Happy Thanksgiving!

Quote of Note: “Being powerful is like being a lady. If you have to tell people you are, you aren’t.”
-Margaret Thatcher

“Good wine is a necessity of life.” - Thomas Jefferson

Ron’s wine pick of the week: 2014 K. Vintners Syrah & Shiraz (Other than French)
"Milbrandt"

“No nation was ever drunk when wine was cheap.” - Thomas Jefferson

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
7 of the Most Serious Dams in the United States
Pile the concrete high and wide.
By Tim Newcomb, Oct 31, 2016, popularmechanics.com

If you want to find our nation's most impressive dams, those huge blockades against water made of earth and concrete, you'll need to fix your gaze west of the Rockies. When engineers seek to block up rivers to create hydroelectricity or simply control water flow, they'll often look to the mountainous stretches of Arizona, California, Washington, and Montana, among others. Inside the mountain ravines of the United States there are earthen walls, concrete ones, and sometimes even ones made out of steel, all working to stop up rivers, some having stood for as long as 100 years, before the land they were on was even part of the Union. Here's a tour of seven of the most noteworthy.

1 Oroville Dam, Feather River, California
Forget heavy concrete for a moment, the tallest dam in the United States doesn't need it. About 70 miles north of Sacramento along the Feather River in the Sierra-Nevada foothills, this earthfill dam rises 770 feet tall and, at the base, has a reach of three quarters of a mile. This mound of earth stops up the Lake Oroville reservoir, which offers drinking water, water-based recreation, and hydroelectric power while mitigating flood damage. It was officially dedicated in 1968, seven years since the start of construction—with one giant train wreck during construction that halting all progress for a week. Since then, the Oroville has stood as the country's tallest dam for nearly 50 years.

2 Hoover Dam, Colorado River, Arizona/Nevada
The superlatives fly when it comes to the Hoover Dam. Built between 1931 and 1935, the Art Deco-detailed dam was easily the most expensive engineering project in the country at the time and became the tallest dam in the country at 726 feet tall. Still the second-tallest dam overall and the tallest concrete dam, it required 91.8 billion cubic feet of concrete to create the arch-gravity dam with a 600-foot-wide base, weighing 6.6 million tons in total. The Hoover dam holds back the Colorado River and straddles the border between Arizona and Nevada near Boulder City, Nevada, a town originally created for the project's workers. Behind Hoover, Lake Mead fills as the largest manmade reservoir in the country.

3 Grand Coulee Dam, Columbia River, Washington
The Grand Coulee Dam may not be the tallest at 550 feet, but the seriousness of this 1942-built dam outside of Spokane, Washington, comes from its sheer size. With over 12 million cubic yards of concrete, the Ground Coulee Dam spans the

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
4 Dworshak Dam, Clearwater River, Idaho

It took roughly seven years to build what would become the third tallest dam in the nation and the tallest straight-axis (not curved) concrete gravity dam in the Western Hemisphere. Has Dworshak sat a few miles outside of Orofino, Idaho, blocking up the Clearwater River and creating the Dworshak Reservoir since 1973? Despite its impressiveness, the 717-foot tall dam was never a popular project. Dworshak has been saddled with controversy—1990s expansion approvals were rescinded—for disrupting the natural wildlife of the area.

5 Fort Peck Dam, Missouri River, Montana

Forget the concrete and don't worry about the height. At just 250 feet tall, the impressiveness of the Missouri River's highest dam comes in its breadth. At over 21,000 feet in length and with a base width of 3,500 feet, Fort Peck is the largest hydraulically filled dam in the world. U.S. Army Corps of Engineers crews created the New Deal-era dam by pumping sediment from the bottom of the Missouri River and mixing it with rock and natural materials to form the dam in 1940. Fort Peck Lake rests behind the dam and hydroelectric generation started at the dam in 1943, complete with an Art Deco spillway.

6 Glen Canyon Dam, Colorado River, Arizona

At 710-feet tall, this concrete arch-gravity dam near Page, Arizona, fills a canyon-heavy region on the upper Colorado River with water. Under construction from 1956 to 1966, the dam forms Lake Powell behind it, the second-largest man-made reservoir in the U.S. Thought of before the Hoover Dam, but built after, Glen Canyon helps manage water distribution in the river's basin and, along with hydroelectricity generation, can help hold onto runoff for lean water years while ensuring fewer droughts for those downstream. During the dam's construction, the Glen Canyon Bridge, a steel arch bridge spanning the river's canyon, became the highest arch bridge in the world at the time of its 1959 completion.

