River Crossings

Volume 21 **October/November/December 2012** **Number 4**

Chairman's Comments

It seems like just yesterday that we were all a buzz about the great floods and extremely high water; now we are contending with drought and low water. Many years ago as a new biologist I heard about average and normal conditions of the river. Now with a little more perspective, the river is never the same and average is a condition that rarely exists. The extremes of the hydrograph are difficult to explain to the public. We need to continue to educate publics about how diverse riverine habitats help mitigate some of the impacts of hydrographic variability.

The deadline to apply for the Young Professionals Travel Stipend is January 15, 2013. MICRA has again providing funds to help a deserving individual who has recently begun their professional career to attend a professional meeting or conference that they would not otherwise be able to attend. Visit www.MICRArivers.org for more information.

A MICRA delegation will again participate in National Invasive Species Awareness Week (NISAW) March 3-8, 2013, in Washington, DC. MICRA will take this opportunity to raise awareness of interjurisdictional fishery issues that challenge the basin. This year MICRA is co-hosting a social at the National Aquarium highlighting 'Invasives on the Menu' and is planning a Congressional briefing highlighting the Asian carp issue. As we firm up the itinerary for Hill visits, I will again request states and partners to conduct local efforts during NISAW to raise awareness about AIS in the basin, including local visits to their delegation.

Asian Carp Issues

Silver carp environmental DNA (eDNA) was detected in three of 350 water samples collected this summer from western Lake Erie's Maumee Bay and Maumee River. Additionally, 20 of 150 water samples collected from Sandusky Bay tested positive for silver carp eDNA, The sampling was conducted jointly by officials of the Ohio Department of Natural Resources (ODNR), Michigan Department of Natural Resources (MDNR), U.S. Fish and Wildlife Service (FWS) and U.S. Army Corps of Engineers (Corps).

Barrel full of juvenile Asian carp collected by a fisherman with a cast net from a lower Mississippi River tributary.

The extensive sampling effort was prompted by the discovery of Asian carp eDNA in water samples taken from Maumee and Sandusky Bays in summer 2011. The multi-agency effort included intensive electrofishing and test netting in the Maumee Bay and River and the Sandusky Bay and River in August 2012, during which time no Asian carp were found. "Our field crews were out on the water numerous times over the last couple of months, using multiple gear types and they found no live Asian carp," said FWS Midwest Deputy Regional Director Charlie Wooley. "We are still trying to pull back the curtain on what the source is for these positive eDNA samples."

Researchers say eDNA analysis provides a tool for the early detection of Asian carp at low densities, and these latest positive results heighten concern about the presence of

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Asian carp in western Lake Erie. However at present, eDNA evidence cannot verify whether the DNA may have come from a live or dead fish, or from other sources such as bilge water, storm sewers or fish-eating birds. The FWS, Corps and the U.S. Geological Survey are leading a two-year *Asian Carp Environmental DNA Calibration Study* (ECALS), funded through the *Great Lakes Restoration Initiative* to reduce the uncertainty surrounding Asian carp eDNA results.

Meanwhile, anglers are strongly encouraged to learn how to identify Asian carp, including both adults and juveniles, as the spread of juvenile Asian carp through the use of live bait buckets has been identified as a possible entry point into uninfested waters. A video teaching people how to identify bighead and silver carp is available on the FWS's YouTube channel at: http://youtu.be/B49OWrCRs38.

Meanwhile, more than a dozen Illinois organizations, in late October, announced the formation of a new coalition committed to stopping the two-way transfer of invasive species between the Great Lakes and the Mississippi River basins. "Stopping Asian carp and other invasive species is an economic and ecological imperative," said Robert Hirschfeld of *Prairie Rivers Network*, a founding member of the new *Healthy Water Solutions* (HWS) coalition. "But it is also just one piece of a greater plan for improved water quality, flood control, recreation and transportation in Illinois."

"HWS exists to complement the work of federal and state agencies, while recognizing the importance of local action to help move issues like invasive species forward when they are stalled by outside forces," said Jared Teutsch of the *Alliance for the Great Lakes*, a HWS coalition member. "We encourage the state of Illinois, the city of Chicago and other governmental groups to work with the rest of the region to fashion a modern solution to the growing problems of invasive species and decaying water infrastructure."

The new coalition will also advocate for reinvestment in the Chicago River system, a critical piece of infrastructure that affects the waters of the entire state. "The Chicago River system can be so much more than a conduit for our wastewater," said Jack Darin, director of the *Sierra Club's Illinois Chapter*. "The threat posed by the Asian carp and other aquatic invaders is also an opportunity to restore the Chicago River and make it a clean, healthy resource that attracts wildlife, people and economic development."

Though Asian carp are the public face of invasive species, they are among 39 species labeled by the Corps as "high-risk" to transfer between the Great Lakes and Mississippi River basins and inflict significant damage to new habitat. "We know the carp are just a symptom of the much larger problem of invasive species, some of which are relatively benign but, over time, do very serious damage by slowly eliminating natives," said Tom Lindblade, president and safety chairman of the *Illinois Paddling Council*. "The Asian carp have brought needed attention to this problem."

"Chicago and the rest of the region will not thrive until we address its failing water infrastructure," said Henry Henderson, director of the *Natural Resources Defense Council's Midwest Program* and a former commissioner of the environment for the city of Chicago. "Re-imagining Chicago's waterways is at the core of the vision that the HWS coalition will bring to help move us all toward a modern system that enhances our environment, economy, and quality of life," he said.

HWS plans to work with the region's leaders on a plan for separation of the two basins that satisfies public needs without severing Chicago's vital connection to the lake. Supporters can sign up as members on the HWS website at: www.healthywatersolutions.org.

Source: *Michigan DNR, Ohio DNR and USFWS Joint News Release*, 9/25/12; and *Prairie Rivers Network News Release*, October 31, 2012

Canadian Caught Smuggling Snakeheads into the U.S.

A Canadian pet dealer was sentenced to 60 days in jail and fined more than $20,000 after pleading guilty to smuggling invasive snakeheads and endangered species into the U.S. Muk Leung "Jim" Ip, of Scarborough, Ontario, sold protected axolotl salamanders, endangered arowanas (a fish) and highly invasive snakeheads to an undercover U.S.

River Crossings

Published by

Mississippi Interstate Cooperative Resource Association
(MICRA)
9053 Route 148, Suite A
Marion, IL 62959

River Crossings is a mechanism for communication, information transfer, and coordination between agencies, groups and persons responsible for and/or interested in preserving and protecting the aquatic resources of the Mississippi River Drainage Basin through improved communication and management. Information provided by the newsletter, or opinions expressed in it by contributing authors are provided in the spirit of "open communication", and do not necessarily reflect the position of MICRA or any of its member States or Entities. Any comments related to "River Crossings" should be directed to the MICRA Chairman.

Fish and Wildlife Service agent, according to New York Attorney General Eric Schneiderman (D). He did so knowing the fish and salamanders would be transported to New York, according to the attorney general's complaint.

Ip pleaded guilty to a misdemeanor count of illegal commercialization of fish and wildlife in New York's Erie County Court. He also pleaded guilty in U.S. District Court to violating the Lacey Act for transporting snakeheads from Canada into the U.S and in Canadian courts for violating two Canadian wildlife conservation and trade laws. The snakehead, a fish from Asia and Africa that can grow up to 3 feet long, is a voracious predator that can harm native fish. It is illegal to possess, sell or transport them in many states, including New York, and across state lines.

Snakehead captured in the wild in Wisconsin in 2004.

Advocates applauded the effort to crack down on invasive species imports that pose a serious threat to the ecosystem. "The Great Lakes are relied upon for fishing, shipping and recreation and invasive species pose a serious threat to our economic and environmental health," Rep. Louise Slaughter (D/NY) said in a statement. Wild axolotl salamanders are almost extinct in their home range in Mexico but are widely used in scientific research because of their ability to regenerate limbs. Arowanas are protected in their home range in Southeast Asia. A permit is required to import them into the U. S. under the Endangered Species Act and international treaties.

Source: Laura Petersen, *Greenwire*, 11/14/12

Invasive Risk of New Biofuel Feedstocks

More than 200 scientists in late October urged federal officials to take caution in approving new biofuel feedstocks, warning of past situations where potentially invasive plants were introduced with good intentions only to cause widespread destruction later. Giant reed and napiergrass, two species of grass that U.S. EPA is considering, have many of the same traits as potentially invasive plants, the scientists warned. They recalled the introduction of kudzu, which after its introduction quickly blanketed the South, choking out native species.

"Many of today's most problematic invasive plants – from kudzu to purple loosestrife – were intentionally imported and released into the environment for horticultural, agricultural, conservation, and forestry purposes," the 208 scientists wrote in a letter. "These invasive species already cost billions of dollars a year in the United States and are one of the primary threats to North America's native species and ecosystems." The letter was sent to EPA Administrator Lisa Jackson and the heads of the Agriculture, Energy, Defense and Transportation departments. The scientists are from the fields of ecology, wildlife biology, forestry, and natural resources.

EPA is expected to soon make a decision on the two grasses, along with energy cane and camelina. The approval of the feedstocks would allow them to be included in the renewable fuel standard, meaning refiners that blend biofuels made from them would be able to receive credits toward their annual obligations. The agency issued a direct final rule early this year approving all four of the feedstocks but withdrew it after receiving a critical comment from environmental groups. The agency is now going through the regular order with the rule. In originally approving the grasses, EPA said it took into account the life cycle emissions reductions from using the grasses and found they met the 60 percent reduction threshold compared to petroleum-based fuel. In their comments, the environmental groups warned of invasive risks associated with the feedstocks.

Giant reed, otherwise known as *Arundo donax*, is considered a noxious weed in TX, CA, CO, and NV, according to a letter sent in early October to the Office of Management and Budget by environmental groups. It is also considered either invasive or a serious risk in NM, AL, and SC. USDA in June concluded that *Arundo donax* was a high-risk species and called it a "highly invasive grass" and a "serious environmental weed." It's fast-growing and drought-tolerant, producing tons of biomass per acre. It thrives even in poor soil, can grow to heights of 30 ft. in one season, and is a self-propagating perennial, so it requires little investment once established. Believed to have sprung from the Indian subcontinent, *Arundo* has spread around the globe. And to people in the renewable fuels industry, the giant reed is nothing short of a miracle plant.

