



6/9/2017

# Some Dam – Hydro News™ And Other Stuff



**Quote of Note:** “A teacher affects eternity; he (she) can never tell where his (her) influence stops.” - Henry Adams, historian

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**“Good wine is a necessity of life.” - Thomas Jefferson**  
**Ron’s wine pick of the week: 2014 Vina Robles Cabernet Sauvignon "Estate"**  
**“No nation was ever drunk when wine was cheap.” - Thomas Jefferson**



## **Dams:**

(The fix begins. Good luck)

### **Reconstruction begins at Oroville Dam. Will it be different this time?**

By Dale Kasler, MAY 24, 2017, sacbee.com

The reconstruction of Oroville Dam’s flood-control spillways is underway, and California officials vow the structures will become stronger and safer than ever. More than three months after a near disaster forced the emergency evacuation of thousands of downstream residents, California officials announced Wednesday that permanent repairs have begun on the two spillways. “This week symbolizes a huge, important and positive step,” said Bill Croyle, acting director of the state Department of Water Resources.



Under reconstruction: Oroville Dam spillway like you've never seen it 1:22

Croyle said work officially began Saturday with the start of demolition of the lower portion of the main spillway – the structure that’s taken the heaviest beating since the crisis began in early February. Demolition will continue through mid- to late-June, when reconstruction will start. Work is

also proceeding on the adjacent emergency spillway, whose near-failure in February prompted the evacuations. Speaking to reporters on a conference call, officials said the state's designers have taken into account criticisms leveled by an outside team of forensics investigators and others. They said the February emergency resulted from design and construction flaws dating from the dam's construction in the 1960s, including an inadequate drainage system beneath the spillway and critical inconsistencies in the thickness of its concrete slabs. Those issues and others will be addressed, said Jeanne Kuttel, chief of DWR's engineering division.

"The concrete will be thicker," Kuttel said, adding that the spillway will be supported by "state-of-the-art drains" to prevent new problems. Dam officials "adopted design measures to mitigate any of the challenges that the forensics team identified as possible contributors (to the crisis)," she said. Kiewit Corp. of Omaha, Neb., which was awarded a \$275.4 million contract to fix the dam's two spillways, has more than 200 employees on the site, a workforce that will balloon to 500 by August. The company and its subcontractors will work 20 hours a day, six days a week, in an effort to get as much work done as possible this year, Kuttel said. The complete repair is expected to take two years, although DWR officials say the spillways will be functional by November, the start of the upcoming rainy season. This season's work will focus mainly on replacing the badly damaged lower portion of the main spillway. Next year much of the attention will shift to the upper section of the structure, which wasn't damaged in the February incident but will be replaced anyway.

The dam's emergency spillway – the epicenter of February's crisis – will be fortified, too. Among other things, Kiewit will embed a vertical "cutoff wall" in the hillside beneath the spillway to prevent the type of erosion that nearly toppled the spillway structure three months ago. The state expects the Federal Emergency Management Agency to reimburse much of the repair cost. The water agencies that store water in Lake Oroville are expected to pick up the rest of the expense. State officials shut off the battered main spillway for the season last Friday in order to start the repairs. DWR said it believes the outlet from the dam's hydro plant can release enough water this summer to keep Lake Oroville levels in check, despite a heavy snowpack starting to melt in the Sierra Nevada. If the snowmelt proves heavier than expected, DWR has said it could reopen the spillway one more time. While state officials sketched the broad outlines of the two-year repair plan, they have kept many of the technical details sealed from public view. Oroville's emergency began Feb. 7, when a massive crater was discovered in the main spillway. That prompted dam operators to limit water releases as they sought to contain the damage. Inflow from a heavy storm filled Lake Oroville and caused water to pour over the adjacent emergency spillway – a concrete lip on top of an unlined hillside – for the first time ever Feb. 11.

(A good model can find stuff you didn't know was there.)

### **Oroville Dam in Miniature: Scale Model Helps Repair Damaged Spillway** **Engineers at Utah State University are testing water flows through a model of the Oroville Dam spillway to ensure America's tallest dam can withstand the kind of freak surges that caused it to start breaking apart in February.**

Written by Matt Weiser, May. 29, 2017, newsdeeply.com

When it comes to repairing the tallest dam in America, sometimes it helps to shrink the problem a more manageable size. That's why California water officials are relying on a scale model of the damaged spillway at Oroville Dam to plan their repairs. The model, constructed by engineering professors and students at Utah State University Logan, is built to a 1/50th scale out of wood, steel, concrete and acrylic plastic. At 120ft (36m) long and 30ft (9m) wide, it's roughly the size of a tennis court. About 50 tests have been run on the model since March to simulate the hydraulic forces acting on the structure. More are planned in the weeks ahead, said Michael Johnson, an assistant research professor of civil and environmental



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engineering at the ----- The model, Johnson said, helps fine-tune the rebuilt structure's design before a single bucket of concrete is poured. It was built under a \$277,000 contract with the California Department of Water Resources (DWR). The goal is to help avoid a repeat of the disaster that unfolded in February, when massive water releases from the reservoir caused the spillway to break apart, prompting evacuation of nearly 200,000 people downstream as a precaution. "No computer models can give all the answers," said Johnson, who is chief engineer at the Utah Water Research Laboratory. "A physical model is really an inexpensive insurance measure that can be taken to resolve some of the unknowns. It takes some of the guesswork out of the end product." Such scale models are commonly used when building a new dam to help verify calculations about water flow, depth and pressure. In fact, a model was built of Oroville Dam prior to its original construction in the 1960s.

The model simulates Oroville's entire main spillway, including the water-control gate structure at the top and a portion of the reservoir profile upstream. It does not include the adjacent emergency spillway. The model uses clear acrylic plastic for the gates and the spillway chute surface, because this material effectively simulates the friction between water and concrete at full scale, Johnson said. Water for the model is drawn from the Logan River into a giant cistern beneath the warehouse that holds the model. Pumps circulate water through the model and return it to the cistern, allowing it to be used repeatedly. Johnson's team also modeled damaged areas of the spillway and the eroded hillside beneath it. They replicated those conditions using measurements taken by DWR using laser imaging and computer-aided design programming.



The purpose of modeling the damaged areas is to simulate what might happen if a freak storm requires massive water releases while repairs are under way, or if DWR can't complete the repairs in time for next winter. "There's a lot of unique features about this particular project that really make it interesting and exciting to dive into," Johnson said. "It's the tallest we've ever built in our lab, the most vertical elevation we've ever modeled, and it's got the longest spillway chute. It's a pretty substantial model." The model is now being converted to replicate the finished repairs, and a

new round of tests will be conducted using that version. Ted Craddock, DWR's project manager for the Oroville emergency spillway recovery effort, said the physical model has helped verify computer and mathematical modeling already completed. It has shown, for instance, that the spillway's existing side walls are large enough to contain maximum water releases from the reservoir. The model will also be used to test a new design feature that may be added to the spillway during repairs: aeration slots. These are cutouts in the concrete surface designed to prevent cavitation, a process that can erode concrete during high water flows. Aeration slots have been added at numerous other large dams as a safety measure, including Glen Canyon Dam on the Colorado River. "Ultimately what we're using this information for is to ... understand the flow characteristics," said Craddock. "Sometimes you get eddies and things like that that you need to have some awareness of. It's a way to increase the confidence in the design."