7 Ashfork-Bainbridge Steel Dam, Johnson Canyon, Arizona

Almost everything about the Ashfork-Bainbridge Steel Dam is different
than a typical dam in the West. Not only is it one of only two major dams in the nation using steel — the first of the two — this 1898-completed structure had no hydroelectricity generation purpose. Owned by the Atchison, Topeka and Santa Fe Railway, the steel moved water from Johnson Canyon via piping into the town of Ash Fork, supplying a water stop for steam locomotives. The dam contains 24 curved steel plates fabricated by the Wisconsin Bridge and Iron Company and runs 184 feet long and 46 feet high. It’s been holding back water since before the state where it resides, Arizona, was officially part of the Union.

(Fixing the old guy.)

City wins $1M for dam
Haskell’s earthen works to be shored up
By Ray Lamont Staff Writer, 11/3/16, gloucestertimes.com

The 114-year-old dam that secures Gloucester’s largest single drinking water source will be getting some significant shoring up thanks to a $1 million financial package the city has been awarded by the state. The Massachusetts Office of Energy and Environmental Affairs has proffered a $500,000 grant and a $500,000 low-interest loan extension for Gloucester as part of a $10 million allocation to 16 communities and conservation organizations across the state. The Gloucester money is coming from the state’s Dam and Seawall Repair or Removal Fund and Gov. Charlie Baker’s annual capital budget, according to the announcement from the environmental affairs office. It will be used by the city to launch a needed $6 million rehabilitation of West Gloucester’s Haskell Dam, city Public Works Director Mike Hale said Thursday. The primarily earthen dam, which dates to 1902 and is supported by a concrete core wall and spillway, is one of the most important cogs in Gloucester’s water system, Hale said. “This is a critical piece of infrastructure that we cannot allow to fail, and cannot do without,” he said.

The dam, located at the end of Forest Lane and just north of Route 128, holds water within Haskell Reservoir and keeps it from escaping down Walker Creek and out into Essex Bay. The reservoir supplies more than a third of the city’s drinking water. The dam’s location also allows the city to pump water under Route 128 and to a point on Mount Ann where gravity draws it down to flow into and replenish Dykes Reservoir, Hale said. “Because of that, and the way we are able to manage our water sources,” Hale said, “we have not been nearly in the drought conditions that other communities faced this summer.” The Haskell and Dykes reservoirs comprise the western side of the city’s water system, while Babson, Goose Cove and Klondike reservoirs — when Klondike is used — operate in the east side. The city switches twice a year between drawing off its eastern and western water facilities, and will be shifting from west to east in the coming days, Hale said.

The state funding for the Haskell Dam project still leaves “a significant gap” between the money on hand and the $6 million estimated cost of the needed repairs, Hale said. The city has already spent another $175,000 state grant on design study for the work. The latest grant will allow the city to at least start the work, he said. “We will probably have to pick up much of the rest of the cost ourselves,” Hale said of the city. “It’s time to get this done, and the longer we wait, the more costly it’s likely to get.” From the state’s perspective, the money is aimed at helping cities and towns restore dams and seawalls that have been battered, and hardly ever fully maintained. “These funds provide cities and towns with the resources they need to protect their citizens, valuable infrastructure, and the environment from extreme weather events,” Lt. Gov. Karyn Polito said in a prepared statement. “We are committed to working with municipalities to repair or

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
remove damaged seawalls and dams that present a real threat to residents and small businesses in communities across the state." Hale said that, while Haskell is in one of Gloucester's more sparsely populated areas, the dam is classified by the state as a "high-hazard dam" — not because it is seen as imminently hazardous, but because it would impact residences and other property if it ever were to fail. He also said it is considered in generally "poor" condition, largely because of its age and capacity to withstand potential shifts in the earth and string of major storms. "The components of this dam are past their usual life expectancy," he said, noting the last major restoration work on the dam dates to the 1930s. "With that much time comes a risk of failure," he said, "and that is something we cannot have happen."

(Now, too much water.)

**Wet winter could be Howard Hanson Dam's first big test**  
By Glenn Farley, KING, November 04, 2016, king5.com

SEATTLE, WA — With more than 10 inches of rain, October not only set a rain record for the month, but was also recorded as the 13th wettest of any month at Sea-Tac Airport. November has started out fairly dry, but November is historically the wettest month of the year followed by December. If wet weather continues, it could mean trouble for the Howard Hanson Dam on the Green River. In January 2009, a storm combined with a warm up and melting snow, sent the level of water behind the Howard Hanson Dam to its highest level ever. It was six feet above the previous 1996 record. It was also the storm that created weaknesses in the earthen dam that sent community leaders in the Green River Valley scrambling to raise levees and worried residents for years while repairs were made. "There's always a chance you'll discover something, and that's what happened in 2009," said Dan Johnson, now the Operations Project Manager for both the Howard Hanson and Mud Mountain Dams in the Cascade Mountains. Both dams were built for flood control on different rivers. Repairs were made. First there was a curtain of grout. A cement-like substance was pumped into what was known as the "right abutment," the remains of an ancient landslide forming the right side of the dam.