But in the 16 years since *Arundo* was first identified in California's Sonoma Creek Watershed it has become a major problem, and Mark Newhouser has had to develop his own attack strategy. First, he has workers spray the mature cane with herbicide, then they move in with the large flail mowers. If that doesn't do the trick, he says it's time for the chain saws. "And then you'd still have all of these stumps of cane sticking up everywhere," he says. "You can't even walk through there." The costs to eradicate the giant reed can be as high as $25,000 an acre.

Like kudzu, *Arundo* was once touted as a perfect crop to help stem erosion. In CA and TX, farmers, ranchers and government workers enthusiastically planted it along waterways and drainage ditches. Shallow rooted, the canes would break off and move downstream, starting new stands. *Arundo* has become "naturalized" in 25 warmer-weather states, according to a USDA weed risk analysis released in June. In banning it, CA, NV, and TX have said the plant crowds out native species and consumes precious water. The *Tennessee Exotic Pest Plant Council* lists it as a "Significant Threat." Virginia officials have labeled it "moderately invasive." California has spent more than $70 million trying to eradicate it.

Napiergrass, also known as elephant grass, is considered a serious risk in Florida, where it has been found in almost all of the state's 30 counties, according to the University of Florida.

In their letter, the 208 scientists said the grasses exhibit many of the qualities associated with invasive species, including rapid growth, pest resistance and low input requirements. They urged EPA to take into account an executive order signed by former President Clinton that prohibits federal agencies from taking any actions to promote the spread of invasive species unless the agency has determined the benefits "clearly outweigh" the costs. "It is much cheaper and easier to take the steps to prevent an invasive escape than it is to deal with it after it has

occurred," the scientists wrote.

As for kudzu, it is native to Asia and was introduced to the U.S. at the *Philadelphia Centennial Exposition* in 1876. In the 1930s, the U.S. Soil Conservation Service began encouraging use of the vine as a means of controlling erosion. Since then it has grown aggressively in the South, known for smothering everything in its path – from other plants to fences and buildings. Experts said an infestation can be controlled by cutting the vine down or allowing animals to graze on it. But killing it for good requires chemicals.

Kudzu infestation, USDA Forest Service, Kelly Britton Photo

Kudzu now appears to be moving north, with patches showing up in Ohio counties, officials said. And some of it has even been found as far north as Canada. But the appearance of kudzu doesn't mean that Ohio organisms will soon be choked out by the invasive plant. The northern climate may not be warm enough to give the vine time to flower and produce the fruit that would allow it to spread, researchers said. But researchers also said that could change as the climate warms. "With global climate change, it could be a problem," said James Bissell, a curator of botany at the *Cleveland Museum of Natural History* who tracks the distribution of plants in Ohio. "I expect it will be a problem," he said.

Sources: Mary Beth Breckenridge, *Akron Beacon Journal*, 1015/12; Allen G. Breed, *AP/NBC News*, 11/17/12; Amanda Peterka, *Greenwire*, 10/23/12; and *Greenwire*, 10/18 and 11/19/12

Supreme Court Considering Major Takings Case in AR

The Arkansas Game and Fish Commission (AGFC) recently rejected a $13 million offer from the Obama administration to settle a dispute over timber damage at the Black River Wildlife Management Area (BRWMA). So the case is now being argued before the U.S. Supreme Court. AGFC officials claim that the agency is due compensation under the takings clause of the Fifth Amendment for damage caused to timber in the BRWMA in the northeast part of the state. The damage was caused by the U.S. Army, Corps of Engineers' (Corps) management of the Black River's Clearwater Dam which lies 115 miles upstream in Missouri.

A management decision in the early 1990s to change water management at the Clearwater Dam led to parts of the 23,000-acre BRWMA being radically degraded, the state maintains. Partly in response to requests made by Missouri farmers, the Corps started to release excess water in a steady flow rather than in pulses as it had before. The farmers preferred a lower release rate because it reduces the height of water leaving the dam giving them a longer time frame to harvest their crops. But that also increases the period of time when water is released meaning that the forest floor at the BRWMA would be submerged for extended periods, much longer than usual. Beginning in 1993 and continuing through 2000, this extended flooding season proved devastating for many of the mature oaks, explained Martin Blaney, habitat coordinator for the AGFC.

As soon as the Corps started to talk about changing its management of the dam's water flow – deviating from a plan that the state said had been in place since 1953 – alarm bells sounded in Little Rock. The state maintains that the longer-lasting flooding during the growing season led to the weakening of tree roots. That eventually led to some of the trees dying. By 1996, the state was already telling the Corps to stop deviating from the plan. The Corps eventually did so in 2001 after completing an environmental review. "The word was getting back to them," James Goodhart, AGFC Chief Legal Council said. "It came to a stop because we hammered home the message." But by then, as the state tells it, the damage had been done, exacerbated by a drought in 1999 and 2000. As Blaney explained what had happened, he repeatedly lamented the fact that the state had lost control of its own land. "It's devastating what we lost here," he said.

But the federal government says other factors need to be taken into account before all the blame can be pinned on the Corps. In the administration's most recent brief, Solicitor General Donald Verrilli pointed out that during the growing season, the land in question was usually flooded "a dozen or so days a month" even before the Corps deviated from the water flow plan. The resulting changes "increased that flooding by a few days per month" at most, he added.

After trying to resolve its property damage claims outside of court, the AGFC sued the Corps in 2005. Then in 2009, the U.S. Court of Federal Claims awarded the commission $5.8 million. But then the U.S. Court of Appeals for the Federal Circuit, reversed the claims court decision in a March 2011 ruling. Writing for the majority, Judge Timothy Dyk said that under Supreme Court precedent, a taking only occurs if there is "an actual, permanent invasion of the land," which did not happen in this instance because the flooding was temporary. "The undisputed facts are clear that the governmental action was designed to be temporary and that the Corps never approved of a permanent change in the pre-existing flow rates," Dyke added.

The federal government then attempted to resolve the dispute by offering the AGFC the $13 million mentioned earlier. That number was reached after negotiations between the two parties. In a statement, a spokesman said AGFC commissioners voted 4-3 to reject the offer at a meeting on August 16 on the grounds that the Corps refused to give a written assurance that it would not order similar changes to the management of the water flow in the future. Goodhart, said the commission had made its decision in order to "protect the valuable natural resources of the state of Arkansas." A spokesman for the Justice Department declined to comment.

So this past April the Supreme Court decided to hear the case, and that hearing began this fall. The Court's job is to decide whether temporary flooding of the type that occurred at the BRWMA constitutes a "taking," which is generally viewed as a permanent loss of property. Although permanent government-caused flooding has been recognized as a taking by courts, temporary flooding has not. In those instances, property owners are encouraged to sue the government entity and seek damages – a tough task, as the federal government is generally immune from such claims under the Flood Control Act. In court papers, the Obama Administration maintains that any additional flooding was not sufficient to harm the trees and any damage that was done did "not rise to the level of a taking." But the state has the support of property rights advocates and some business interests.

The case could have implications beyond the narrow question of Corps-directed water discharges. Those keen for the Supreme Court

to become more active in the property rights area, like Jonathan Adler, a law professor at Case Western Reserve University School of Law, certainly hope so. "We don't see many property rights cases," he said. "The language of the opinion will really matter." Others are wary of the Supreme Court expanding the definition of what constitutes a taking. John Echeverria, a professor at Vermont Law School, is concerned that any kind of ruling in favor of Arkansas could have "enormous implications" for local governments. Although the federal government is the defendant in the case before the court, local governments are far more likely to be on the receiving end of such claims if the Supreme Court endorses the practice, Echeverria wrote in a brief in support of the Corps filed by the *International Municipal Lawyers Association* and other local government groups. In an interview, Echeverria said property rights advocates would be keen for a broad ruling on "temporary takings" that could prompt challenges to such activities as government inspections of property. "This is one front of a multifaceted debate over property rights," he added. "The property rights advocates see it as an opportunity to expand the doctrine."

During initial arguments in early October, a majority of the Supreme Court justices appeared sympathetic to the AGFC's argument, and appeared hostile to the federal government's position that no landowners downstream of a government-operated dam can seek compensation in part because they should be aware of the inherent risks of owning land on a floodplain. The federal government would not "have got into the flood control business" if it was going to face litigation over its management of projects, Deputy Solicitor General Edwin Kneedler said.

As alluded to above, where the court may face difficulty is in determining in what kind of cases compensation may be allowed for flooding. Justice Sonia Sotomayor noted that the area in question is already subject to regular, natural flooding. Some of the justices appeared particularly concerned with Kneedler's contention that landowners downstream could never make a claim even though a property owner with land next to a dam reservoir could potentially seek compensation if the water regularly floods his property. "Your position seems to be if it's downstream, it's not the government," Justice Anthony Kennedy told Kneedler. Chief Justice John Roberts seemed to share that concern in pointing out evidence in the record that the Corps was aware that the BRWMA would be flooded if there were deviations in the water release plan. "When you opened up the dam, you knew where it was going to go," he said in reference to the commission's land.

James Goodhart, the AGFC attorney insisted that the government should have to pay for a "direct invasion" of property. "They knew they were using the land to store this water," he said. "They knew."

Source: *WATER LOG* 32:3, 8/10/12; and Lawrence Hurley, *Greenwire*, 9/5, 9/26, and 10/3/12

Recreation vs Barge Traffic

Perry, Tuttle Creek, and Milford reservoirs in Kansas were nearly drained this summer by the U.S. Army Corps of Engineers (Corps) purportedly to provide water for commercial navigation on the Missouri River. Marinas were closed, boat ramps were left high and dry and many recreationists abandoned the lakes for other locations. Marina owners John and Kathy O'Malley feel like their business was sacrificed to save another. "I've seen Tuttle Creek go up and down," Kathy O'Malley said, "but I've never seen anything like this. We're worried. We're really worried."

Indeed, businesses that rely on the three eastern Kansas reservoirs are collapsing. But what riles folks around the lakes as much as the loss of business is that the water was taken to support commercial barge traffic that barely survives on the Missouri River. "They have taken down our (lake levels) 3 foot, maybe 6 foot, for what we deem a limited benefit," said Tracy Streeter, Kansas Water Office director.