The spillway chute will be rebuilt with thicker concrete and more steel reinforcing, a response to flaws identified by an expert panel that investigated the spillway after the disaster. The original design for the Oroville's spillway specified concrete 18in (46cm) thick, but many areas were found to be only 12in (30cm) thick. The upcoming repairs specify 30in (76cm)-thick concrete. In addition, many of the damaged areas will be built up with what Craddock called "leveling concrete," instead of relying on bedrock, which the expert panel found to be suspect in some areas. DWR's contract for the work, valued at \$275 million, is with Kiewit Corp. and runs through to January 2019. It includes rebuilding the spillway from its terminus at the Feather River channel to 600ft (183m) above the damaged areas. The remainder of the spillway up to the water-control gates will also be rebuilt, Craddock said, but that work is being delayed to the following year, and is not likely to be as

extensive. "As we've dug into the records, what we've found is that the bedrock from the gate structure downstream is better than the area where we had a problem this year," Craddock said.

The current year's contract also includes fortifying the emergency spillway. It was used for the first time in February after DWR officials shut down the main spillway when it began to break apart. The emergency spillway is nothing but a massive concrete curb, with no water-control gates. When the reservoir reached maximum capacity, water simply spilled over the curb onto the hillside below, causing massive erosion that threatened to undermine the spillway and topple it over. This is ultimately what led to the evacuation order in February. Environmental groups warned about that risk during Oroville Dam's recent federal relicensing process, but were ignored.

Kiewit will also be working on this emergency spillway. Its contract for this year includes replacing the weakest portion of the emergency spillway on western end to make it "more robust," Craddock said, including thicker concrete and more reinforcing steel. Kiewit will also build a vertical concrete cutoff wall, parallel to the emergency spillway and about 600ft downstream, intended as an erosion-control measure. In a follow-up contract next year, DWR plans to add a heavy concrete buttress against the downstream face of the emergency spillway, essentially giving it more thickness and a bigger foundation. It will also build a concrete "splash pad" between this buttress and the new cutoff wall as another erosion-control measure. Craddock said he is confident the main spillway will be ready to perform at full capacity by November 1, the typical start of the flood-control season. "We're going to be able to pass the flow that the original design was for," Craddock said. "We need to be able to use this spillway with the assumption we're going to have record rain again next year. That's what everyone's working towards."

(Watch out, danger ahead.)

## Low head Dams can be Deceptive Dangerous

OMARI SANKOFA II, Pittsburgh Post-Gazette, post-gazette.com, MAY 23, 2017

Even at low speeds, it doesn't take much for the waters flowing over a low-head dam to create a dangerous situation for swimmers or boaters who are carried over the edge. On Saturday, two women kayaking went over the dam at the Dashields Locks and Dam near Sewickley and got caught in the recirculating water beneath it. The body of Brittany Evans, 25, of West View was found on Sunday. The body of 25-year-old Helene Brandy, the second woman, has yet to be located. Crescent Township River Rescue Chief, Chief Kevin Scott said Tuesday



that about 50 people were searching the river from the dam into Beaver County in several boats with assistance from a Pennsylvania State Police helicopter. The water in the Ohio River was only flowing at six-tenths of one mile per hour on Saturday, according to National Weather Service hydrologist Lee Hendricks. However, once the water flows over the drop, the water goes down the backside of the dam to create a turbulent, rotating trap that is tough to escape from.

A plunge over this type of dam — also called a weir dam — is very dangerous, Chief Scott said. Boaters looking at the relatively small drop and smooth water flowing toward such dams often have no concept of how ferocious the force of the water beneath can be.

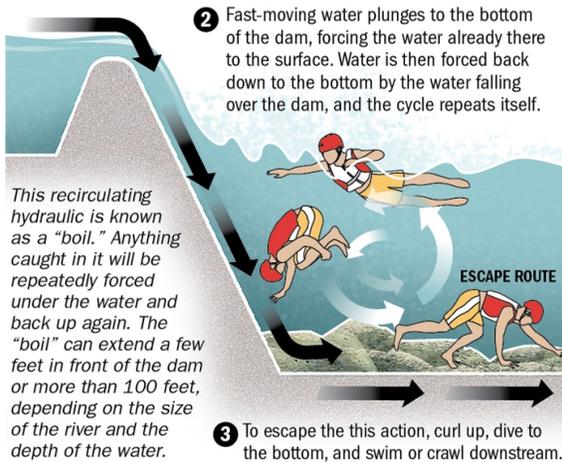
## Low-head dam safety

Approximately 300 dams in Pennsylvania fit the definition of a low-head dam and are regulated by the Department of Environmental Protection. While these structures must be marked with signs and buoys to warn anyone approaching to stay back, they may not always be visible from upstream to unsuspecting boaters and swimmers. Adding to the danger, these barriers can create an underwater hydraulic cycle that is nearly impossible to escape.

### SURVIVING A HYDRAULIC 'BOIL'

If you are caught in a low-head dam try to stay with the boat or on-top of anything that floats, for as long as possible.

- 1 The water above the dam picks up speed as it is squeezed over the top of the structure.



Sources: Pennsylvania State Police community awareness bulletin, Popular Mechanics

Post-Gazette

The force of the water will take you right down," he said. "You could be the strongest swimmer but there is just no way. The debris will be beating you up, you'll be constantly sucked down and shot up." It's not known if the women were in their boats or out when they went over the dam. Whether in the boats or out, they would have been caught in the rotating water, carrying them toward the riverbed and back to the surface at the base of the dam. "Six-tenths of a mile per hour is a relatively low velocity," Mr. Hendricks said. "At the dam they were still passing 22,800 cubic feet of water per second. Even though the velocity was fairly low there's still a high volume of water here." Mr. Hendricks said the conditions would've been similar to the more extreme conditions of whitewater boating, which can produce currents strong enough to flip over a canoe, kayak or large raft.

A safety guide from the Pennsylvania Fish and Boat Commission noted that debris in the dam can create additional safety hazards. "To complicate matters, these dams are sometimes loaded with debris, such as tires and logs on the surface and rocks and steel bars on the bottom, posing another serious problem for the recirculating victim," the guide states. "I don't know how well-versed these young ladies were, or how much experience they had," Mr. Hendricks said. "So many factors here."

Experienced boaters might be able to keep their craft upright and ride over the churning water, and would have known how to try to escape it if they were out of their boats.

Ironically, the trapped swimmer must fight the impulse to struggle for the surface. The escape route is at the bottom, where the water is flowing downstream out of the hydraulics at the base of dam. "If rescue is not immediate and the victim is to survive and escape this water trap," the safety guide says, "he must go down with the current coming over the face of the dam, stay as close to the bottom as possible, and try to get past the crest of the boil before resurfacing. This maneuver is very difficult, and few have done it." *Shelly Bradbury contributed.*

(They are all not unsafe. Many just don't meet today's safety standards and they aren't as large as Oroville dam.)

## Warning: 15,498 'High-Hazard' Dams in America

By Chriss W. Street, 24 May 2017, [breitbart.com](http://breitbart.com)

The new American Society of Civil Engineers 2017 Infrastructure Report Card (ASCE) has identified 15,498 high-hazard dams, whose failure could risk loss of life. ASCE is appropriately holding this year's Environmental & Water Resources Institute (EWRI) in Sacramento, California from May 21 to 25. The meeting is an opportunity for its members and infrastructure regulators to share ideas and strategies to address the growing risk of life-threatening catastrophes, exposed this winter by the



failure and near-collapse of Oroville Dam's spillway due to the dangerous combination of age and lack funding to address known infrastructure risks.