What Army Corps engineers found was that under the pressure of the high pool, the abutment was being compromised as fine materials like sands, powdered rock, and soil were being washed out. Noticeable depressions were forming above. One of the last techniques used to protect that part of the dam was the installation of pumps because the grout curtain can't do it all. "As the water level rises in the dam and the right abutment, we can pump that water level down and keep the higher levels of the dam dry, so we don't have any risks," said Johnson. In the valley below, the extra flood protection has been taken down, and it's business as usual in the neighborhoods and business parks that now dominate a valley that saw repeated and devastating flood events in the decades before the December 1961 opening of Howard Hanson Dam. But if the weather provides a test like it did in 2009, the Army Corps of Engineers says the dam is ready for that and a lot more. "We're very ready for November and December," said Johnson. "Even January and February and until March you have a chance of a big storm."

(Historic disaster. This unfortunate incident got many dam safety programs off the ground.)

**Toccoa Falls Dam gives way and kills more than 30 in 1977**  
NEW YORK DAILY NEWS, originally published by the Daily News on Nov. 7, 1977, nydailynews.com

Copy obtained from the National Performance of Dams Program: [http://npdp.stanford.edu](http://npdp.stanford.edu)
TOCCOA, GA. - An earthen dam burst early yesterday and sent a 30-foot-high avalanche of water, mud, trees and debris smashing through a small Bible college. At least 37 persons were killed - most of them students and their families asleep in campus homes. George Civil Defense officials said 60 persons were injured and two persons were still reported missing. The dam burst sent tons of water over the 186-foot-high Toccoa Falls into the lower campus of Toccoa Falls Bible College, where some 250 persons slept in dormitories, houses and mobile homes below the falls.

Kenny Carroll of Washington, one of the few to escape from the basement of a men's dormitory, said: "The Lord woke me up an instant before the water came in." "I reached over from my bed and was trying to shut the door, but the water forced the door open. When I got out of bed, the water was already a foot high. We ran up the stairs and by the time we got there the whole basement was filled up. It just happened in five or six seconds." Bill Stacey, 19, who lived with his parents in a trailer, said: "I heard a bunch of people screaming and hollering. There was this terrible screeching noise... the trailer were all over the place - some floating, some just torn apart."

Find Bodies Miles Away

Bodies were found as far as two miles from the dam, which held back the 80-acre Kelly Barnes Lake. Waterlogged mattresses, battered window frames and scores of uprooted trees littered the banks of Toccoa Creek. Dave Hinkle, a student from Syracuse, N.Y., said a wave 30 feet high and 40 feet wide tore through the second-story windows of a men's dormitory. The building was extensively damaged. Nine permanent faculty houses were destroyed. The dam had been placed on the "high hazard" list by the Army Corps of Engineers. The lake served as a reservoir for the college and the small mountain town below it. The flood was the nation's worst since the West Virginia Buffalo Creek flood of 1972 in which a coal mine refuse dam, saturated by heavy rains, collapsed and flooded a valley, killing 118 persons.

Tried to Warn People

Three members of the school's fire patrol tried to give some warning of the flood. Two died in the effort. Eldon Elseberry, the surviving patrol member, said "I looked up and I saw red water that was really starting to move down Toccoa Creek. We ran and got into a jeep. We were going to turn the sirens on and wake the people up. We didn't even get to the bridge." The jeep was swamped, pitching Elseberry and his companions into the swirling water. Elseberry said he was swept 125 feet downstream. "I grabbed a little tree. I saw the bank. I said, 'This is my chance,' and I made it for the bank." He found a more substantial tree and scrambled up onto the bank to safety.

The school, with an enrollment of 425, is a private institution operated in conjunction with the Christian Missionary Alliance, an association of religious organizations. It is just north of Toccoa, which is about 100 miles northeast of Atlanta near the George-South Carolina border. The National Weather Service said poor communications in the area prevented an accurate record of rainfall. But a spokesman said one station north of Toccoa reported 5.25 inches of rain in the 24 hours that ended at 7 a.m. (New York Times) yesterday. Water and natural gas supplies to the community were cut off and electric power curtailed. A state of emergency was declared. Officials said that the flood jammed houses, mobile homes and cars against the bridge over the creek. If the debris had not piled up there, slowing the wave of water, the damage and death toll might have been much greater, they said. In western North Carolina, five persons died in flooding.
dead included a mother and two children swept from their mobile home. Dozens of highways were reported flooded and about 30 secondary bridges were washed out after thunderstorms dumped more than five inches of rain in six hours.

(Fish gotta swim.)

A Dam Along The Jeremy River Comes Down So Fish Can Go Up
By Peter Marteka Contact Reporter, 11/5/16, courant.com

When someone says you lack vision and imagination, you might take it as an insult. But not when it came from Steve Gephard, a supervising fisheries biologist with the state Department of Energy and Environmental Protection. He spoke those words in a general manner as we stood on a rock ledge overlooking the remains of the Norton Paper Mill and its dam being crushed into hundreds of chunks of broken concrete. He looked through the dam and painted an image of the Jeremy River flowing freely through a rocky gorge for the first time in centuries. He spoke of species like Atlantic salmon and sea lamprey passing through on their way to more than 17 miles of pristine waterways once blocked by the 20-foot-high dam.