Only about 200 barges have trekked up the Missouri River to Kansas City this year, less than a tenth of what once navigated the channel. By comparison, some 40,000 barges float by St. Louis in most years on the Mississippi River. Some tow boat operators have already abandoned the Missouri. Yet the remaining few on the river say their industry isn't dead, and still hold out hope for rejuvenation. "Being able to have the option to ship on the Missouri River has made us competitive with the world market," said Steve Engemann, president of *Hermann Sand and Gravel*. "The Missouri River is a world highway."

Moving commodities by barge is one of the cheapest forms of transportation. More than 300 million tons are shipped on the Mississippi River, while barges on the Missouri River carry a fraction of a percent of that cargo, less than 200,000 tons, in 2010. At its peak in 1977, long-haul commercial tonnage on the Missouri reached 3.3 million tons. That cargo was worth $1.1 billion that year, but the value of what's being barged annually today hovers around $100 million.

Meanwhile, the drain on the Kansas lakes has an economic impact on more than a million tourists, representing millions of recreation dollars, who visit those reservoirs each year, state officials said. This year's releases from the lakes caught the attention of Gov. Sam Brownback (R) and Sen. Pat Roberts (R) who lobbied the Corps to stop the draining. The Corps agreed, Streeter said, but not before doing "all the damage they could do."

But even after the Corps quit draining the lakes for navigation interests, state officials closely watched the lakes' levels continue to drop – albeit more slowly – because the water that was left was being siphoned to preserve water quality for drinking supplies for towns along the Kansas River.

Corps officials say they were forced to lower the three lakes at least three feet in a few weeks in July to keep the Missouri River level high enough to support the barges. They say they had no choice. A Congressional mandate requires the Corps to release enough water to raise the river to support commercial barge traffic from April 1 to Dec. 1 – even if there are no barges on the river. Only Congress can change that mandate. "We don't have the option to decide not to do it one year or other years because of drought," said Jody Farhat, the Corps' chief water manager for the Missouri River.

The lakes that feed into the Kansas River are all part of the Missouri River Basin. That covers all or parts of nine states, including KS, MO, SD, ND, WY, and MT. Water could have been taken from four of the nation's largest reservoirs on the Missouri River – all well upstream from where the Kansas River feeds the channel with water from the state's depleted lakes. But the Corps' hands were tied there, too. That's because two bird species, the least tern and the piping plover, had built nests on sand bars just below Gavins Point Dam near Yankton, SD. That's 340 miles upstream from where the Kansas and Missouri meet between the two Kansas Cities' downtowns. The birds are federally protected endangered species. "If we would have increased the

(upstream Missouri) releases, we would have flooded the nests and taken the adults and the chicks," Farhat said.

For decades the Corps has spent millions annually lining the channel with rock to maintain a channel fit for barge traffic. The goal has been to essentially mold the river into a shipping canal to cheaply transport agricultural products, fertilizer, asphalt, concrete and other bulk goods. Barge navigation has also been touted as a way to provide competition to keep rail and trucking rates down. There was a time when barges traveled the Missouri River from St. Louis through Nebraska to Gavins Point Dam. No more. The few barges on the river usually travel only as far upstream as Kansas City because north of there, riverboat captains say, river instability and currents increase.

Critics of the Corps' river plan say the Missouri's swift current, and railroad competition – Kansas City is the second largest rail hub in the country – make it unlikely to ever support waterway shipping to any great degree. But the river still presents hope for a few barge companies, including *Magnolia Marine* headquartered in Mississippi. Over the last few years, *Magnolia* has been hauling fuel from Wood River, IL, to Kansas City, said Michael Carpenter, port captain. Another company, *Hermann Sand and Gravel*, is moving away from harvesting sand and gravel from the river bottom, and toward barge shipping.

John LaRandeau, navigation program support manager of the Corps' northwestern division, said the industry may not be navigating the Missouri as much as other waterways, but "the industry is still using the river." But the real point, said Farhat is "if Congress would decide they don't want navigation, they would change the law, and we would change" river management. Until that happens, Missouri River navigation is part of the Corps' mission, she said.

For years, the state of Kansas has been fighting the releases of water from its reservoirs during drought – at least 10 times since 1973 – to aid navigation on the Missouri River. In 2000, after the Corps dropped lake levels by three feet and planned to reduce them by another three feet, then-Attorney General Carla Stovall filed a petition for a restraining order in federal court. The state argued that the extra water would raise the Missouri River at Kansas City by only one inch. The Corps disputed that figure in court but said even a small increase would help barge traffic. The state won when the judge ordered the Corps to stop draining the lakes any further that year.

Two years later, with another drought at hand, the Corps lowered the lake levels six feet and disrupted boating on the lakes for a year. But in 2004, when state officials and Perry Lake residents complained, the Corps agreed to allow the lake level to rise 2.2 feet above normal – sort of a reverse rainy day – and use that water, if needed, for Missouri River navigation. But it could only be granted for one year at a time, officials said.

Gavins Point Dam and Reservoir, SD.

In 2006, in the last fight over water in Kansas, the Corps dropped lake levels three feet to support navigation because a drought in the northern states had severely reduced releases from those reservoirs.

A Corps study authorized by Congress a few years ago compared the economic impact on the lakes to the value of the barge industry, and was finding recreation around the reservoirs more valuable. Interestingly, the study's funding was pulled and the research was never finished. But according to state generated data, last year, about 1.5 million people visited the state parks at the three lakes. And tourism dollars in the counties where the lakes are located bring in hundreds of millions of dollars a year. The lakes are the chief draw, if not the only thing, in those counties. At Tuttle Creek, the reservoir is six to seven feet below normal pool. Boat slips and docks sit 15 feet below their normal spots. Boat ramps reach only to mud flats. Milford State Park shut down a number of boat ramps. A new houseboat dock, built over what's disappeared, has bent from sitting on rocks. A pump station can't handle sewage because there isn't enough water.

When the water gets low, the landscape on the lakes changes. Boats get mired in the muck. Weeds grow up around the shoreline. Boat ramps sit far out of reach of water. Speedboaters, skiers, fishermen and others move on to other lakes that can support their activities. "We've been raising hell about it for years," Gary Templeton, property manager for the *Perry Yacht Club*, said. "It's pretty devastating."

One has to wonder if these water releases didn't have as much to do with keeping navigation going on the lower Mississippi this year as they did on the Missouri. In late August it was reported that 97 vessels were stranded on the Mississippi River near Greenville, MS, after the Coast Guard closed an 11-mile stretch of the waterway to dredge and replace missing navigation buoys. This year's drought had brought the river level to its lowest point since 1988, when a similar drought also stalled traffic on the key waterway.

Farther north, near St. Louis, dredging operations aimed at keeping shipping lanes wide enough and deep enough for commercial barges stalled traffic for 12 hours at a time. For weeks, shippers were told to cut the amount of cargo loaded onto barges by 30 percent so the vessels will sit higher on the water and to limit the number of barges in tows, but vessels still ran aground.

Sources: Karen Dillon, *The Kansas City Star*, 9/29/12; Karl Plume, *Reuters*, 8/20/12; and *Greenwire*, 8/21/12

Missouri/Mississippi River Flow Issues

The U.S. Army Corps of Engineers (Corps) will proceed with plans to reduce the flow from an upper Missouri River reservoir despite concerns that it will worsen low-water problems on the Mississippi River, officials told the *Associated Press* in early November. The Corps expects to cut the flow from the Gavins Point Dam in SD to 12,000 cubic feet per second from 17,000 cubic feet per second starting around Nov. 23 as a drought-related conservation measure.

But Missouri Gov. Jay Nixon (D) and a barge industry trade group have implored the Corps to reconsider. The Missouri flows into the Mississippi north of St. Louis, and reduced flows from the Missouri would

lower water levels in the "middle" Mississippi between St. Louis, MO, and Cairo, IL, potentially halting barge traffic. Nixon said that could create an "economic disaster" for farming, fuel and other interests that use the river to ship goods.

Corps officials told the *AP* about their plans three days ahead of a scheduled new conference in St. Louis. They said efforts such as dredging, river structures, and rock removal aim to keep the Mississippi open for as long as possible. Corps spokeswoman Monique Farmer said the agency is obligated by Congress and the courts to act in the best interest of the Missouri River Basin, an obligation spelled out in the *Missouri River Master Manual*. "We do not believe we have the authority to operate solely for the Mississippi River Basin," Farmer, of the Corps' office in Omaha, said. "There are incidental benefits for the Mississippi River. The manual is for benefit of the Missouri River."

Nixon wrote a letter earlier in November to Jo-Ellen Darcy, the Army's assistant secretary, urging the Corps "to avert potential economic disaster on this vital avenue American farmers use to get their goods into the world market." Meanwhile, the *American Waterways Operators* and *Waterways Council* urged Congress and President Barack Obama to act on behalf of river interests. Tom Allegretti, the trade group's president and CEO, said barges carry 20 percent of the country's coal and more than 60 percent of its grain exports. Other cargo such as petroleum products, lumber, sand, industrial chemicals, and fertilizer also get shipped by river.

The Corps typically reduces flow from the upper Missouri River reservoirs this time of year, in part out of concerns that the heavier flow could create dangerous ice formations during the winter. But severe drought this year has led to severely low water levels on many rivers, including the Mississippi. Mike Petersen of the Corps' office in St. Louis said efforts have been under way for months to fight back against the drought. Dredging operations that normally begin in August started in July, with work going on around the clock to remove sediment from the river bottom.

The Corps also plans to use explosives to blast away treacherous rock formations at the bottom of the river near two southern Illinois towns, Thebes and Grand Tower. If the river level gets too low, those formations could bring barge traffic to a standstill. The project has passed environmental approval, but contracts must still be awarded. Work is expected to begin in early February.

But Petersen conceded the river could be closed if the drought persists. He said closure at St. Louis would become more likely if the river gauge gets to around minus-5 feet. It was at minus-1.2 feet in early November. "The middle Mississippi is a tricky spot because we're depending on the upper Mississippi and the Missouri and what they give us," Petersen said. "For us, the reduced flow from the Missouri is a fact of life in how we operate the river."

