the week. Nueces County has advised residents along Nueces River of rising waters due to the ongoing release. Major flooding is expected in the small community of Bluntzer. Moderate flooding is expected in Calallen. All are urged to prepare in case evacuations are necessary. The City of Corpus Christi remains under stage 2 water restrictions.

Environment:

(You don't often hear about this side of the dam fish story!)

A Fish Tale with a Dam Hero? Pulling Coho Salmon Back from the Brink in Russian River

By Glen Martin, May 13, 2015 - alumni.berkeley.edu

If the drought is hard on California's lawns, it's sheer murder on the state's fish—especially the "salmonids," that family of cold-water fishes that includes trout and salmon. But one rare salmon species is doing fairly well in the current water crisis. And it's being helped by the kind of project usually associated with the wholesale destruction of native fisheries.

Chinook and Coho salmon and steelhead trout are anadromous, meaning they spawn in fresh water and migrate to the sea to forage and fatten into massive, slab-sided and tasty adults. Though they once teemed in California waters, their numbers have dwindled due to pollution, water diversions—and especially dams. Virtually all of California's major rivers have been dammed, denying thousands of miles of spawning habitat to returning salmon and steelhead. Further, the minimal downstream releases that characterize many dammed rivers are warm; the fish and their eggs are subjected to tepid water better suited for carp and catfish than salmonids, which require clean, cold water to thrive.

Last year, 90 percent of the eggs and fry (newly-hatched fish) of the endangered winter-run Sacramento River Chinook salmon died, mainly from low, warm water downstream of the dams. The equally beleaguered Sacramento spring-run salmon suffered 100 percent losses in eggs and fry, while the mainstay of California's commercial and recreational salmon fishery—the fall-run Sacramento River Chinook—took a 97 percent loss in wild (non-hatchery) young fish and eggs. Salmon and steelhead on the Klamath/Trinity River system, California's second salmonid stronghold, also have been hit hard due to low flows from impoundments. So from a salmon's perspective, dams suck. But Warm Springs Dam near Healdsburg may prove at least a partial exception to this rule.

Warm Springs Dam

Warm Springs Dam

This massive earth embankment dam was completed on Dry Creek, a tributary of the Russian River, in 1983 as a response to a devastating drought in 1976 and 1977. Though it was estimated that Lake Sonoma (the reservoir behind the dam) would take several years to top out, it completely filled in the 1982-83 rainy season due to a vigorous El Niño. It's now a primary source of water for 650,000 Sonoma County residents. Many environmentalists thought the dam would doom the Russian River's salmon and steelhead runs, given their already depleted state. By the late 1960s, the Russian's watershed was severely degraded from decades of logging, agriculture and development. The river's once renowned steelhead runs were anemic at best. Though less scientific data was available about the Russian's Coho salmon, anecdotal reports confirmed they were crashing as well. Warm Springs Dam, it was widely felt, would only hasten the race to extinction for both. But the dam actually improved fish conditions on the lower reaches of Dry Creek, a major tributary of the Russian. That's because, in its undammed state, Dry Creek was often, well, dry. "We now have Coho runs in places where we didn't used to have Coho runs. We're pulling the Russian's Coho back from the brink of extinction." "Most of the run-off in the Russian River watershed typically occurs in the winter," says David Manning, who holds a UC Berkeley degree in Forestry and Resource Management and is the environmental resources coordinator for the Sonoma County Water Agency. The agency co-manages Warm Springs Dam with its owner, the U.S. Army Corps of Engineers. "In summer and fall, much of the creek was dry, with only intermittent flows, or even separated pools, in the lower section near the confluence with the Russian River.

Warm Springs Dam did destroy scores of miles of spawning habitat on Dry Creek's upper watershed, particularly for steelhead. But it also changed the lower creek's flow regime; water now ran down the streambed year-round. What's more, the water coming from Lake Sonoma is cold, well within the temperature profile favored by salmonids. A fish hatchery was established at the base of the dam to augment the steelhead and Coho runs. But the Coho and steelhead

operations have different emphases, says Gregg Horton, the lead fisheries scientist for the county water agency. “Along with mitigating for habitat losses, the steelhead program is designed to improve the recreational harvest,” says Horton. Relative to Coho, “there are still fairly good numbers of wild steelhead in the Russian system. The Russian has 200 tributaries, and most or all of them support wild steelhead. The hatchery allows anglers to catch and keep steelhead, while releasing wild fish.” (Technicians clip the adipose fins of young hatchery-raised steelhead, allowing anglers to identify them.) But the Coho program, continues Manning, is strictly about conservation. And salmon conservation, in turn, is about maintaining genetic diversity. When it comes to genes, most hatchery fish are truncated compared to their wild counterparts. That’s because the eggs and milt (sperm) are usually taken from a limited number of parent fish. That’s OK if you just want to catch and kill an inbred, slack-jawed and stupid, but still delicious steelhead or salmon. But it won’t do when you’re aiming for an analogue to a wild population; everything possible must be done to ensure a varied DNA palette. “We’re collaborating with Carlos Garza, a really gifted research geneticist at the National Marine Fisheries Service,” says Manning. Garza is another Cal alum, holding a Ph.D. in integrative biology. “We were working with Coho collected from Green Valley Creek in Sonoma County, but they were pretty inbred and small. So the decision was made to cross them with fish from the Lagunitas Creek watershed (in Marin County). The resulting hybrids have been producing really healthy offspring. Carlos has been developing a spawning matrix, and he jiggles the brood stock recipe each year to maximize genetic diversity.”
But assuring a genetically robust population isn’t enough. Though the Coho emerge from their eggs in the hatchery, they are released to Dry Creek to grow into fingerling-sized smolts before migrating to the sea to mature into adults. The problem is that Dry Creek’s restored flows are too fast; it’s hard for the young salmon to find shelter and sustenance. They need “structure”—snags, rocks and logjams that slow the flows down, and create eddies and still water where the youngsters can forage, rest and hide from predators. They’ve been working with willing local landowners to turn Dry Creek into the kind of log-strewn, overgrown stream that young salmon simply adore.

Fisheries agencies recognized the problem, and in 2008 the National Marine Fisheries Service issued a ruling to aid fish affected by Warm Springs Dam and a sister structure, Coyote Dam, on the East Fork of the Russian. Since then the county water agency and the Corps of Engineers have been working with willing local landowners to turn Dry Creek into the kind of log-strewn, overgrown stream that young salmon simply adore. A total of 1,251 root wads, logs and vertical snags and 1,213 boulders have been introduced into six miles of watercourse; 31,650 cubic yards of dirt have been removed from prime habitat zones; banks have been stabilized with willow and dogwood plantings; and a backwater channel has been created at Quivira Vineyards and Winery to provide a refuge for young fish during winter storms, when Dry Creek can brim bank to bank.
“We’ve already found young fish using these newly created habitats,” says Horton. “Coho are definitely making a living in the main stem now. And we think this could be the basis for achieving a much larger goal. We estimate there are between 300 to 500 returning adults in the system at this point, and low as that it is, it actually represents an uptick in numbers. We’re looking at 22 candidate sites for planting Coho, and we’re already planting some of them with juvenile fish. We now have Coho runs in places where we didn’t used to have Coho runs. We’re pulling the Russian’s Coho back from the brink of extinction.” Manning acknowledges it may be difficult to accept the proposition that a dam could actually help with fish restoration, “but in this particular

case it's true. The Russian's Coho are much more secure in the current drought than they were in 1976 to 77. And Warm Springs Dam and Lake Sonoma are definitely contributing factors."

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