And he was right, I never saw it. For years, I've loved seeing the brick and steel shell of the mill along Route 149 in the Westchester section of Colchester up against the concrete dam. It was a showcase of human industrial history when it once tamed Mother Nature. I loved it when water would thunder over the dam during the spring freshet and a sense of awe would draw you in. But with 4,000 dams, the Connecticut River watershed is the most dammed in North America. And the DEEP and The Nature Conservancy have the daunting task of removing the dams whenever funding is available. The Norton dam is the largest one to be removed in the state.

"These mills that were along the river is what gave our state prosperity and so back then it was a good thing," Gephard said. "But now these mills don't serve any purpose. The dams don't serve any purpose and they are degrading our streams. The DEEP has put a priority on restoring migratory fish to the state's waters and we can't do that without addressing the problems with dams." The project is a collaborative effort with the Conservancy, which secured funding for the dam removal and river restoration from the U.S. Department of Interior's Hurricane Sandy Habitat Restoration fund. The Wasniewski family, which owned the mill, sold it to the town for $1 and signed off on the dam removal and river restoration plan. The town received a $350,000 small town economic assistance grant to demolish the mill and create a riverside park to be called Norton Park.

The Jeremy River — named after Jeremy Adams, one of the first settlers of Hartford — begins in Hebron and flows through Colchester before merging with the Blackledge River to form the Salmon River, one of the cleanest waterways in the state. The Salmon flows through Colchester, East Hampton and East Haddam and into the Connecticut River. Sally Harold, the Conservancy's director of fish passage and river restoration, said the removal is "so critical for habitat restoration and restoration of access to habitats upstream of the dam." The work will help resident fish like brook trout and migratory species like blueback herring and American eel. "It supports species resiliency," she said. "You are talking about a dam that goes back to 1726. That's nearly 300 years of having a barrier preventing fish going downstream and migrating upstream. With the dam, you have less aquatic diversity." "When the Indians were here fishing for salmon, this was a bedrock gorge with the water tumbling down," Gephard said. "It was beautiful. And we are going to bring those conditions back. We know that and we just need to show the people how to envision that when the dam is gone. ...We've been around to know what the potential is."

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
The dam along the Jeremy River is coming down. And fish, eels and lamprey are going up — hopefully way upstream. And that’s a good thing. I just needed to have a vision to see it.

(Dam removal always gets free money.)

Dam removal could see boost
Money would cover costs tied to Boardman, Sabin removal
BY JORDAN TRAVIS, record-eagle.com, 11/7/16

TRAVERSE CITY, MI — Dam removal efforts along the Boardman River may get a boost from the Grand Traverse County Brownfield Redevelopment Authority. The authority agreed to contribute $500,000 toward costs associated with removing the Boardman and Sabin dams, said authority Deputy Director Jean Derenzy. The grant would go toward environmental costs before and after removal. Those include soil sampling and stabilization work, along with removal or restoration work, Derenzy said.

"It’s solely a public project related to water quality, and we have been looking at water quality and been trying to improve water quality since one of our first brownfield plans in Midtown," she said, referring to the former foundry site where River’s Edge now stands.

Removing the two dams is part of a larger project to restore the Boardman River. Arsenic in soil samples taken from the two dams’ former pond areas exceeds the Michigan Department of Environmental Quality’s residential direct contact standards, according to a brownfield redevelopment plan. Barium and selenium concentrations also exceeded U.S. Environmental Protection Agency ecological screening standards. The authority would grant the money from its Local Site Restoration Revolving Loan Fund, Derenzy said; money in the fund is from private development projects and its balance is projected to reach $1,129,336 by 2017, according to a memo from Derenzy. The money wouldn’t have to be repaid, but first Garfield Township trustees and county commissioners must approve the grant.

The grant would relieve both Traverse City and Grand Traverse County, the latter of which owns the dams, of a $250,000 obligation, Derenzy said. City Manager Marty Colburn said both the city and county had agreed to spend the money as local matches to federal grants for the dam removal project. "This does not mean that there might not be future (local) obligations, but this is the front end of it, and we’re excited at the fact that it’s going forward," he said. If the grant is approved, it could free up funds for future projects, including a potential joint city-county information technology system upgrade, Colburn said. Frank Dituri chairs the Boardman River Implementation Team and said he’s glad members of the team behind the dam removal project continue to seek ways to fund it. "The move to use brownfield funds, I think, just shows the ... owners and partners’ engagement in this process," he said.