Farmer said the Corps must tend to eight Congressionally authorized purposes on the Missouri River: hydropower, water supply, water quality control, fish and wildlife, recreation, irrigation, navigation, and flood control. Because of the drought, the Mississippi has received as much as 78 percent of its water from the Missouri this year, compared with 60 percent in a normal year, according to Nixon's office.

Source: Jim Salter, *AP/Stars and Stripes*, 11/13/12

Greenback Cutthroat Trout More Rare Than Thought

Colorado's state fish, the rare greenback cutthroat trout (native to the South Platte River Basin) is even more imperiled than scientists thought according to a new study by Colorado and Australian researchers. By analyzing DNA sampled from cutthroat trout specimens pickled in ethanol for 150 years, comparing it with the genes of today's cutthroat populations, and cross-referencing more than 40,000 historic stocking records, researchers have revealed that the fish survives not in five wild populations, but in just one, a four mile stretch of a small alpine stream called Bear Creek which lies in the Arkansas River Basin, about 5 miles southwest of Colorado Springs.

Stocking records and the tangled genetic patchwork of trout in the southern Rocky Mountain region suggest that efforts to replenish populations were far more extensive and began earlier than previously recognized. Between 1885 and 1953, state and federal agencies stocked more than 750 million brook trout, rainbow trout and cutthroat trout from hatcheries into streams and lakes in Colorado, the researchers found.

The study, published in late September in the peer-reviewed journal *Molecular Ecology* as a follow-up to a 2007 study led by the same biologist, Jessica Metcalf, yielded some findings that "may be uncomfortable," Kevin Rogers, a researcher for Colorado Parks and Wildlife (CPW), said in a call with reporters. Doug Krieger, senior aquatic biologist for the CPW, predicted that the study would shift the direction of conservation efforts.

A shift in the scientific landscape is not an entirely new experience for fish managers working with the cutthroat trout in the region. The 2007 study shook the very foundations of cutthroat trout recovery efforts, showing that managers had accidentally mixed a different subspecies of cutthroat trout, the Colorado cutthroat, with the rare greenback, and then stocked these hybrid strains into otherwise pure greenback streams.

The latest study, whose co-authors also include the biologist Chris Kennedy of the U.S. Fish and Wildlife Service (FWS) and scientists with the University of Adelaide's *Australian Center for Ancient DNA* and the University of Colorado, Boulder, shows that the last surviving greenback population lies within Bear Creek. Located outside the greenback's native range, this holdout population is probably descended from fish stocked at the Bear Creek headwaters in the 1880's by a hotelier seeking to promote a tourist route up Pikes Peak, the researchers say.

Greenback Cutthroat Trout - westerntrout.org image

Historic records indicate that Bear Creek, like many high-alpine streams made inaccessible by waterfalls and other natural barriers, once had no fish at all. When frontiersmen arrived in the area, they typically would settle near a creek, Dr. Metcalf said. "The first thing you're going to do is stock it, so you have a good food resource right by your house all year round," she said.

To map out the historic distribution and range of a species whose taxonomic record is, to quote the latest study, "rife with errors," Dr. Metcalf sampled skin, gill, muscle and bone from trout specimens collected in Colorado and New Mexico from 1857 to 1889, before the state and federal efforts to propagate and stock native trout were ramped up. Now housed in museums in-

cluding the *Smithsonian Museum of Natural History* and the *California Academy of Sciences*, the specimens were preserved in ethanol. "The DNA was very degraded, and there wasn't very much of it," Dr. Metcalf said. "So this took a lot of effort and repeated sequencing for each specimen."

Still, ethanol preservation opened a window to the past. "After the 1900's, a lot of things were fixed in formalin, which keeps them looking the way they were when they were collected," Dr. Metcalf said. "Before that, things were just straight up pickled in ethanol." The problem for latter-day genetic sleuths is that formalin actually binds with DNA, making the latter impossible to recover. It's not always obvious what chemicals were used for a given specimen, but the fact that some fish appeared partially decayed was a good sign these trout were preserved the old-fashioned way (in ethanol only), leaving fragments of DNA intact. "The DNA I get out of 15,000-year-old, extremely degraded animals from Patagonia is in better shape than these ethanol-preserved fish," she said.

The FWS does not plan to take immediate action around Bear Creek in response to the Metcalf research, which the agency helped finance as a member of the *Greenback Cutthroat Trout Recovery Team*. Other funds flowed from the Forest Service, the Bureau of Land Management, the National Park Service and *Trout Unlimited*. A FWS representative told reporters that the greenback's status would not be changed from threatened to endangered until a thorough scientific review was carried out and the public had a chance to weigh in. Separate research that the agency will use to crosscheck Dr. Metcalf's genetic results is to be completed this fall.

Aside from presenting an approach for using pre-1900 museum specimens to provide a baseline for historic diversity, the study effectively yanks the rug out from under cutthroat trout restoration efforts and raises the stakes in a lawsuit filed in late September by the *Center for Biological Diversity* (CBD) against federal land managers. CBD claims that "rampant motorcycle use" permitted on trails running along and across Bear Creek is destroying precious habitat. "We've asked the Forest Service to close that trail to motorcycle use and move it," the director of CBD's endangered species program, Noah Greenwald, said in an interview. Even after the construction of bridges and other projects designed to minimize erosion, Greenwald said, heavy trafficking of erosive soil around Bear Creek causes sediments to fill pools that are vital to cutthroat trout survival. "It's a really small stream," he said. "So the pools are super-important during drought, when the stream freezes in the wintertime, and to hide from predators."

The revelation that Bear Creek is home to the last remaining greenback cutthroats underscores the importance of protecting the population, said CBD's Greenwald. "If we can't protect it, if we don't do what's necessary to protect it, we're at risk of losing another one of these cutthroat trout subspecies, and that would be a real tragedy," he said.

Source: Josie Garthwaite, *New York Times*, 9/25/12 and *Greenwire*, 9/26/12

Energy Companies Fight Diamond Darter Listing

The proposed listing in July of the diamond darter (*Crystallaria cincotta*) under the Endangered Species Act (ESA) by the U.S. Fish and Wildlife Service (FWS) is being opposed by coal, oil, and natural gas companies. The darter has not been seen in Ohio since 1899 and in Kentucky since 1929. It was thought to be extinct until it was rediscovered in West Virginia in 1980.

Diamond darter - Conservation Fisheries, Inc. Photo

At the very least, the energy companies want the FWS to make a more convincing case for listing the species. "The agency is urged to move cautiously in advancing any such listing or designation and therefore must develop a more thorough record before finalizing this proposal," Tom Boggs, vice president of the *West Virginia Chamber of Commerce*, wrote in a comment letter in September. FWS has said it will submit its findings for peer review and conduct an economic impact analysis. But at this point, Boggs said, "The agency has failed to meet the criteria for making this proposal."

Green groups, including the *Center for Biological Diversity* (CBD), have been urging the federal government to increase protection for the darter for years. FWS agreed to speed up its review after a legal settlement last year. CBD biologist Tierra Curry said, "The diamond darter is one of the most endangered fish in the world. We're thrilled that it's getting the Endangered Species Act protection that will make sure it isn't lost forever." Like conservation groups, FWS blames coal and drilling activities for jeopardizing the rare fish, which is currently only found in West Virginia's Elk River. The agency also cited inadequate regulations as a justification for further action.

"In addition to chronic sediment releases and water quality effects from coal mine areas," FWS said in its proposal, "the potential exists for failure of large-scale mine waste impoundment structures contained by dams constructed of earth, mining refuse, and various other materials which could release massive quantities of mine wastes that could cover the stream bottoms." But industry interests take exception to FWS's suggesting that the regulatory environment is lax enough to warrant extra protection for the darter.

West Virginia Coal Association Vice President Jason Bostic wrote in a letter that "the proposed rule underestimates the effectiveness of the existing regulatory mechanisms to control the impact of coal mining on downstream waters." The *West Virginia Oil and Natural Gas Association* raised similar objections. Executive Director Nicholas DeMarco said in comments to FWS, "Language in the rule describing the oil and gas industry's threat to the Diamond Darter is very broadly stated and warrants significant additional information."

The agency is proposing to designate more than 100 miles of stream as critical habitat for the darter, including spots in West Virginia and neighboring Kentucky. But industry groups question the impact mining and drilling are having on the darter, and object to the use of conductivity as a barometer for the stream and, therefore, the fish's health. Boggs said he was "troubled" by the issue, which has been controversial among industry leaders and some state regulators worried about federal overreach. West Virginia Mining and Reclamation Director Thomas Clarke wrote, "Coal mining activities were described as occurring throughout the entire Elk River watershed. However, less than four percent of the watershed has been subject to permitted coal mining activities – approximately 37,000 acres of the total 980,500 acre watershed."

In several comment letters, critics said small populations and inbreeding are also potential reasons for the fish's vulnerability. But

another West Virginia regulator, Division of Natural Resources wildlife chief Curtis Taylor, wrote a letter of his own, this one supporting FWS scrutiny. He called ESA status for the fish "prudent and the only mechanism available for our state to manage and preserve the sole North American population of this unique darter."

But with fewer than 50 fish found since the 1980s and a lack of information about its habitat needs, critics say small numbers do not equal the need for endangered status. "That fact alone," said Bostic "does not support the notion that existing regulatory mechanisms are failing the species, because no evidence exists that a sizable Diamond Darter population has ever existed in the Elk River or any other river in West Virginia or surrounding states."

Source: Manuel Quinones, *Greenwire*, 10/12/12

Coal Mining Issues

U.S. EPA is appealing two rulings that struck down key components of its efforts to expand oversight of Appalachian mountaintop-removal coal mining. The rulings spring from *National Mining Association* (NMA) v. Jackson – in which mining interests and the states of WV and KY went against EPA. The Justice Department filed a formal notice of appeal in late September in the U.S. Court of Appeals for the District of Columbia Circuit.