The average age of America's 90,580 dams is 56 years, the same age as the Oroville Dam, which the California Department of Water Resources began constructing in 1961. As America's tallest dam, Oroville was built with what was considered at the time to be the best engineering and construction safety standards to withstand floods and earthquakes. Over the next almost six decades, the U.S. population grew by 57 percent to 321 million, and California's population has grown by 136 percent to 39.2 million. But despite the improved collection of scientific and engineering data, there has been little new infrastructure built, and greater pressure is being put on aging dam systems.

The ASCE annual report notes that the Association of State Dam Safety Officials estimates that the cost to rehabilitate the nation's federal and non-federal dams would now exceed \$64 billion.

The number of high-hazard dams — those whose failure would be anticipated to cause loss of life — climbed by 52 percent in the last 12 years, from 10,213 to 15,498 dams. Another 11,882 dams are currently labeled as significant hazard potential, meaning that they are expected to soon join the watch list for high-hazard dams. The cost to rehabilitate just the most critical dams is estimated to cost \$22 billion. The U.S. Army Corps of Engineers estimates that more than \$25 billion will be required to address federally-owned dam deficiencies. But at the current congressionally-authorized rate of investment, those repairs would take over 50 years.

Frank Blackett, a regional engineer at the Federal Energy Regulatory Commission's Division of Dam Safety and Inspections, told the EWRI attendees that federal regulators, who have authority over licensing of about 16 percent of America's dams, are re-evaluating how they conduct dam inspections following the Oroville Dam spillway crisis, according to the Sacramento Bee. He added that none of the federal and state safety inspectors that visited Oroville Dam over the last decade recognized the now obvious signs that a giant sink-hole could form in the spillway, causing the crisis evacuation of 188,000 people. Blackett stressed that FERC has stepped up on-site inspections and is re-evaluating its construction and design models to anticipate scenarios that could lead to infrastructure failures. FERC has also hired outside consultants to perform an internal audit of how federal regulators can improve their inspections and dam oversight.

(Leave the fixin' to those that know how.)

## **TVA: Dam safety reports contain 'sensitive, confidential' info; Not public record**

By Josh Smith, May 25, 2017, wjhl.com

JOHNSON CITY, TN (WJHL) – Tennessee Valley Authority is in the process of finalizing safety assessments at 49 dam projects, a process that's supposed to wrap up at the end of the year. That's according to the agency's most recent annual report to the federal government. But when News Channel 11 asked to see the findings of TVA's dam safety inspections, TVA said the official reports contain sensitive and confidential information that's not a part of the public record, and TVA said sharing the reports could expose the dams to a possible security risk. News Channel 11 also learned the complete details of the official dam safety assessments conducted by TVA aren't shared with the Federal Emergency Management, the agency in charge of overseeing national dam safety.

But while protecting the security of its dam safety information, TVA said the public needs to know that inspections show all dams in the Tri-Cities are in good working order. "Our dams are very safe, very stable," David Bowling, vice president of Land and River Management for TVA, said. "We have a very comprehensive program and set of procedures that we have developed over the last 60 years in order to ensure that our dams function as designed." Bowling said TVA is constantly



conducting safety inspections at its dams. At regular intervals, TVA conducts a complete dam safety analysis.

"There will be a dam safety inspection that occurs every month and then on an annual basis there will be a different set of eyes or a different dam safety professional group of folks," Bowling said. "On at least a 5-year basis, everything that we know about that dam we will put all of that out and we will have the experts look at it." Bowling said technology allows the dams to be watched around the clock. "We have over 7,000 instruments that are collecting data for the most part in real time," he said. "People are looking at that on a daily basis." Recently, after a request from News Channel 11 to see the agency's dam safety reports, TVA said that information had to be closely guarded.

"The official dam safety reports, which contain all of the detailed technical information that would be considered 'sensitive' or 'confidential,' are internal to TVA or to a select number of industry-related technical experts with the necessary security clearances," Jim Hopson, TVA spokesman, said.

Hopson asked TVA engineers to prepare a summary of their dam safety assessments in response to News Channel 11's request to see dam safety reports.

READ: Summary of TVA dam safety assessments provided to News Channel 11 on May 17th  
All the summaries concluded the same about each TVA dam in the Tri-Cities. "All inspections have indicated the dam is performing as intended."

The Federal Emergency Management Agency oversees the safety of the nation's dams. When News Channel 11 asked if FEMA has access to TVA's internal dam safety studies, a spokesman said, "Currently, FEMA does not have access to internal safety assessment reports the Tennessee Valley Authority (TVA) has conducted on its individual dams. Federal guidelines for dam safety recommends that all federal high-hazard potential dams have emergency action plans, and it is our understanding that the TVA has created such plans for the dams within its jurisdiction." But while TVA said its dam safety program is self-regulated and its findings are confidential, the agency said it is heavily involved in sharing information and participating in national dam safety initiatives. "TVA does report information annually to FEMA's National Dam Safety program and also to the National Inventory of Dams," Hopson said. "The reporting to FEMA contains information about inspections and the status of TVA dams, although we do not submit the inspection reports themselves." "For dam safety, TVA is self-regulated in voluntary compliance with the Federal Guidelines for Dam Safety, which TVA, the U.S. Army Corps of Engineers, the Bureau of Reclamation, and other federal dam agencies helped create.

TVA also participates on the National Dam Safety Review Board, and the Interagency Committee on Dam Safety. "It is more than just taking us at our word," Bowling said about TVA's dam safety initiatives. "For most folks within the dam safety industry, it becomes a calling to maintain the structures as safely as possible." "We have a forecast center in Knoxville that's staffed 24 hours a day, 365 days a year that manages and operates these projects to make sure that they bring benefit to the community is that they are in," he said. "And every one of those folks know that unless that dam and that structure is safe, not only does it become not a benefit, it becomes a hazard. And that's the way we are going to manage them – to keep people downstream as safe as possible."

(Making sure it's safe, as it should be.)

## 'Dam safety is our top priority': Army Corps of Engineers inspect Cougar Dam

By Audrey Weil, May 24th 2017, kval.com

BLUE RIVER, Ore. -- The U.S. Army Corps of Engineers is conducting its periodic investigation of Cougar Dam on the McKenzie River. The Willamette Valley's 13 dams are checked every five years to access risk and monitor changes. "Dam safety is our top priority and we take it very, very seriously," Operations Project Manager Erik Petersen said. They look at the walls of the dam: "To look for cracking, to



look for any changes in cracking, to look for spalling, any concrete peeling off, just to make sure there aren't changes to the facility that we don't know about," Petersen said. They look at the spillway gates: "Those gates hold back an awful lot of water and there's a lot of stress on them and so they're looking for any deformation, they're looking for any vulnerabilities in paint conditions or metal fatigue, anything like that," he said.

At Cougar Dam on the McKenzie River, everything must be in tip top shape to protect the hundreds of thousands of people who live in the water's path. "If the facility were compromised in some way, it would impact people's lives downstream perhaps in a catastrophic way. That's what we want to avoid," Petersen said. Every once in a while, during these inspections, engineers find an urgent problem, like in 2008 when engineers noticed malfunctioning gate hinges at another dam that prompted area-wide changes. "We've spent somewhere in the neighborhood exceeding \$100 million since 2008 buying down that risk with the spillway gates in the valley," Petersen said. One concern for Cougar Dam is earthquake safety, which they'll be evaluating in the next few weeks. "We expect this dam to perform really well. there's some preliminary analysis that we did that we need to look at things a little further, but generally we're doing everything we can to reduce the risk to the downstream population," Silas Sanderson, the team lead for the Cougar Issue Evaluation Study, said. All in all, they say thanks to close monitoring there aren't usually major concerns, just little things that get fixed along the way.