Conservation Resource Alliance is coordinating the implementation team’s work, organization director Amy Beyer said. She echoed Dituri’s remarks about the move to use brownfield funds, and added the local contribution is needed to complete the project. Charles Peterson and his company, Peterson Equipment Sales, received a preliminary permit from the Federal Energy Regulatory Commission in 2015 to study the feasibility of generating power at the two dams. His company bought generating equipment at both dams in 2007, according to FERC filings.
Peterson said there’s no reason for brownfield authority funds to be used on the dam removal project, and questioned why pond bottomlands with known contamination are being exposed. He voiced deep suspicions that government agencies and private companies have financial motives for pushing these projects. Peterson’s latest FERC filing stated the company will continue to intervene against the dam removal process, attempt to negotiate a deal with the county, and restore property owners’ rights on Boardman Pond. But Peterson’s preliminary permit can’t stop the dam removal process if the county isn’t interested, he said.

(More dam removal.)

Removing Armstrong Dam will benefit marine life, study shows
By Fred Hanson, The Patriot Ledger, 11/8/16, patriotledger.com

BRAINTREE, MA – Removing the Armstrong Dam on the Monatiquot River will help enable herring to return to their historical spawning grounds in Great Pond. And, because herring are a food source for larger fish, the benefits to marine life will extend beyond the Fore River Basin, advocates say. On Monday night, about 30 people attended a meeting on the results of a study into the benefits of removing the dam, which is near the intersection of Hancock and Plain streets. The meeting was held at the Metropolitan Yacht Club Monday night. The 12-foot-high dam is owned by Messina Enterprises. The company is interested in removing it to reduce maintenance costs and liability. The dam is a barrier to fish seeking to head farther up the river to spawn in its tributaries and Great Pond.

Carl Pawlowski, the Fore River Watershed Association’s director of fisheries and water quality, said fish have been able to make it up river as far as a natural waterfall behind the Shaw’s supermarket on Plain Street, a short distance from the dam. Removing the dam would be “the best bang-for-the-buck project” in terms of ecological and economic benefits, Pawlowski said. Bradford Chase, a marine fisheries biologist for the state Division of Marine Fisheries, said herring want to go as far upstream as possible to spawn. And when the herring head downstream, they attract larger species of fish. “They will not stay in areas without a good forage base,” Chase said of larger fish. The Tri-Town Water Board is obtaining permits to add a fish ladder to the Great Pond Dam to eliminate another barrier to the pond. Supporters are seeking state funding for additional studies and to obtain the permits needed to remove the Armstrong Dam.

(It’s about dam removal.)

COMMENTARY: The plight of aging dams, and one solution
By Geoffrey M. Goll, November 8, 2016, courierpostonline.com

Many of our nation’s dams, while originally intended to provide benefits for mills, water supply and energy generation, are severely aged and unmaintained. Nearly 20,000 of the dams on the Army Corps of Engineers’ National Inventory of Dams – which doesn’t even include many dams that are not inventoried or known about – were built in the 1960s. With expected lifespans of 50 years, these dams have reached their limit. And by 2020, 70 percent of all dams will be over 50 years old. Like roads and bridges, dams also require upkeep, maintenance and eventually removal or rehabilitation.

Copy obtained from the National Performance of Dams Program: http://npdp.stanford.edu
As dams age, the danger to life and property around them increases. If they were to suddenly fail and flood downstream communities and infrastructure, there would be loss of property and life. The Association of State Dam Safety Officials, the professional organization for dam safety engineering professionals and regulators, estimates there would need to be a $21 billion investment to repair just 2,000 deficient, high-hazard dams. More and more, the removal of dams has become an option for owners who no longer want or no longer can afford the rising cost of maintenance and repair work required to maintain such a complex structure. For dams like this, removal benefits local economies, and eliminates threats to people and property in local communities. There are also many byproduct benefits, including restoring fish migration routes, improving water quality, restoring floodplain functions and values, and increasing biodiversity.

On Sept. 8, we had the honor of meeting the Secretary of the Interior Sally Jewell during a visit of our Hughesville Dam removal project on the Musconetcong River, located in northwestern New Jersey. This project exemplifies the successes that can be achieved through public-private partnerships, including local communities, state and federal agencies, nongovernmental organizations, and private commercial entities. This is the fifth dam removed on the Musconetcong River by a coalition of stakeholders, led by the Musconetcong Watershed Association. The Department of the Interior (specifically, the U.S. Fish and Wildlife Service) provided funding to remove this very old, out-of-compliance dam.

Hydro:

(It’s getting some years on it.)