In one ruling, U.S. District Court Judge Reggie Walton in the District of Columbia last year struck down an EPA-led enhanced review of dozens of strip mining projects, saying the agency was acting beyond the scope of the Clean Water Act (CWA). In the other, Walton in July tossed the agency's guidance document for CWA oversight and permitting of Appalachian mountaintop-removal mines. He said the guidance amounted to rule making without going through the proper rule making procedures. The NMA expressed confidence that Walton's rulings would stand. "The courts have, to date, been strongly supportive of NMA's views that EPA's actions were illegal," spokeswoman Carol Raulston said. "We are optimistic that reasoning will prevail."

The EPA guidance, which was released in draft form in 2010 and finalized last year, includes the first-ever numeric limits for conductivity for waterways near Appalachian mine sites. Environmentalists are increasingly using conductivity as a barometer of aquatic health. *Earthjustice* attorney Emma Cheuse, who argued on EPA's behalf, said in a statement, "Our appeal will ask the D.C. Circuit to reverse the D.C. district court decision so that there may be no doubt that the EPA retains its full legal authority – as granted by Congress under the CWA – to continue protecting communities in Appalachia from harmful mountaintop removal mining permits under the CWA." *Appalachian Voices* legislative associate Thom Kay said, "We are also calling on the Obama administration to fulfill its responsibility to protect the health and environment of Appalachia by issuing a formal rule – with full public participation – to replace the coal industry-friendly rules that have been harming Appalachian communities for far too long."

West Virginia's Kanawha County Circuit Court is also considering arguments dealing with EPA's guidance on conductivity after the state's Environmental Quality Board, an independent panel of experts appointed by the governor, called on state regulators to include similar standards in an *Arch Coal* mine permit. The West Virginia Department of Environmental Protection is challenging the board's decision.

Meanwhile, the EPA is also appealing a U.S. District Court ruling earlier this year that invalidated the agency's retroactive veto on grounds that it overstepped its CWA authority. EPA argues that it can block certain parts of U.S. Army Corps of Engineers (Corps) "dredge and fill" permits before or after they are issued. But the state of West Virginia, in a brief filed in late September, said EPA's 2011 move against *Arch Coal Inc.*'s 2007 permit for its *Spruce Mine* exceeded the agency's power over the state. "EPA's purported 'veto' is but one example of its recent efforts to undermine the State's role as the primary protector of its waters under the [CWA] and as the primary regulator of mining" under the Surface Mining Control and Reclamation Act, attorneys for the state wrote. West Virginia said its scrutiny of the overall mine project began in 1997, a decade before the Corps issued its permit. The state said it worked with EPA on other permit decisions.

In its brief, the state further argued against EPA's use of conductivity as a measure of environmental health. "EPA also usurped the State's authority when it unilaterally determined that the discharges from *Spruce* (mine) would violate the State's numeric water quality standard for selenium and cause a golden algae bloom," they wrote. West Virginia Gov. Earl Ray Tomblin (D) said in a statement backing the state's filing: "Hundreds of miners are out of work because of the unjustified attacks on West Virginia coal miners and their families."

Several industry groups, including the *U.S. Chamber of Commerce* and the NMA, argued in a second brief that EPA's action would illegally make the entire federal permitting system uncertain, particularly under the CWA's Section 404, which covers dredge and fill permits. "Permit holders and prospective permit applicants who previously looked to the Corps' regulations as the exclusive framework under which Section 404 permits could be suspended, modified or revoked are thus facing an expansive new threat to the reliability of their permits," the groups said. They added, "Even if a project proponent decides to move forward in the face of increased uncertainty, EPA's action in this case could still have a serious adverse impact on the ability to obtain necessary financing."

United Co., in a third brief, said EPA's actions could constitute an unconstitutional taking. *United* owns the coal that *Arch* would mine and stands to gain from having mining start. *United Co.* attorneys compared the present case with 1979's *Kaiser Aetna* v. United States, which centers on a pond in Hawaii that fell under federal jurisdiction after it was connected to a nearby bay. Justices ruled in favor of compensation for the owners.

Regarding the *Spruce Mine* case, *United Co.* argues that because the Corps issued a permit for mine operations and because of the legal uncertainty surrounding EPA's retroactive veto, the agency may have needed to provide compensation for its actions, which the company argued blocked access to the coal reserves. *United Co.*'s brief said, "These heightened expectations create a property interest that cannot be revoked without compensation, regardless of the revocation's effect on the overall value of the property." EPA and its backers have already filed their initial briefs in the case. They have also agreed to an expedited timeline.

Meanwhile in mid-October, environmental groups filed two lawsuits against the Corps in bids to block CWA permits issued by the agency for other mountaintop-removal coal mines in KY and WV. The groups say the Corps failed to do its homework before issuing CWA permits for *James River Coal Co.*'s *Leeco Inc. Stacy Branch Mine* in eastern KY and *Raven Crest Contracting LLC's Boone*

No. 5 Mine in southern WV.

The lawsuits were filed in U.S. District Court for the Southern District of WV and U.S. District Court for the Eastern District of KY, respectively. Pam Maggard, a member of *Kentuckians for the Commonwealth* and a neighbor of the *Stacy Branch Mine*, said in a statement, "This mine is going to ruin our neighborhood here in Sassafras. We have several people on my street who already have breathing problems and kids with asthma," she said. "Once again no one will be able to enjoy being outside on their porches and in their yards because of all the dust and mud."

The Corps gave *Leeco* a permit in July to allow impacts to more than 3 miles of streams. *Raven Crest* will have a similar stream impact if its August permit stands, activists say. The agency has defended its permits for mountaintop-removal mining as being the least environmentally damaging and within the law. U.S. EPA had set up a system of enhanced review for dozens of projects, but as noted above, Judge Reggie Walton for the U.S. District Court of the District of Columbia struck it down last year. The ruling is pending appeal.

Court battles are also ongoing for other permits. Earlier this year, Judge Robert Chambers of the U.S. District Court for the Southern District of WV upheld a Corps permit for *Alpha Natural Resources Inc.'s Reylas Surface Mine* in Logan County, WV. Environmental groups have appealed the decision. Litigation is also pending on another permit for *Loadout LLC's Nellis Surface Mine* in Boone County, WV. Chambers blocked the Corps permit pending review.

Three environmental groups are also fighting back against a state permit to allow a mountaintop removal mining operation in eastern TN. The *Sierra Club, Statewide Organizing for Community eMpowerment* and the *Tennessee Clean Water Network* said in an administrative appeal sent to state regulators that the permit would allow more pollution to seep into streams and less stringent monitoring than what federal clean water laws allow. The permit is the second that has been issued to the *National Coal Corp*.-operated *Zeb Mountain* mining site. The company challenged the first permit, but the environmental group said the new one is too lax.

Sources: *AP/San Francisco Chronicle*, 10/11/12; Manuel Quinones, *Greenwire*, 9/20, 9/28, 10/18/12; and *Greenwire*, 10/12/12

High Salt Levels in Streams Near Shale Gas Drilling

High levels of an ultra-salty compound that could be linked to oil and gas drilling persist in the Allegheny River's Pittsburgh-area watershed, while the levels declined in the nearby Monongahela River, recent research shows. Officials at public water utilities in both watersheds grew concerned in 2009 and 2010 when bromide levels soared during a surge of *Marcellus Shale* gas drilling. Although not considered a pollutant by themselves, the bromides combine with chlorine used in water treatment to produce compounds that can threaten public health.

A recent Pittsburgh Water and Sewer Authority (PWSA) report found that high levels of bromides persisted this year in the Allegheny just downstream from industrial brine treatment plants. The plants accept wastewater from oil and gas drilling and other industrial activities. Also, preliminary research by a Duke University team found a similar problem in a tributary of the Allegheny, professor Avner Vengosh told the *Associated Press* in mid-November. Vengosh said the source there appears to be from conventional oil or gas wells, not shale wells. But on the Monongahela River, a Carnegie Mellon University team said, preliminary research found that bromide levels declined significantly this year, after *Marcellus Shale* gas drillers responded to warnings from scientists and environmental groups and voluntarily stopped taking waste to treatment plants there. The Monongahela merges with the Allegheny in Pittsburgh.

In early 2011, the state Department of Environmental Protection (DEP) called on shale gas drillers to voluntarily stop taking wastewater to public water treatment plants along rivers, and major companies and industry groups agreed to the request. Now, most shale wastewater is sent to deep underground waste wells in Ohio or recycled. The DEP wastewater request doesn't apply to conventional oil and gas well wastewater, and Vengosh said that doesn't make sense. "I think the focus on only shale gas is kind of misleading," Vengosh said, noting that all the wells produce naturally-occurring brine water, which can be much saltier than seawater, and also contain heavy metals and natural radiation. "It's all psychological," Vengosh said of the distinction between shale gas waste and other drilling waste. "That for me doesn't make any sense."

The PWSA report also noted that bromide levels rose in rivers below where some coal-fired power plants discharge wastewater, which can also include bromides. Dave Mashek, a spokesman for the *Pennsylvania Independent Oil and Gas Association*, said that state regulators don't set a limit on bromide discharges and that the amount of wastewater that comes from conventional wells is decreasing. He also noted that the PWSA testing only identified elevated bromide levels in the Allegheny for part of the year, during periods of low river flow.

Kevin Sunday, a spokesman for the DEP, said many other sources of bromide exist beyond oil and gas wells. He said the volume of wastewater produced by conventional oil and gas wells is substantially lower than what comes from shale gas wells.

The *Marcellus Shale* lies under parts of PA, MD, NY, OH, and WV, and hydraulic fracturing has made it possible to tap into deep reserves of oil and gas. Large volumes of water, along with sand and hazardous chemicals, are injected underground to break rock apart and free the oil and gas. The industry and many federal and state officials say the practice is safe when done properly.

Sources: Kevin Begos, *AP/San Francisco Chronicle*, 11/12/12; and *Greenwire*, 11/13/12

Farm Runoff and Water Pollution

Water that runs off fields treated with chemical fertilizers and manure is loaded with nitrogen and phosphorus, two potent pollutants that inevitably end up in rivers and lakes and set off a cascade of harmful consequences, including contaminating the drinking water used by millions of Americans. Treating this water after the fact to clean up the contamination is increasingly expensive, difficult and, if current trends continue, ultimately unsustainable. The only solution is to tackle the problem at the source.