(Another dam removal story.)

### **Iowa City Plans to Remove 2 Dams and Improve River Access**

**Iowa officials hope to improve access to the Des Moines River with a plan that includes the removal of two dams.**

usnews.com | May 28, 2017

FORT DODGE, Iowa (AP) — Iowa officials hope to improve access to the Des Moines River with a plan that includes the removal of two dams. The Messenger (<http://bit.ly/2qntgSq>) reported that Fort Dodge city officials and Webster county officials held an open house Wednesday to review the Des Moines River and Lizard Creek Water Trails and Corridor Plan. Chad Schaeffer is the city's director of engineering, business affairs and community growth. The two dams will be removed in the next two years, he said. Removal will be funded by about \$2 million from the Iowa Department of Natural Resources clean water program and another \$2 million from Fort Dodge's capital improvements plan, Schaeffer said. The plan also entails removing some trees and bushes around the river, adding a bike trail system, and adding handicap accessibility. "Overall when you look at this entire plan, from dam removal, access to the river, fishing, taking out another small dam further north on Lizard Creek, you start developing the riverfront," he said.

(Back in the news, a bad story just won't go away.)

### **Mosul Dam risks devastating failure without urgent repair**

By Jim Michaels, 5/30/17, USA TODAY, msn.com

WASHINGTON — Iraq's massive Mosul Dam risks devastating failure without additional urgent repairs as the government keeps stalling over how to proceed with the critical reconstruction after this year. A rupture of the 370-foot-high structure would put 4 million people at risk by sending floodwaters racing more than 200 miles downstream as far as the capital of Baghdad, engulfing villages, destroying farms and causing up to \$20 billion in economic damages, the U.S. Army Corps of Engineers estimates. The Iraqi government has



delayed a decision on whether to renew a contract with an Italian engineering firm managed by the Corps of Engineers when it expires after this year. It may try to make the critical repairs itself to save money at a time when it is feeling a cash squeeze because of the cost of the war to expel the Islamic State from the country. Lt. Gen. Todd Semonite, commander of the Army Corps, told USA

TODAY he fears the government is "going to be too optimistic" about the level of repairs needed and may not renew the contract.

The government is running out of time to make a decision. "I'm kind of expecting in another couple of months we'll either get a decision or probably not get a decision, which means by default then ... we'll unplug," Semonite said. Iraq's government faces deep political divisions that often delay critical decisions. The financial squeeze adds to the indecision. "When you're fighting a war and oil prices are where they are, you don't have a lot left over to fund public works," said William Watts, an analyst at Dunia Frontier Consultants. The current contract with Trevi Group is worth \$300 million, some of which is funded with World Bank and other loans. The dam will require at least another year's worth of intensive work before it is stabilized, the Corps of Engineers estimates. "The risk that the dam poses is still extremely high and it will be still at the end of this first year," said Eric Halpin, an Army Corps dam safety official. Construction of the dam, which provides irrigation and hydroelectric power, was completed under the regime of Saddam Hussein in 1985. The dam — a half-mile wide at its base — was properly constructed but built on a foundation of water soluble materials, according to the Army Corps.

Ever since it was built, workers regularly have to drill holes and pump grout — a mixture of cement, water and clay — into the holes to strengthen the foundation. But maintenance declined in recent years, raising concerns of a massive failure. The dam had been seized by the Islamic State in 2014 when the militants first invaded Iraq, but it was quickly taken back by Iraqi forces. Soon afterward, engineers discovered the dam was in bad shape, not only the result of damage caused by the Islamic State but also from prior years of neglect. The work to stabilize the dam began a year ago. Corps officials believe that after an additional year of intensive work to stabilize the structure, Iraq can focus on routine annual maintenance. "We think at the end of the second year ... we'll be safe enough where then you'll certainly bring down the risk," Semonite said.

One key reason for renewing the contract is that the Italian firm and U.S. engineers employ new techniques and technology to the repair work, which Iraqi workers still need to learn. "The key part of transitioning from the Italian firm to the government of Iraq is that all of those new things — new technology and materials — are understood and can be executed correctly (and) effectively by the Iraqis," Halpin said. Analysts say Iraq's fractured government needs to come together and recognize the need to spend money on the repairs. "The Mosul Dam requires that the whole Iraqi government ... focus on the issue," said Lukman Faily, former Iraqi ambassador to the United States. "That is not happening now." "It shouldn't be a political issue," he said. "It's a humanitarian issue." Consultant Watts said Iraq's government may approve the contract at the last minute. "A lot of times things do come down to the wire," Watts said.

(Depends where it rains.)

## Good Question: Why isn't a Local Dam Preventing Flooding?

May 30, 2017, whec.com

Several viewers asked Pat Taney if the Mt. Morris Dam is doing enough to prevent flooding along Lake Ontario for this week's Good Question segment. Hundreds of homeowners are dealing with a nightmare along Lake Ontario. Homes are flooded, docks are underwater and millions of dollars in damage are being reported. Several miles south, down the Genesee River, sits the Mt. Morris Dam in Livingston County. "This dam is over 1,028 feet



across 245 feet tall and it can hold 302,000 acre feet of water above it," said Dam Manager Steve Winslow, who is with the Army Corps of Engineers. But when we visited the dam, its storage lake - where water is held back from going down the Genesee River and eventually into the lake - was not anywhere near full or at capacity.

Taney: That looks very empty and to think there are gallons and gallons of water flooding people's homes right now downstream along the lake, how do you respond to that?

**Winslow:** First and foremost this dam was never built to protect the lakeshore. The dam, built in the 1950's, was constructed to prevent flooding in communities along the Genesee River, including the City of Rochester. "Our main purpose is really to help protect the city and all of the area in between from flooding that happens on the river itself not the lakeshore." The dam has already had to close gates this spring to prevent flooding along the river. Winslow says closing the dam did not and would not impact flooding along the lake, again he says that's not the dam's purpose.

**Winslow:** Let me give you a scenario if we filled the full extent of our storage capacity at the dam and then we were able to pick up all of that water at once and dump it directly into Lake Ontario, it would raise the lake's levels by one and a half centimeters. It's nowhere near big enough to control water depths on Lake Ontario. The dam also can't stay at capacity and hold water back longer. It needs to release periodically to prepare for another rain event. "Let's say we did hold back the water and stay at capacity. Then we get another major rain event, water would spill over and we're talking the potential for catastrophic flooding for communities along the Genesee River, including the City of Rochester," Winslow said. Since it opened in the 1950's, the dam has prevented billions of dollars in flood damage.

(This one will be in for a battle.)