Don Pedro Reservoir to undergo major refurbishment work in 2017

By Alysson Aredas Staff Reporter, turlockjournal.com, November 1, 2016

While emphasizing that Don Pedro Reservoir remains a safe — but aging — facility, Turlock Irrigation District is hoping to secure another 50 years of successful operation with three major refurbishment projects in 2017. “It’s up to current standards and it’s passed every single thing we’ve thrown at it,” said Chief Dam Safety Engineer Peggy Harding. “It’s an excellently constructed and maintained dam. There’s absolutely nothing I can think of that this dam needs aside from routine maintenance.” “The chances of dam failure are very low. It’s one of the best designed facilities out there,” added Assistant General Manager of Power Supply Administration Brian LaFollette. These three major projects will cost about $7 million, according to LaFollette, who said that the costs are included in next year’s budget for the Don Pedro Reservoir. The TID Board of Directors is slated to make a final decision on the budget on Dec. 13.

Power Plant Engineering Department Manager Robert Bohrisch said that after staff repaired corrosion of an emergency cooling water basket at the facility in 2010, they began to look “with a critical eye” at where there might be other issues within the facility that may present different, long term issues for the power plant. All three projects for next year will take place in the Power
Tunnel, which is one of two major tunnels at Don Pedro Reservoir that feeds into the Power House to generate electricity. The other major tunnel, the Diversion Tunnel, was the originally installed tunnel at the reservoir and recently underwent refurbishment work of its own. The work on the Power Tunnel will be completed in two phases, with the first phase beginning before the irrigation season in February with the bulkhead gate installation and turbine shutoff valve replacements. The second phase, which is expected to begin after the irrigation season in October, will include the fixed wheel gate installation. Each phase is slated to take about 45 days to complete. “They served us well for the last 45 years, but after 45 years of having been underwater, it’s the appropriate time to do some refurbishment work,” said LaFollette. “Between those two outages, we hope to complete all three projects and we will have restored our gates for another 50 years of operation.”

Completed in 1971, the Don Pedro Reservoir has a capacity of 2,030,000 acre feet, making it the sixth largest reservoir in California. The reservoir is licensed by the Federal Energy Regulatory Commission and jointly held by TID and the Modesto Irrigation District. It undergoes frequent regulator inspections by the State Division of Safety of Dams and the FERC Regional Engineer Office, as well as an independent engineer report every five years. During their meeting Tuesday, TID Board of Directors also received information regarding current hydrological conditions from Utility Analyst Jason Carkeet, who reported that the Tuolumne River Watershed received nearly three inches of precipitation during this weekend’s storm. The month of October wrapped up with 5.96 inches of precipitation, which is four more inches than the historical monthly average. The precipitation year, which starts in September, now stands at 5.99 inches, which is 235.8 percent of the historical average of 2.54 inches for this date.

(More on hydro gas emissions. How ya do dat?)

The hydropower paradox: is this energy as clean as it seems?

New research finds that the world's hydroelectric dams generate a surprising amount of greenhouse gas emissions

By Matt Weiser, 6 November 2016, theguardian.com

In July, UN Secretary Ban Ki-Moon highlighted the role of hydropower in boosting the use of renewable energy globally, when he visited a nonprofit institute in China that helps emerging nations develop and build hydropower plants. Many countries consider hydroelectricity a clean source of power because it doesn’t involve burning dirty fossil fuels. But that’s far from true. Hydropower is a significant source of greenhouse gas emissions: a new study shows that the world’s hydroelectric dams are responsible for as much methane emissions as Canada. The study from Washington State University finds that methane, which is at least 34 times more potent than another greenhouse gas, carbon dioxide, makes up 80% of the emissions from water storage reservoirs created by dams. What’s more, none of these emissions are currently included in global greenhouse gas inventories. These are already revealing a worrisome future in which rising global temperatures will likely cause environmental changes such as rising sea levels and stronger hurricanes, which could uproot communities and intensify competition for food and other resources.

“I think this study shows that dams as a source of energy aren’t without their greenhouse gas costs,” says Bridget Deemer, a research ecologist at the US Geologic Survey, who led the study during her prior position as a research associate at Washington State. “Even though it’s a renewable source of energy, people should keep the greenhouse gas side of the picture in mind when making planning and policy decisions regarding dams.”

The research, which examines 100...
recent studies on greenhouse gas emissions from 267 large reservoirs around the world, also
calls into question the wisdom of building more hydroelectric dams as countries try to nix their
dependence on coal, natural gas and oil. An estimated 3,700 new dams are proposed or under
construction around the globe, the study reports. **It suggests the hydropower industry will need to
control its emissions.**

(Slow, but sure.)

**Construction on Red Rock Hydroelectric Project nears halfway point**

By ETHAN GOETZ Pella Chronicle, 11/7/16, oskaloosa.com

PELLA, IA—Construction of the second
largest hydro power plant in Iowa is little
more than halfway through completion,
officials said. The project, called the Red
Rock Hydroelectric Project (RRHP), is
licensed by the Federal Energy Regulatory
Commission. The plant will be located at the
existing U.S. Army Corps of Engineers Red
Rock Dam located on the Des Moines River.
The project is more than 3 miles southwest
of downtown Pella. The construction site
looks more like a scene from a science-fiction movie with hundreds of thick rebar rods protruding
out of concrete molds and gargantuan metal facades jetting upward. More than 100 people are
working the project. “The number [of workers] will go up,” said Vern Cochran, project manager for
the Hydro Power Plant. “We'll have more craft [workers] coming in eventually, like pipe fitters and
electricians.”