A new report supported by the *Environmental Work Group* (EWG) entitled, "*Troubled Waters - Farm Pollution Threatens Drinking Water*" focuses on four states in the core of the Midwestern corn belt – IL, IA, MN and WI. Nutrient overload in surface and groundwater is a significant water quality problem for these states, making nitrate and phosphorus levels higher and algal blooms more frequent compared to national averages. To tackle polluted source water, water utilities in the region are often forced to install expensive treatment plants that can cost millions to install and operate. USDA

economists estimate that removing nitrate alone from drinking water costs more than $4.8 billion a year. The cost of dealing with algal blooms is particularly daunting. The total capital cost of water treatment that would address cyanobacterial blooms and cyanotoxins, can range between $12 million and $56 million for a town of 100,000 people.

The only true solution is to confront the issue upstream, at the point where pollution – much of it from farms – first flows into America's precious surface water and groundwater. With the exception of large animal feeding operations, farm businesses are exempt from the pollution control requirements of the federal Clean Water Act, and few states have authority to compel farm businesses to adopt practices that reduce the amount of farm pollution reaching our rivers, lakes and bays. As a result, the farm bill, which is renewed every five years, serves as the primary tool for addressing the environmental damage caused by polluted runoff from agricultural operations.

The EWG therefore recommends that Congress should take three steps to ensure the new farm bill protects drinking water:
• Reform Farm Subsidies - Congress should end direct payments, reduce subsidies for farm insurance programs and refuse to create new farm entitlement programs that encourage all-out production to the detriment of the environment. Instead, lawmakers should help farmers when they suffer deep losses in yields and provide options for them to purchase additional crop and revenue insurance at their own expense.
• Renew the Conservation Compact - Congress should renew the "conservation compliance" provisions of the 1985 farm bill by relinking wetland and soil protection requirements to crop insurance programs. In addition, legislators should require farm businesses that receive subsidies to update their conservation plans and should strengthen the government's enforcement tools.
• Strengthen Conservation Incentive Programs - Congress should strengthen programs that reward farmers who take steps to protect sources of drinking water. In addition to providing adequate funding, Congress should expand "collaborative conservation" tools that award funds to groups of farmers working together to protect drinking water sources. Greater focus should be placed on restoring buffers and wetlands that filter runoff of farm pollutants.

The entire EWG report can be downloaded at: http://www.ewg.org/report/troubledwaters

The U.S. EPA also now offers new educational materials on its nutrient pollution website (http://water.epa.gov/polwaste/nutrientoutreach.cfm) to help raise awareness about nutrient pollution problems. These resources include:
• a *Community Outreach Toolkit*, designed to help watershed groups, non-governmental organizations, states and federal partners educate the media about nutrient pollution;

Farm runoff can carry sediments, nutrients and pesticides into surface waters - USDA Soil Conservation Service Photo

• a nutrient pollution video, targeted to raise awareness about nutrient problems;
• a postcard/poster, showing a before and after photo of Lake Erie to illustrate the impacts of nutrient pollution; and
• a *Future Farmers of America Curriculum*, to share information with young farmers about source water protection and management practices that can help control runoff to protect surface and groundwater.

Sources: *Environmental Working Group*, 4/12/12; and *Nonpoint Source News-Notes, Issue 92*, 10/2012

Industries to Pay WI Farmers to Curb Runoff

Under a new Wisconsin state regulation (approved by the USEPA) industrial pollution permit holders will be allowed to meet their pollution reduction targets by funding pollution management on state farmlands. Phosphorus-rich fertilizers washing off farmland are a leading source of non-point water pollution beyond the reach of the federal Clean Water Act (CWA), which focuses on pollution discharged from "point sources" (i.e., pipes from waste treatment plants). The new Wisconsin approach aims to reduce farmland nonpoint source pollution while saving money for industries and earning extra cash for farmers.

Industry and environmental groups that helped write the Wisconsin "adaptive management" policy are touting it as a national model. The policy, they say, could go far toward curing some of the nation's worst water pollution problems linked to dirty farmland runoff, including the vast summer "dead zones" in the Chesapeake Bay and at the mouth of the Mississippi River in the Gulf of Mexico. "I think that this could be phase two of the Clean Water Act," said Melissa Malott, water program director for *Clean Wisconsin* (CW), a partner in the state pilot project.

Farmers are more skeptical. So are some influential environmentalists who praise the concept but say execution so far by Gov. Scott Walker's (R) administration has been deeply flawed. "If done correctly, it can be a win-win," said Paul Zimmerman, executive director of governmental relations for the *Wisconsin Farm Bureau* (WFB). "If done incorrectly, it may not be a benefit to the agriculture industry as a whole." Zimmerman said the policy could take farmland out of production. He also warned that farmers could face unforeseen consequences. "We'd certainly urge farmers to be very cautious and make sure they know what they're signing," he said.

Threat of a lawsuit from the *Midwest Environmental Advocates* (MEA) is what prompted Wisconsin to become one of the first states to introduce numeric pollution limits for phosphorus in 2010. But Kim Wright, MEA Executive Director, said the state Department of Natural Resources (DNR) botched rollout of the new policy by issuing overly lax permits. "The implementation has been incredibly problematic," she said.

The policy rests on the widely held notion that limiting farmland runoff through better land management is generally less expensive – and more effective – than forcing industrial facilities already in CWA compliance to add new layers of pollution controls. Wisconsin regulators say phosphorus reductions at an industrial facility might cost $120 per pound, versus $30 per pound when they take the form of best-management practices on upstream farms. In theory, farmers could earn extra money while their industrial partners save. Meanwhile, facilities that opt to go the adaptive management route get a generous, 15-year grace period to achieve hoped-for results.
Wisconsin's adaptive management policy is similar to – but not the same as – water quality credit-trading systems being tested in other watersheds across the country. The key difference is that under a typical water quality trading system, permitted facilities must meet the specific pollution limits set in their

discharge permits. They may buy "credits" from farmers who implement land management practices according to a trading ratio set by regulators that accounts for a margin of error. So a facility required to reduce its phosphorus discharge by 100 pounds per year could install new treatment systems capable of removing 75 pounds. The difference could be purchased from farms that have taken steps to control phosphorus-rich runoff. If regulators set a 2-to-1 trading ratio, the facility would have to buy 50 pounds worth of credits to close the 25-pound gap and meet its permit requirements.

Under Wisconsin's adaptive management, there are no trading ratios, and facilities get valuable wiggle room when it comes to meeting the numeric pollution limits established in their discharge permits. "Whether the number is 0.075 or 0.06 or 0.07, it really doesn't make that much difference, quite frankly," said Dave Taylor, director of special projects for the *Madison Metropolitan Sewerage District (*MMSD*)*. Rather, success is achieved when numeric water quality targets established for the rivers, lakes and streams themselves are hit. So long as the river's clean, the industrial facility may be allowed to exceed the pollution discharge limits in its permit.

Taylor and the MMSD, which serves 300,000 people, are leading a three-year pilot project under the new policy. Thirty partners are signed on, including industrial facilities, other sewage treatment plants and conservation groups. The U.S. Geological Survey is sharing in the cost of in-stream gauges that will be used to measure water quality. But Taylor says it will take time to get it right. "Adaptive management is a very creative approach that doesn't come with an instruction manual." "So it's learn as you go, experiment, and hopefully at the end of the day we will meet water quality criteria and do so in a much more cost-effective manner than the traditional compliance approach," Taylor said.

But MEA's Wright, said the state has bungled the program start. Some permits recently issued by the state allow for adaptive management to begin in year nine – essentially stretching the grace period within which facilities must show results from 15 years to 24, she said. "You're getting up to 24 years before anyone lifts a finger to improve water quality, and we've got algae-choked waterways," she said. Other new state-issued discharge permits, she added, loosen pollution-reduction requirements beyond the point that some facilities are already capable of achieving with current controls in place. "The limits are so high, you don't have to do anything," she said.

A former employee of the Wisconsin DNR, Wright blames the Walker administration's tough stance against public unions, which she says has led to massive turnover and brain drain at the agency responsible for enforcing the CWA in Wisconsin on behalf of USEPA. "There was a huge number of people who had the ability to retire, who jumped ship," she said. That left inexperienced and overworked permit writers in charge who she fears will be steered by anti-regulatory forces in the administration and the regulated industries themselves.

Last year, EPA wrote a letter to the Wisconsin DNR with a 75-point critique of the state water pollution permitting program. Many of those issues have yet to be corrected, according to Wright. "When people sing a rosy story, that's not written yet," she said of adaptive management. "There is a lot of promise. We want this to work. ... But if it's not done right, it's not going to help water quality." Permitting issues aside, there remains the question of buy-in. Flexibility and potential savings are an obvious lure for industrial facilities. But few farmers have signed up so far to participate in the pilot project. Organizers, however, say farmers are curious and are attending meetings in high numbers.

Because farmland runoff is not regulated under the CWA, authorities have few tools available to force farmers to take steps to stanch polluted nutrient runoff. One of those tools is a state law enacted in 1997 that requires farmers to implement so-called nutrient management plans. But the law also requires that the state share the cost of implementing the plan and conservation practices. Environmentalists contend that the nutrient management program has been woefully underfunded – to the tune of $3-6 million per year for a state with about 50,000 livestock operations and 20,000 crop-growing farms. The law also requires that once a farm is brought into compliance, it is expected to stay there – a disincentive to getting there in the first place.

WFB's Zimmerman estimates that about half of the farms in the state are managing nutrient pollution to an acceptable standard; although many of those, he says, are doing it on their own without reporting to the state. He is concerned about what happens to farmers who accept money to reduce nutrient pollution, then fail to deliver results through no fault of their own. Even if runoff is controlled, phosphorus built up in stream, river and lake beds could take as long as 25 years to fully wash away, he said. "What happens if the farmer can't follow through?", he asked. "Farmers and municipalities will certainly need to work out what happens when things don't go as planned. Although farmers could earn money by "selling" conservation practices, he questions whether that could safely be considered profit, because high crop prices in any given year might make crops – rather than conservation – the more valuable play. Success of the program will hinge on whether the most polluted farms – where runoff control would yield the most significant water quality gains – can be brought into the fold. CW's Malott said it will take money and political grit to make the program work.