### **Feds Issue Permit for Large Dam on Colorado River Headwaters**

**The project is designed to help secure water for growing Front Range communities near Denver, but environmental groups are concerned that more diversions and climate change impacts will leave too little water in the river.**

Written by Mary Catherine O'Connor, May. 31, 2017, newsdeeply.com

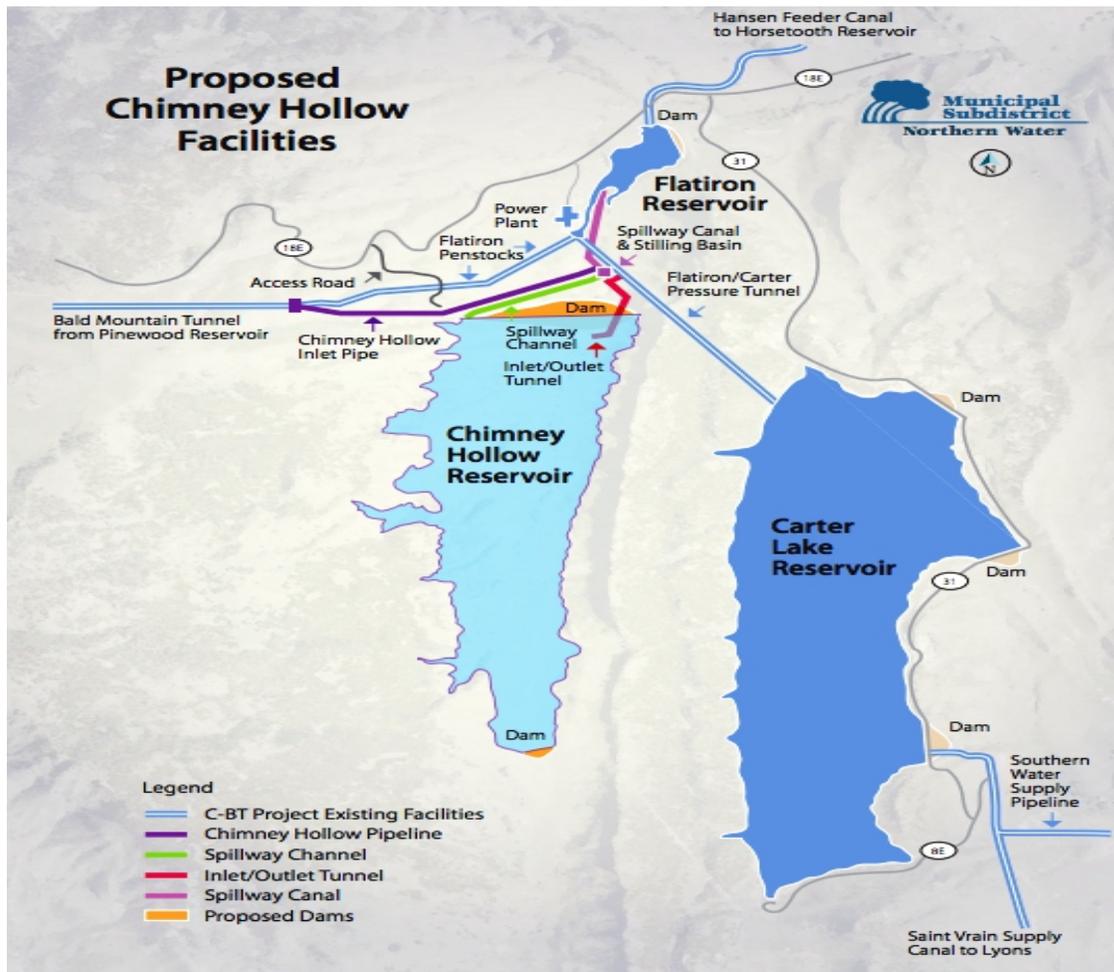
The United States Army Corps of Engineers have given a water agency in Colorado's Front Range the green light to build a large dam and reservoir to divert and store water from the Colorado River – the first such project that has been permitted in decades. The \$400 million Chimney Hollow dam and reservoir is designed to "firm" water supply to around a dozen quickly growing communities in Colorado's Front Range communities, north of Denver. In water parlance, firming refers to making a variable water supply secure.



Conservancy District pulls water from the Windy Gap Reservoir, on the western slope of the Continental Divide, through a tunnel and sends it to Broomfield, Greeley, Longmont and Louisville, among other towns. Instead of going straight to those communities, that water will be stored in Chimney Hollow Reservoir, which will be formed by the construction of a 300ft-tall dam. The project will divert 30,000 acre-feet from the Colorado River, and the reservoir will provide a steady supply, regardless of whether the Colorado is running low or high in a particular year or season, to meet growing demand. Brian Werner, spokesman for Northern Colorado Water Conservancy District, said the population of roughly 925,000 that the agency serves today is expected to grow up to 1.5 million by midcentury. "We're the bullseye for growth in Colorado," he said. "We're close to Denver, to the Denver International Airport and we've got the [Rocky] Mountains in our backyard."

But concern over the health of the riparian ecosystem in those mountains makes diverting water from the headwaters of the Colorado River controversial. Gary Wockner, director of Save the Colorado River, said he has a team of lawyers pouring over the Army Corps permit right now. He said in the coming month or two the group, which has long opposed the project, is likely to file suit against the federal government over the issuance of the permit. Without delays from legal action, the construction of the dam could start in early 2019. The project has been moving through the permitting process since 2003, according to Werner, but its germination dates back to the mid-

1990s. Wockner called adding a new dam to the Colorado River “absolutely insane” because “it is already the most dammed, drained, depleted river on the planet – with every drop drained before it reaches the Gulf of California.” He added that climate change models indicate the Colorado River will have less water in years to come, so a new dam near its headwaters will only exacerbate water scarcity in cities and states downriver, and leave less water in the rivers for fish. Wockner asserts that agencies need to look at other methods of securing water, such as arranging leases from farmers with water rights, and that Front Range communities need to consume much less water than they currently do. He pointed to Las Vegas as an example of where strict water use regulations significantly cut per capita consumption. Werner countered that tiered pricing for water rates does induce Front Range residents to conserve, since the more they use, the more they pay. And that communities promote reductions in non-essential water use through the use of drought-tolerant plants. As for seeking supply from agriculture, Werner said it is difficult to strike deals with farmers, and Front Range cities would rather purchase water outright.



Trout Unlimited, which advocates for healthy rivers and streams across the U.S., is also concerned with impacts that new diversions could have on the health of the river, but it has taken a different approach than other opponents. Following years of negotiation, Trout Unlimited forged an agreement with Northern Water. Contingent on receiving all permits to build Chimney Hollow Reservoir, the agency said it will pay \$2 million toward a \$12–13 million project to add a channel to the Windy Gap Reservoir, which will provide a means for fish and other aquatic organisms, as well as sediment, to bypass the reservoir and continue moving downstream. This will also help regulate water temperature during low-flow summer months. (Other funding for the bypass construction is coming from state and federal sources, but Trout Unlimited still needs to raise an additional \$3

million.) Mely Whiting, a lawyer with Trout Unlimited, said 65 percent of the flows of the Colorado River headwaters are already diverted by Front Range communities. After the Windy Gap Firming Project and another planned diversion called the Moffat Collection System Project, it is expected that 80 percent of flows will be pulled from the headwaters. Whiting said Trout Unlimited's approach is to tell water agencies that if they want to continue diverting, they need to pay for mitigating the harms that diversion have already caused in the river. "The bigger picture is that we've got to figure out how to make the limited amount of water we have available work for everybody, including the environment and including the fish," Whiting said. "If we don't work together on this stuff, we're not going to survive."



## Hydro:

(Good title.)

### Dam worth it: Peterson Dam has great ecological impact, extensive history

May 24, 2017, by Kaylee Sullivan, miltonindependent.com/

Milton's Peterson Dam, VT received the highest ranking for ecological impacts on the state's waterways in a Nature Conservancy assessment of 400 Vermont dams. The conservancy debuted its dam screening tool for the Lake Champlain Basin earlier this year, citing both Peterson and Swanton dams to be of great interest. Fish such as endangered lake sturgeon and landlocked Atlantic salmon are blocked by the structures, officials said. Talk of Peterson's impacts, though, is not new. While the dam was relicensed in the mid-2000s, the renewal was not easy.