On Oct. 25, workers were prepping the site to pour concrete, setting thick rebar and digging a
hole for the power house. Concrete forms are poured 5 feet at a time. Pouring many layers of
concrete is a process. After pouring one level the concrete cures, then has to be scuffed for the
next layer. “Can't pour concrete on top of concrete without a good aggregate,”Cochran said. “You
[have got to] prep the concrete for the next placement. It's an ongoing thing.” A 100-feet deep
hole had to be dug for forms to house two large turbines. The 100 feet is measured from the top
of the retaining wall to the bottom of the hole. About 30 feet of this hole was rock and had to be
blasted out. The turbines placed in the Hydro Power Plant are 16 feet in diameter and will be
placed in the draft tube forms. The draft forms have been set, and are now being encapsulated in
thick concrete.

Another project crews are working on is excavating an area for pen stocks, which are large tubes
that carry the lake water from the intake structure to the powerhouse of the Hydro Power Plant.
The penstocks are 21 feet in diameter. Construction crews were digging out a section of dirt to put
sheet pile in to form the walls of the excavation. A project of this magnitude takes huge amounts
of concrete and rebar, including many man hours or work and good communication, Cochran
said. So far, construction crews have poured 44,000 cubic yards of concrete, which equates to
4,400 truck loads. They have laid 7.2 million pounds of rebar, and as of July 2016, the total hours
worked on the project is more than 350,000 hours.

With a project of this magnitude safety is of utmost importance. “Everybody meets in the parking
lot first thing in the morning for discussion. [The] Foreman go over projects being worked on for
the day. Everybody on site knows what's going on,” Cochran said. Communicating before leaving
for the day is just as important. “At the end, they all regroup in the parking lot and discuss any
issues that came up through the day,” Cochran said. After completion, Cochran will still work
there. Cochran will still be the plant supervisor when the project is complete. **The revised
schedule for completion of the Hydro Power Plant is the third quarter of 2018.**

(Small is good too.)

Copy obtained from the National Performance of Dams Program: [http://npdp.stanford.edu](http://npdp.stanford.edu)
Micro-Hydro Electric Power- An Efficient, Emission-free, Renewable source of electricity
11-09-2016, openpr.com

Water power can be utilized in numerous ways; tidal flows can be used to generate power by building a barrage across an estuary and discharging water in a controlled and systematic manner by a turbine; large dams accumulate water, which can be utilized to provide ample quantities of power; wave power is also harnessed in different ways. It is a method that has been in use throughout the world, by a diverse range of cultures and societies. Water can be harnessed from small to large hydro electric plants.

In United Kingdom, water mills are in use for the past 900 years. Their numbers grew rapidly and by the end of 19th century, there were over 20,000 water mills in operation in England itself. In Europe, Asia and few parts of Africa, water wheels were utilized to propel various industrial machineries, such as mills and pumps. First effective water turbine appeared in the middle of 19th century and they started replacing water wheels in various applications. In contrast to the water wheels and turbines, modern turbines are small, highly efficient and are capable of running at high speed. Hydropower is a reliable technology, relying on non-polluting, renewable and indigenous resource, which can easily integrate with irrigation and water supply projects all across the globe. Of the total, china constitutes more than 85,000 small-scale, electricity generating hydropower plants.

Other Stuff:
(Here’s some more of the numbers, but where’s the hydro? The article could have least said something more about hydro. In case you wondered, you can go to this website to see how much hydro is in each state: [http://www.hydro.org/why-hydro/available/hydro-in-the-states/] )

The renewable energy production of each US state: Part 2
By Polly Coleman - Renewable Energy – 11/1/16, energydigital.com

This article is part two of five in a series where we’ll be looking at the renewable energy that is produced by each state in the U.S. We take a look at the percentage of green energy that has been generated by each state and provide some interesting data about the renewable energy that is produced there.

11. Hawaii
Total renewable energy produced (percent): 100. Hawaii runs on 100 percent renewable energy. This is largely down to the states biomass industry which equates to over 50 percent of its total renewable power production. Hawaii’s energy production totals 16,382 billion BTUs, which is 0.22 percent of the total United States renewable energy production. Hawaii imported 90 percent of the energy it used (mostly in petroleum fuel) in 2014. Later in 2015, the state had the highest electricity prices in the nation. In 2014 (because of its hot, tropical climate) Hawaii had the fourth-lowest energy use in the United States.