Source: Paul Quinlan, *Greenwire*, 9/12/12

MR Grain Processing Facility in Iowa Fined $4.1 Million

Roquette America Inc. has agreed to pay a $4,100,000 civil penalty to settle alleged violations of the Clean Water Act and its National Pollutant Discharge Elimination System (NPDES) permit at its grain processing facility in Keokuk, IA, the U.S. EPA and the U.S. Department of Justice announced on November 13. As early as 2008, *Roquette* was aware that its wastewater treatment plant was marginally adequate and that it could not handle spills or surges in loading. Instead of constructing additional containment structures for wastewater surges, or routing spills to the wastewater treatment plant, *Roquette* allowed the industrial waste to be discharged directly into the Mississippi River and Soap Creek.

The Iowa Department of Natural Resources (IDNR) had issued three Administrative Orders and eight Notices of Violation to *Roquette* since 2000. Despite these orders and notices, *Roquette* continued to overload its wastewater treatment plant and failed to address the deficiencies at other portions of its facility, resulting in permit violations and illegal discharges of untreated industrial waste. At the request of IDNR, EPA initiated its review of the violations. "The magnitude of these violations warrants the magnitude of the penalty," said EPA Region 7 Administrator Karl Brooks. "The Mississippi River is a vital waterway, used by millions of Americans for commerce, recreation, and drinking water. It is imperative that industrial facilities abide by their discharge permits to

protect our valuable water resources."

The Keokuk facility violated its NPDES permit at least 1,174 times, and on at least 30 occasions illegally discharged via storm drains resulting in at least 250,000 gallons of industrial waste being released into the Mississippi River and Soap Creek. In addition to these permit violations and illegal discharges, *Roquette* discharged partially treated industrial waste from its wastewater treatment plant, and discharged steam condensate into Soap Creek through an unpermitted outfall. "*Roquette's* actions resulted in over a thousand permit violations and allowed the discharge of untreated industrial waste into the Mississippi River and another Iowa waterway even after it was informed on numerous occasions it was violating its state permit and federal law," said Ignacia S. Moreno, Assistant Attorney General of the Justice Department's Environment and Natural Resources Division.

In addition to paying the penalty, *Roquette* will complete other requirements valued at more than $17 million to further protect the Mississippi River and Soap Creek. Among these requirements are the completion of a sewer survey to identify possible discharge locations, the implementation of sewer modifications, the construction of upgrades to the wastewater treatment plant, and the performance of enhanced effluent monitoring. In addition, *Roquette* will obtain annual third-party audits of its compliance with its operations and maintenance program, Storm Water Pollution Prevention Program, the company's NPDES permits, and the compliance requirements set out in the consent decree.

Source: *U.S. EPA News Release*, 11/13/12

Eco-credit trading and Stream Mitigation in TX

A new U.S. Army Corps of Engineers (Corps) -administered ecological credit trading system being introduced in Texas is viewed by developers as a potential game changer in the struggle to balance conservation and city growth. Adjacent to the State Highway 99, or *Grand Parkway Project* in Houston, work crews began construction in early October on the nation's largest "stream mitigation bank" project, a market-based approach to mitigating losses of creeks, streams, and smaller waterways affected by development.

The project, undertaken in conjunction with a local conservation group called the *Katy Prairie Conservancy* (KPC), seeks to restore more than 110,000 feet of streams lost to earlier development at a site managed by the KPC on the *Warren Ranch*, the largest operating cattle ranch in Harris County. Officials involved in the project say it will serve as a template for this city's future growth, ensuring that development in one part of the watershed will be met first with protections and ecological mitigation in another part of it.

The project, paid for by the sale of environmental mitigation credits to the highway project, will also potentially create revenues the KPC can use to purchase and protect other parts of what is left of the historic Gulf Coast prairie that used to dominate Harris County, now almost completely swallowed by the city's relentless growth. Mary Anne Piacentini, director of the KPC, said the arrangement will earn her organization enough funds to pay off the debt it took on to acquire the ranch and create that portion of the preserve. "Clearly the money is important, and it will ... allow us to ensure the permanent protection of the ranch," Piacentini said. "But it also is important because it is really improving habitat on the ranch, not just the streams themselves, but the banks of the streams and the flood way and floodplain and the improved grasslands that are going to be on either side lining the creeks." The KPC owns 72 percent of *Warren Ranch*, while family members control the rest.

Under the new Corps system, which the agency began crafting in 2008, construction projects that would cross or otherwise affect waterways in Houston's watershed would have to receive a special permit to be allowed to continue. Developers have the option to avoid the impact entirely, minimize it as much as possible, or mitigate the damage by restoring an equal amount of waterway in a different part of that watershed. The stream mitigation bank project on the *Katy Prairie* will offset damage to other waterways at points where the massive *Grand Parkway* will be built.

The system allows third-party developers to manage their own restoration projects and bank credits for doing so. Later projects can then purchase those credits from these mitigation banks to meet regulations and proceed with construction. Mitigation banking has been up and running elsewhere but had yet to be introduced to Texas. George Howard, president of *Restoration Systems LLC*, said this initial project will serve as a template for future development mitigation banking throughout Houston and eventually across all of Texas. *Restoration Systems* is the firm leading the *Katy Prairie* stream mitigation bank project.

The Texas Parks and Wildlife Department estimates that the *Katy Prairie* – a popular birding spot and home to a variety of species – once covered an area of 500,000 to 750,000 acres before development began, first in the form of rice farms and later as subdivisions. Piacentini estimates that less than 20 percent of the Prairie is in "OK" condition, while perhaps 1 percent is considered "pristine." And a booming Houston economy is still putting pressure on the land. Plans for thousands of new homes and businesses are in the works for both sides of the route along the future Highway 99 toll road.

Howard said it took the group four years to secure the permit for its stream mitigation project, but he said the delay was expected. Having never administered such a system in its area of jurisdiction before, the Corps' office in Galveston essentially had to develop standard operating procedures. Future projects will experience fewer bureaucratic hurdles, officials predict.

During a recent tour of the stream restoration project site, Lee Forbes, a fluvial geomorphologist and president of *Forbes Consultancy PLLC*, explained the team's plan for building – sometimes almost from scratch – more than 100,000 feet of streams that will be nearly identical to natural streams that once were found on the ranch. "Stream impacts, which prior to this were able to be mitigated with wetlands, now have to be mitigated with streams," Forbes said. "And streams are a lot more complex to design, build and maintain, and they have different function, ecological function, than a wetland."

Earlier settlers to the site worked to straighten out some streams and create a direct path to their tributaries, believing that was better for moving water efficiently and for flood control. But natural streams engineer themselves to move both water and sediment in the most economic manner that nature allows, creating the winding paths that creeks and rivers take in near-flat terrain. Blueprints of the first phase of the project show what Forbes and others involved have planned. The course is deliberately windy and crosses much of the existing straight channel several times. Crews will also build the stream to have different depths at different places, and trees and branches will be carefully inserted in places to brace the walls of the stream, just as naturally fallen trees do

for wild streams.

"A stream functions best when it has easy access to the floodplain. That's how it builds itself, how it manages its energy," Forbes said. "We're putting back in ripples, runs, pools and glides. ... It's a very complex science." Stream construction is so complex that advanced computer models and the latest satellite-driven surveying equipment have to be laid out to plot the best meandering path to take. Local construction crews are also unschooled in the idea, requiring extra training, Forbes said. "The contractors that do it have been from other states where they have been doing it a lot longer," he said. "We have a mission here in Houston to start training the local contractors on how to do this."

Technical challenges aside, both Forbes and Howard are convinced that the market-driven approach behind the mitigation banking concept is the future of environmental conservation across the U.S. *Restoration Systems* estimates it will generate about 250,000 credits from just this project, each credit selling to construction projects for about $250. As the first project, the *Katy Prairie* stream mitigation bank is being priced in the absence of competition, but Howard expects more actors to enter the fray and force credit prices lower as Houston continues to grow. City leaders believe Houston will overtake Chicago as the nation's third most populous city by 2030.

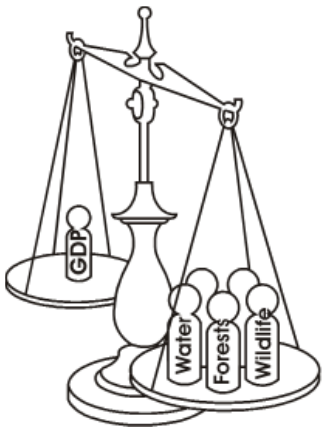
But conservation through market-based credit trading systems does have its detractors. A similar project proposed by U.S. EPA for Chesapeake Bay is facing a court challenge by environmentalists who allege that credit trading will invite fraud and abuse. But the Corps and the forces behind the pilot in Texas seem convinced that the concept is proved to work and may be one of the best methods for balancing development and environmental protection. "There could be additional banks, and then it would be a competitive market that sells to the impactor at the best rate, so it's a market-driven ecosystem management," Forbes said. "Meanwhile, economic development and growth are restoring some of the last vestiges of native prairie and streams in the country."

Piacentini says she's equally enthusiastic about the concept and the millions of dollars her organization will receive from it. She is looking for other market-based conservation models that the *Katy Prairie* could tap into, to grab hold of more tracts of land to preserve ahead of the expanding zone of concrete. The stream mitigation bank going up now is a prime example of the obvious benefit, she said. "It will give us water. It will give us a place to put trails. It will allow us to improve the water quality in that stretch of the various tributaries to Cypress Creek," Piacentini said. "And it will also just ensure that there are places that continue to be available for wildlife."

Source: Nathanial Gronewold, *Greenwire*, 10/5/12

Push for Companies to Consider Resources' Worth

Nature lacks a seat in the boardrooms of most big companies even though it provides valuable resources that should have a price tag, Pavan Sukhdev, formerly of *Deutsche Bank*, a United Nations goodwill ambassador, and one of the world's most influential green economists said. Ignoring nature's value risks "mayhem" for corporations and mankind in the rush for profits and finite resources he said. Water, clean air, coral reefs, forests, and rivers provide natural services worth trillions of dollars, yet these are made use of for free, he said. Putting a price on nature's services would change how firms think about the planet and their quest for profits.