To restore spawning habitat for fish and water quality standards, the Vermont Natural Resources Council advocated for the removal of Peterson. According to Jason Lisai of Green Mountain Power, which owns the dam, litigation over two decades eventually declared the dam's benefits outweigh its ecological impacts, and the Vermont Public Service Board found no guarantee that removal would better the fishery. "This absence of clear benefits is in contrast to the known environmental benefits of a clean, renewable energy source that has been in place for more than 50 years," the PSB said in 2006. Peterson is one of GMP's 36 hydroelectric dams, and its energy output originated in 1948. Swanton Dam, along with a number of others ranked high on the conservancy's

list, does not generate power. Peterson's relicensing process also included Milton, Clark Falls and Fairfax dams, three others along the Lamoille River that, according to Lisai, all operate in conjunction with one another. At 6.4 megawatts, Peterson is the largest single unit on the river. Lisai, who is responsible for GMP generation operations, said operation safety and environmental obligations are two top considerations in relicensing. The conservancy's tool is part of an accelerating trend of dam removal both globally and statewide, conservancy watershed restoration manager Shayne Jaquith said.



Degraded infrastructures with harmful environmental impacts must be taken care of, he added, but not all of the dams studied have an avenue for removal, especially if

they're of use to the community. "Many dams out there serve valuable purposes, and that needs to be part of the conversation," Jaquith said. "Certainly, many, many more dams may not be doing anything at the present time positively for society. And beyond impacting the water quality, they may be preventing health and safety hazards." To remove a dam, a number of parties would have to reach consensus and obtain the necessary funding, Jaquith said. Peterson Dam is licensed until 2034, and GMP has no intention of removing the structure, which provides power for 3,700 homes and amounts to 8 percent of GMP's overall hydro-generation, officials said. "The removal of that and the long-term cost to the rate payers is substantial versus the benefit of ongoing generation," Lisai added.

Come relicensing time, Jaquith said he expects many stakeholders to work to mitigate the dam's ecological impact. "I don't think it'll be as lengthy. I think it'll be just as rigorous," Lisai said. Peterson has been studied extensively in the past, but other dams haven't endured decades-long mitigation. Jaquith said the conservancy's screening tool uses available data to evaluate dams officials don't know much about, creating a foundation for more rigorous assessment and fieldwork. Vermont has upward of 1,000 dams. Without the tool, a dam's true ecological impact is as good as a guess, Jaquith said. About 50 dams are removed annually nationwide, and the conservancy has a keen interest in helping Vermont recognize and remove invaluable dams. This tool, Jaquith said, helps them do that. If the tool was used during Peterson's relicensing process, it wouldn't have highlighted anything unknown at that time. Rather, the significance of the tool is its ability to investigate funding and impacts of dams with less established research during the federal licensing process, Jaquith said. "A lot of focus should continue to be on dams that aren't currently in service and what can be done to open up those headwater areas," Lisai said. "And it's also from a dam safety standpoint; getting a dam out that is not being maintained, thus, it's not being monitored. "That is a great place for people to put their energy," he added.

(Can't do it without hydro.)

## California Breaks Record After Getting 81 Percent Of Energy From Renewables

By Robin Andrews, 25/05/2017, iflscience.com

While Trump et al. continue to do all they can to trash the environment and pretend climate change isn't happening, certain US states continue to forge their own low-carbon path. The Golden State has always had a penchant for clean energy, and now it looks like they've broken another renewable record.

As reported by SF Gate, on Saturday, May 13, renewable energy sources – solar and wind – produced 67.2 percent of the electricity demand.



This doesn't take into account hydroelectric power, but when this is factored in, this figure rises to a remarkable 80.7 percent. A combination of sunny and windy days, combined with peak operating capacities of California's hydroelectric plants, helped set this record. Without the massive investment in clean energy, however, this laudable target would have never been met. One caveat: these readings were based off the California Independent System Operator (CISO). This nonprofit oversees the operation of the state's bulk electric power system, and manages about 80 percent of California's electric flow. So there's 20 percent of the electricity demand not accounted for here.

However, plenty of the population have stuck photovoltaic panels on their roofs, and the electricity generated in this manner was not taken into consideration here, so the final figure is lower than the actual value. In any case, this is a wonderful and substantial record to have broken, and it fits perfectly in line with the history of the state. These certainly help. Patrick Jennings/Shutterstock  
By law, California requires utilities to get a third of their electricity from renewable sources by 2020, a figure that rises to 50 percent by 2030. They're already close to meeting their goal – in 2016, California's key electric utilities managed to eke 32.3 percent of their energy from wind, solar, and hydro sources.

Back in the 1970s, before global warming and climate change were really in the zeitgeist, the oil crisis led to people worrying that fossil fuels wouldn't be enough to power the state. Both federal and state tax credits allowed California to develop fledgling solar and wind industries. Over time, renewable energy commissions were given more influence over state policy, and ever since, California has become a national leader in clean energy. Now, with climate change on everyone's minds, reducing the carbon footprint of the state has become a top priority. A CISO spokesperson said that, in particular, solar power records are falling like dominos. It helps that Jerry Brown, the Democratic Governor of California, is decidedly pro-clean energy and pro-science. He's also a fierce critic of the Trump administration's attempt to muzzle researchers and defund clean energy research. California has a population of 39.1 million people, more than many countries. If one US state can become clean, then the rest of the world definitely can. We're looking at you, Paris.



## **Water:**

(When there's too much, ya gotta let some of it go!)

### **Open dams, water levels and worries rise in Delta**

By Karaline Ann | May 25, 2017, nbc11news.com

CIMARRON, Colo. (KKCO) -- The spill gates of the Morrow Point Dam just east of Montrose are open and letting out massive amounts of water. It's a beautiful sight to see, but the problem now is it's causing some flooding concerns for people who live near the Gunnison River. "I think it's a beautiful thing," said Louise Bell, a Montrose resident who went to look at the dam. It's all based on snowpack. Every couple of years the Bureau of Reclamation opens up the dams to



Morrow Point Dam

clean out the rivers and make them healthier for the species living in them. "We usually come down and take a look at it," said Bell. While it's good for species, it could also be a threat for the small community of Delta.

"We've seen this area, right here where we are standing, under water," said Glen and Mary Robinson, who have been coming to Delta for years. Both the Crystal Dam and Morrow Point Dam have their spillway gates open, clearing out snowpack water. "It's a necessary part of nature that happens every single year it's good for that ecosystem and the cycle every year," said Ambre Lopez, a Delta resident. Despite the positive impacts for animals in our river, the water is causing the Gunnison River to rise at Delta. "We've seen it go over that bridge," said Glen Robinson. "You kind of feel helpless, water is very powerful." The Bureau of Reclamation monitors the gage outputs and how fast the river is moving. "River runs pretty high, they keep a real close watch," said James Horn, a Delta resident. The bureau said because they monitor, there is no need to worry about flooding. The only spots to look out for are low level flooding, which happens in spots closest to the river. Still, for folks in Delta, better to be safe than sorry. "You don't want to play around rivers, creeks that are flowing really high, things like that. Just kind of avoid that danger," said Lopez. Right now water levels are at their peak, so they won't go up any higher, they may go down a little bit over the next couple of days. The dam will be shut on Sunday.

(When there's lots of water.)