12. Idaho
100 percent of the energy that Idaho produces is renewable. Idaho is rich in renewable energy resources. The renewable sources in the state provide 100 percent of energy production. This totals 139,888 billion BTUs. This is 1.86 percent of the total United States renewable energy
production. As well as having the 5th lowest average electricity prices in the U.S. in 2014, 82 percent of Idaho’s electricity generation came from renewable energy resources in that year.

13. Illinois
Total renewable energy produced (percent): 11.54 Renewable sources provide more than 11 percent of Illinois’s total energy production. This totals 239,478 billion BTUs which is 3.18 percent of the total renewable energy production in the nation. **Illinois is a vital transportation centre for natural gas and crude oil that moves throughout North America.** In January 2015, Illinois was ranked fourth in the nation in regards to leading the Midwest in crude oil refining. Illinois households use 129 million BTU of energy per household annually, this is 44 percent more than the average in the United States (according to EIA’s Residential Energy Consumption Survey).

14. Indiana
Total renewable energy produced (percent): 15.79. Renewable sources provide 15.79 percent of the state’s energy production, this totals 152,917 billion BTUs which is 2.03 percent of total U.S. renewable energy production. **Indiana is a key manufacturer of ethanol. Indiana's ethanol plants (as of January 2016) were capable of manufacturing more than 1.2 billion gallons of ethanol per year.**

15. Iowa
Total renewable energy produced (percent): 91.69. In Iowa, renewable sources provide 91.69 percent of the state’s energy production. This totals 539,707 billion BTUs. Which is 7.16 percent of the total United States renewable energy production. **Iowa is the main producer of ethanol in the U.S. The state had over 27 percent of the nation's fuel ethanol operating capacity in 2015. The state has reduced its usage of coal in recent years. In 2015, 53 percent of Iowa's net electricity generation was fueled by coal, which was reduced from 59 percent in 2014.**

16. Kansas
Kansas produces 11.15 percent of its energy from renewable sources. This totals more than 91,144 billion BTUs which is 1.21 percent of total U.S. renewable energy production. **One of the top-producing natural gas fields in the U.S. is located in Kansas. The Hugoton Gas Area is located in southwestern Kansas. 21 percent of electric generation in Kansas came from renewable wind energy in 2014. This means that wind energy is the state’s second biggest power provider, after coal.**

17. Kentucky
Total renewable energy produced (percent): 2.35. Renewable sources provide 2.35 percent of Kentucky’s energy production. This totals 66,193 billion BTUs which is 0.88 percent of total U.S. renewable energy production. **Kentucky’s energy is mostly produced through their coal industry. Most of the state’s natural gas production comes from the Big Sandy field in the east of the state. Kentucky is home to the United States first net-zero energy public school.**

18. Louisiana
1.47 percent of the energy that Louisiana produces is renewable. This totals 107,406 billion BTUs. Louisiana is home to the Louisiana Offshore Oil Port (LOOP) which is the only port in the U.S. that is capable of berthing Ultra Large Crude Carriers, the largest ocean-going crude oil tankers.

19. Maine
Maine produces 100 percent of its energy renewably. **This is mostly down to the states creditable biomass industry which equates to over 60 percent of the state’s total energy production. Maine’s energy production totals 139,654 billion BTUs. This is 1.85 percent of the total United States renewable energy production. Almost 90 percent of Maine is thick forest.** This means that wood products including biomass fuels are a vitally important part of the state’s rural economy.

20. Maryland

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17.14 percent of the energy that Maryland produces is renewable. This totals 42,549 billion BTUs which is 0.56 percent of the total United States renewable energy production. The Dominion Cove Point in Maryland is the only liquefied natural gas import terminal in the whole of the Mid-Atlantic. Export operations from this port are expected to begin in the late part of 2017. Renewable energy resources accounted for 7.5 percent of Maryland’s total net electricity generation in 2015.

(For those who travel a lot.)

5 Best, Worst Airports in America
Our condolences, everyone in the New York area
By Jenn Gidman, Newser Staff, Nov 3, 2016, newser.com

(NEWSER) – You'd be hard-pressed to find many people who actually enjoy the rush and chaos of navigating the airport while traveling, but some airports rate better than others if you're forced to wait at the gate with your newspaper and latte. The Points Guy took a look at the nation's busiest airports and ranked them based on amenities, timeliness, and accessibility. Congrats, Phoenix—and better luck next time, NYC region. Here, the five best and worst of the bunch:

Best Airports
1. Phoenix Sky Harbor International
2. Portland International (Portland, Ore.)
3. San Diego International
4. Salt Lake City International
5. Honolulu International

Worst Airports
1. LaGuardia (New York City)
2. John F. Kennedy International (New York City)
3. Newark Liberty International (Newark, NJ)
4. Chicago O'Hare International
5. Detroit Metropolitan


(One of these airports was recently named "most miserable" in America: http://www.newser.com/story/225877/the-most-miserable-airport-in-america-has-been-named.html)
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