### **Good water year spells challenges, fun for reservoir managers**

By Amy Joi O'Donoghue | Posted May 26th, 2017, ksl.com

EAST CANYON DAM, Morgan County, Utah — Multiple times a day and into the evening hours, Chris Hogge is monitoring stream flows, checking the runoff forecast, the weather and the capacity at East Canyon Dam and a half dozen other reservoirs in northern Utah. He doesn't grind antacid tablets or complain of an ulcer. Instead, there's a bit of a sparkle in his eye. "I enjoy it. It gives you something to do at night."



Hogge is the manager of power and irrigation for the Weber Basin Water Conservancy District and on Friday morning, battling a brisk wind and a smattering of raindrops, he stood on the crest of the 260 feet high dam at East Canyon Reservoir. Like his colleagues from the U.S. Bureau of Reclamation and the general manager of the Davis/Weber Canal Co., Hogge marveled at the spectacular torrent of water that gushed over the spillway into East Canyon Creek below. "In the last five years, nobody cared about flood control because there was no flood to control," Hogge said, recalling Utah's prolonged drought marked by below average snowpack. The last time any of these water aficionados saw East Canyon Dam's spillway do what it's built for — relieve the swelling reservoir with surges of water — was in 2011. That year, however, brought too much of a good thing, all at once. While the spillway was spitting out 110 cubic feet per second of water on Friday — at peak — in 2011 it hit around 300 cubic feet per second. "The safe channel capacity (at East Canyon Creek) is 250 cubic feet per second," Hogge said. "At 300 cubic feet per second, it was more than we wanted." Right now, East Canyon is at its brim. Its inflow from the creek is 300 cubic feet per second. "Obviously, there's no space available," Hogge said, adding that he believes East Canyon Creek, which feeds the reservoir, reached its peak a couple of weeks ago.

Much of his work is based on technology, measuring and modeling — scientific predictors of how streams will behave in the coming weeks. But Hogge said there's also other tools he relies on. "There is a lot of guess-work and listening to the old-timers who've been around." There's a snow formation, as an example, on the mountains in Morgan Valley that resembles a dove. Hogge said those old-timers will tell him when the dove is gone, that means the peak flow of rivers and streams has come and gone. Hogge admits he will look to see if that dove is still there, but he is also relying on a whole host of numbers to guide his decisions. Earlier this year, those numbers were critical at Pineview, farther to the north. That reservoir, which is 94 percent full — has already released enough water this season to fill it 1 1/2 times so it can handle the coming runoff. Its capacity is 110,149 acre-feet of water. "We could have filled it in March, but if you fill it too soon, you are at the mercy of nature's runoff," Hogge said. "That is why it's so important to save some space in the reservoirs so you can absorb the peak of runoff." At the same time, Hogge said the idea is not to release too much water because the goal is to get the reservoirs to fill so there is a cushion of water in years that are dry.

Gary Henrie, a civil engineer with the U.S. Bureau of Reclamation, said it is a tricky business of keeping enough water for storage and not releasing too much that it will flood. "You have a dam in place and you think you can control the river and you have this much space, but then Mother Nature throws you a curve ball," he said. Henrie and his colleagues at the bureau — which is the nation's largest wholesale water supplier — oversee 48 dams in Utah. Henrie, who also specializes in hydrology, said the bureau acts as a "middle man" between districts like Weber Basin and the Army Corps of Engineers, which requires operational plans in place for flood control. Like Hogge, he said flood control is something they haven't had to think about in a few years.

"In wet years like this, you're making sure there's enough space in the reservoirs. For the last five years, which were dry, it is catch everything you can, catch everything you can and hold onto it. Now, we go to all of a sudden 200 percent snowpack in some places. Your mentality needs to shift

and that takes a little time." While the lower and mid-elevation snow has melted, the high mountain snowpack has yet to come down — and everyone is holding their breath that it behaves and melts in an orderly fashion. "We not out of the woods yet, but we're in a great place," Hogge said. Hyrum, Pineview, Jordanelle, Rockport and Echo reservoirs have room to take on more water, as does Strawberry and Starvation in the Uinta Drainage Basin. About every other reservoir is to the brim, such as Causey, Willard Bay and East Canyon. Rachel Musil, a civil engineer with the bureau, said the chilly Friday in the mountains southeast of Morgan provided some respite for water managers who didn't have to worry about more snow melt coming their way. "It's such a moving target," she said. "This calms things down."



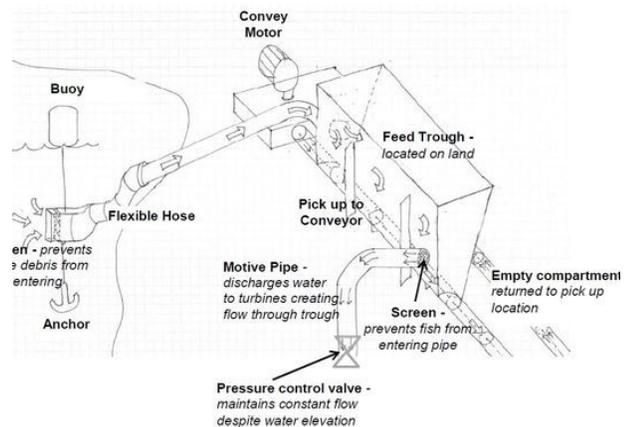
## **Environment:**

(Making a big jump easier.)

### **Prizes awarded for Shasta Dam fish passage proposals**

By Damon Arthur , Record Searchlight, May 25, 2017 | .redding.com

"Four or five Friday nights" of work has paid off for Briana Conners, who recently won \$10,000 for her winning entry in a contest seeking proposals to get fish past tall dams like Shasta Dam. The Cincinnati woman was one of four people who won prize money for submitting proposals. While the U.S. Bureau of Reclamation sponsored the contest to solicit ideas for getting fish around tall dams, the agency is specifically interested in finding ways to get young endangered salmon around Shasta Dam.



More: Study sheds new light on solving salmon puzzle Conners said when she submitted her 12-page proposal, she wasn't aware of the project to reintroduce winter-run chinook salmon to the McCloud River, which will entail getting the fish past Shasta Dam.

The 24-year-old chemical engineer said she got the idea to enter the contest while reading a book titled "Imagine," which mentioned the Innocentive website where the contest was advertised. "I just figured I would give it a shot," she said. She said she worked several Friday nights developing her idea. Her proposal includes attracting the fish to a "drag conveyor system" in the water using a skimmer-type device that would be connected to hoses attached a 5-inch diameter tube.

This illustration shows the type of tubular conveyor that would be used to get fish past tall dams like Shasta Dam. Briana Conners included the illustration in a proposal to get fish past tall dams. She won \$10,000 for her proposal. (Photo: Briana Conners) The fish would be trapped between discs spaced several inches apart inside the tube. The discs would be attached to a cable and pulled through the tube, taking the salmon past the dam to a point where they could be released, according to Conners' proposal. She said in the proposal the conveyor system could be built for less than \$1 million. A total of \$20,000 in prize money was awarded to Conners and three others. Ted Grygar of San Diego came in second place and received \$4,000; Joseph Rizzi of Benicia came in third and received \$3,500; and Kenneth Smith of Colfax, Wisconsin, came in fourth and garnered \$2,500.

The bureau received 59 ideas, and plans to further test, develop and demonstrate the four ideas selected, officials said. The bureau went looking for ideas to get fish around dams because it wants to reintroduce winter-run salmon to the McCloud and Sacramento rivers upstream of Lake Shasta. The winter run once spawned in the upper reaches of those two rivers until Shasta and Keswick dams were built, blocking the route. The winter-run now mainly spawn in the Sacramento River in the Redding area, but because their numbers have dwindled, federal and state fisheries agencies are interested in developing more spawning areas for the fish.

The agency plans to conduct a pilot project to see whether it can get the salmon to live in the McCloud, but that is still about two years away from happening, said Russell Grimes, a bureau spokesman. The agency is preparing an extensive report that would analyze the environmental impacts of the pilot project, he said. The ideas developed by Conners and others could be used to get young salmon hatched in the McCloud past Shasta and Keswick dams and into the Sacramento River. From there they would swim on their own to migrate out to the sea. The salmon typically live three years in the ocean and then swim back upstream to where they are hatched. The bureau has traps at Keswick Dam to take returning salmon out of the water to haul them by truck past the lake to the McCloud River.

(If they ain't doing anything, take 'em out.)

### **New Jersey dam removals improve fisheries**

By Bruce Edward Litton, Correspondent, May 26, 2017, mycentraljersey.com

Four New Jersey rivers in our region — the Musconetcong, Raritan, Lamington and Millstone — have had or will have dams removed. Improved access for migratory fish, including Atlantic shad, striped bass, river herring and American eels, is the chief concern. Some of these species now swim these rivers. Trout and smallmouth bass habitat also improved significantly. Seven Musconetcong River dams have been demolished, including the 12-foot Hughesville Dam. Sally Jewel, secretary of the interior during the Obama Administration, visited the site of the \$1.5 million Hughesville Dam demolition in September 2016.



Citing dam removal from a national perspective, Musconetcong Watershed Executive Director Alan Hunt said: "From my understanding of the Department of the Interior, they understand it's part of their mission to promote dam removals especially for migratory fish." New Jersey has seen quick results. "We're seeing striped bass caught all the way up to the Hughesville Dam," according to Brian Cowden, co-owner of Trout Scapes River Restoration LLC. "Now they can continue all the way up to the big dam in the Musky Gorge." Cowden refers to the 35-foot Warren Glen Dam. This spring, anglers fishing the Delaware and Raritan rivers are enjoying banner shad catches. Jim Waltman, Stony Brook-Millstone Watershed director, puts the scene in a larger frame. "What we know about shad is they're opportunistic," he said. "They should come up this river, and they're coming up this river." Reports of shad catches at Millstone River's Weston Mill Dam foresee catches upriver to Carnegie Lake in Princeton after eventual removal of Blackwells Mills Dam and improvement of the Raritan River's Island Farm Weir for fish passage, according to Waltman.

Currently, legal-size stripers get caught in the Raritan River during high water, but for now, the Burnt Mills removal by Trout Scapes in conjunction with other agencies will improve the Lamington for local species. "There'll be a bunch of new pools. It's going to significantly improve fishing for stocked trout and smallmouth bass," Cowden said. The Musconetcong River features the finest trout habitat of the four improved rivers. According to Cowden, "Hughesville Dam is not as important as what it sets up. The removal of the 35-foot Warren Glen Dam will open up the beautiful Musconetcong Gorge. That demo allows the Bloomsbury Dam above it to be removed, as well. "Lower water temperatures, proper sediment transportation through all these regions where the dams have been will allow much better macroinvertebrate habitat. It will give opportunity for our

wild browns and our native brook trout in the tributaries spawning to move up and down the main stem, which strengthens genetics. Dams can interrupt that process by isolating populations." **New Jersey, the most densely populated state, may be the nation's bellwether for dam removal fishery improvements.** "If we can do it in New Jersey, we can do it anywhere," said Hunt. "These dams are affecting the entire food chain."



### **Other Stuff:**

(None of that coastline looks too stable.)

### **New California Mudslide Is Enormous**

**Part of Highway 1 in Big Sur is buried under 40 feet of rock, dirt**

By Newser Editors and Wire Services, May 24, 2017, newser.com

(NEWSER) – **A massive landslide is the latest natural disaster to hit California's Big Sur, which relies heavily on an iconic coastal highway and tourism. Plus, it adds to a record \$1 billion in highway damage from one of the state's wettest winters in decades.** The weekend slide in Big Sur buried a portion of Highway 1 under a 40-foot layer of rock and dirt and changed the coastline to include what now looks like a rounded skirt hem, says Susana Cruz, a rep with the state Department of Transportation. More than 1 million tons of rock and dirt tumbled down a saturated slope in an area called Mud Creek, covering a quarter-mile stretch of Highway 1, reports the AP. Authorities have no estimate on when it might re-open. "We haven't been able to go up there and assess. It's still moving," Cruz said. It's the largest mudslide she knows of in the state's history. "It's one of a kind."



**One of California's rainiest and snowiest winters on record has broken a five-year drought, but also caused flooding and landslides and sped up coastal erosion.** "This type of thing may become more frequent, but Big Sur has its own unique geology," says a district director for the California Coastal Commission. "A lot of Big Sur is moving; you just don't see it." This winter has been particularly rough for Big Sur. **Repeated landslides and floods have taken out bridges and highways, closed campgrounds, and forced resorts to shut down temporarily.** Even before the weekend damage, the state had closed the Highway 1 along Mud Creek to repair buckled pavement and remove debris after an earlier slide. **Authorities removed work crews from the area last week after realizing that saturated soil was increasingly unstable.**

(For beach lovers.)

### **Welcome to the Best Beach in America**

**Florida's Siesta Beach is Dr. Beach's fav**

By Newser Editors and Wire Services, May 25, 2017, newser.com

(NEWSER) – Just in time for summer, Dr. Beach—aka Florida International University professor Stephen Leatherman—is out with his ranking of the best beaches in the country. Leatherman has been rating beaches since 1991 and takes his job pretty seriously, examining 50 different factors, from sand and waves to parking, reports the AP. **His favorite beaches of 2017:**

1. Siesta Beach (Siesta Key, Fla.)
2. Kapalua Bay Beach (Maui, Hawaii)
3. Ocracoke Beach (Outer Banks, NC)



Siesta Key beach

4. Grayton Beach State Park (Florida Panhandle)
5. Coopers Beach (Southampton, NY)
6. Coast Guard Beach (Cape Cod, Mass.)
7. Caladesi Island State Park (Dunedin-Clearwater, Fla.)
8. Hapuna Beach State Park (Big Island, Hawaii)
9. Coronado Beach (San Diego, Calif.)
10. Beachwalker Park (Kiawah Island, SC)

(People everywhere.)

## 10 Fastest-Growing Cities in US

### Half of them are in Texas

By Evann Gastaldo, Newser Staff, May 25, 2017, newser.com

(NEWSER) – Four of the top five fastest-growing US cities with populations of 50,000 or more are in Texas, according to US Census Bureau estimates released Thursday. And of the top 15, 10 are in the South, the AP reports. The top 10:

1. Conroe, Texas: 7.8% increase from 2015 to 2016
2. Frisco, Texas: 6.2%
3. McKinney, Texas: 5.9%
4. Greenville, SC: 5.8%
5. Georgetown, Texas: 5.5%
6. Bend, Ore.: 4.9%
7. Buckeye, Ariz.: 4.8%
8. Bonita Springs, Fla.: 4.8%
9. New Braunfels, Texas: 4.7%
10. Murfreesboro, Tenn.: 4.7%



People dressed in green in Canoe, TX

Since the 2010 Census, large cities in the South grew, on average, 9.4%. In the West, that rate was 7.3%; in the Midwest, 3%; and in the Northeast, just 1.8%. No cities in the Northeast made the top 15. The entire list here: <https://www.census.gov/newsroom/press-releases/2017/cb17-81-population-estimates-subcounty.html>



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