"There is going to be mayhem if they don't get this right," said Sukhdev, founder and author of *Corporation2020*, a new program and book on changing corporations. So far, only companies whose turnover makes up less than 5 percent of the world economy have put in place ways to calculate the damage to nature by assessing the effects of waste, energy, water, or greenhouse gas (GHG) emissions, he said. "This is still too little. We are talking about a small fraction of the total economy," he said.
Sukhdev leads a global push involving governments and the U.N. to put nature on balance sheets. The idea is to treat the planet like a company, which would "charge" big corporations trillions of dollars a year for using its resources and for the pollution they cause. Environmental benefits such as cutting emissions or restoring forests would also be taken into account. All companies should have an environmental profit and loss account – even though initially this would only show the damage to and use of nature's services, rather than oblige them to pay compensation. "Today, no one would not disclose the directors' bonuses ... or your accountants, your auditors would take you apart," he said in a phone interview from an environment conference in Jeju, South Korea.

Nature needs a bigger say at every level, from the factory floor to the boardroom, he said. He praised groups such as German sportswear maker *Puma*, Indian software services provider *Infosys*, or Brazil's cosmetics group *Natura* as pioneers. Some countries also impose charges, for instance, for carbon dioxide emissions. But he said little had been done to remove $1 trillion in annual subsidies for fossil fuel use, agriculture and fisheries, cash that is locked in unsustainable practices.

Scientists have long said that the planet's resources are being used up faster than they can recover. The *International Union for Conservation of Nature* says about 40 percent of amphibians, a third of reef-building corals, a quarter of mammals, and 13 percent of birds are threatened with extinction. But there are some hopeful signs. At the Rio+20 environment summit in June, companies with total turnover of between $2 and $3 trillion supported greener accounting. Although that is less than 5 percent of the $65 trillion global economy.

Puma has created an annual environmental profit and loss account that costed its impacts at 145 million euros in 2010, or more than half total 2011 net earnings. Last November, the firm said 51 million euros came from land use, air pollution, and waste, and 94 million from GHG's and water. Sukhdev said companies are key to saving the planet, with 75 percent of the U.S. economy in the private sector. "Today's corporations are determining what governments do. At the end of the day they are the drivers of jobs, of employment, they are the driver of GDP growth. And their taxes bridge fiscal deficits."

Sources: Alister Doyle and David Fogarty, *Reuters*, 9/13/12 and *Greenwire*, 9/13/12

Colorado River Water Pact Sets International Precedent

A new Colorado River agreement between the U.S. and Mexico, signed in late November, could serve as a model for other countries locked in conflict over water. *Southern Nevada Water Authority* chief Pat Mulroy said she already has talked to several people from Africa, Asia, and Australia who want to read and perhaps borrow from the 5-year water accord. "This agreement will go down as a blueprint across the globe," she said. "Just the notion that one country would use its facilities to store water for another country is a huge issue," Mulroy said.

Under the 5-year agreement Mexico will siphon less water from the river during dry periods but will be permitted to store water in Lake Mead to use when there is a surplus of water in the system. Currently, Mexico has very little storage capacity. Additionally, the three lower basin states (AZ, CA, and NV) will buy about 100,000 acre-feet of water from Mexico, which will provide enough water for 200,000 homes for one year. In all, Mexico will receive $21 million under the deal, which will go toward much-needed repairs to irrigation canals and other infrastructure damaged by an earthquake in 2010, allowing agricultural production to resume on thousands of acres of farmland that relies on river water. At Mexico's insistence, the U.S. also pledged to purchase additional water to help restore the Colorado River Delta, parts of which have dried up over the decades due to diversions upstream.

Interior Secretary Ken Salazar said the agreement is the most significant Colorado River accord since the 1944 treaty (which this agreement amends) that partitioned the river's water among the seven U.S. Colorado River Basin states and Mexico. "For the first time, the U.S., Mexico, and NGOs will be dedicating water for the mainstem Colorado River in Mexico," said Francisco Zamora, who works on Colorado River Delta issues for the *Sonoran Institute*. "Even if it's only a short period of time, it will reconnect the river with its estuary."

Currently, by the time the 1,450-mile Colorado River reaches the U.S.-Mexico border, it is reduced to a small stream. Where it historically emptied into the Gulf of California, it rarely flows at all. The agreement will restore areas of the Colorado River below the border that have been dry for years, Zamora said. "It will help to not only protect habitat, it will create new habitat, and that will benefit many species," he said. "It will also help communities that live along the river." People along the river in Mexico soon will be able to swim, fish, and canoe – activities that have not been possible for many years, he said.

The binational agreement is a good starting point for resolving the long-standing issue of how to ensure that Mexico receives its fair share of water while also providing reliable water supplies for the southwestern U.S. – and it goes a long way in restoring flows to the beleaguered delta, as well, said Jennifer Pitt, *Colorado River Project* director for the *Environmental Defense Fund*, which participated in the negotiations leading to the agreement. "It is a remarkable commitment, and while the NGOs have established the *Colorado River Delta Trust*, and it's been functioning for four years, acquiring water rights for restoration, there is no way that the trust alone, or Mexico alone for that matter, could provide the kind of flows to be used for environmental purposes," she said. "And it's really only in partnership between the U.S. and Mexico, using all the tools available including reservoir storage to store water over time that that water can be delivered over time."

The flexibility built into the agreement – particularly balancing the distribution of Colorado River water between the two countries based on conditions – will also help water managers deal with the vagaries of climate change, Pitt added. According to an assessment of climate change impacts on the Colorado River issued by the U.S. Bureau of Reclamation last year, flows will likely decline by 8.7 percent by 2060. The agreement also provides a framework for future discussions about the delta and other issues, she said.

Sources: Henry Brean, *Las Vegas Review-Journal*, 11/15/12; April Reese, *Greenwire*, 11/21/12 and *Greenwire*, 11/16/12

New EPA App Checks Waterway Health

The U.S. EPA in mid-October launched a new app and website to help people find information on the condition of thousands of lakes, rivers, and streams across the U.S. from their smart phone, tablet, or desktop computer. The *How's My Waterway* app and website uses GPS technology, or a user-entered zip code, or city name to provide information about the quality of local water bodies. The release of the app and website helps mark the 40th anniversary of the Clean Water Act, which Congress enacted on October 18, 1972, giving citizens a special role in caring for the nation's water resources.

"America's lakes, streams and rivers are national treasures. Communities and neighborhoods across the U.S. want to know that their local lakes, rivers, and streams are healthy and safe to enjoy with their families," said Nancy Stoner, acting assistant administrator for EPA's Office of Water. "This new app provides easy, user-friendly access to the health of a waterway, whether it is safe for swimming and fishing, and what is being done about any reported problems. People can get this information whether researching at a desktop or standing streamside looking at a smart phone."

Potential users need to go to http://watersgeo.epa.gov/mywaterway and allow GPS-technology to identify the nearest streams, rivers or lakes or enter a zip code or city name. They will instantly receive a list of waterways within five miles of the search location. Each waterway is identified as unpolluted, polluted, or unassessed. A map option offers the user a view of the search area with the results color-coded by assessment status.

Once a specific lake, river or stream is selected, the *How's My Waterway* app and website provides information on the type

of pollution reported for that waterway and what has been done by EPA and the states to reduce it. Additional reports and technical information are available for many waterways. Users can read simple descriptions of each type of water pollutant, including pollutant type, likely sources, and potential health risks. A related links page connects users to popular water information on beaches, drinking water, and fish and wildlife habitat based on a user's search criteria.

Source: *USEPA News Release*, 10/18/12

New Fish Consumption Advisory Tools

Every year since 1993, the U.S. EPA has made available to the public a compendium of information on locally issued fish advisories and safe eating guidelines. This information is provided to EPA by states, U.S. territories, Indian tribes, and local governments who issue fish consumption advisories and safe eating guidelines to inform people about the recommended level of consumption for fish caught in local waters. Most advisories involve five primary contaminants: mercury, PCBs, chlordane, dioxins, and DDT. These chemical contaminants persist for long periods in sediments where bottom-dwelling animals accumulate and pass them up the food chain to fish. Levels of these contaminants may increase as they move up the food chain, so top predators in a food chain (such as largemouth bass or walleye) may have levels several orders of magnitude higher than the water.

EPA has now developed three interactive online search and mapping tools that allow users to perform more advanced searches of fish advisory and fish tissue data in the *National Listing of Fish Advisories* (NLFA) database. The search tools include a "where you live" basic search for advisories issued for water bodies in the state and local area and two advanced interactive maps and searches for technical users to obtain more detailed information.

The A*dvisories Where You Live* search provides historical data on fish advisories in the U.S. and its territories. EPA requests fish advisory data from the states, territories, and tribes and updates the NLFA database every 2 years. States may add new advisories or rescind advisories before this data appears in the NLFA database. Therefore, for the most current fish advisory and meal advice information for your state, please visit your state fish advisory website.

The easy-to-use *Interactive Technical Mapping* tool allows state and tribal fish advisory program managers to view information about fish advisories based on the geographic location of a waterbody, the species of the fish, the chemical contaminants identified in the advisory, and the portion of the consumer population for whom the advisory was issued. It also allows users to search the NLFA database for fish tissue contaminant data.

The *Technical Advisories* search is recommended for more advanced users. A drop-down *Advanced Searches* form allows the user to search the technical advisory information and fish tissue contaminant data. Users can then choose to display the results in map format, table format, or as a downloadable spreadsheet or PDF report.

To access the tools, visit EPA's updated fish consumption advisories website at: http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/

Source: http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/

Are We in the Anthropocene?

Twelve years ago, Paul Crutzen, a Nobel laureate and atmospheric chemist, coined the term "*Anthropocene*" at a meeting of the *International Geosphere-Biosphere Programme* (IGBP). Geology, he said, had long relegated humanity to the sidelines, but in recent history, the human fingerprint on the Earth had grown too deep to be ignored. We have created our own geological time. The world had left the *Holocene* behind and entered an epoch of humanity. While foreign to stratigraphy, the arcane and sometimes internecine discipline that judges geological time, Crutzen even hazarded a guess at when this transition occurred: the early 19th century, when the Industrial Revolution unleashed the energy found in fossil fuels. Man could move mountains, and the steady buildup of carbon in the air began. "Whenever you go somewhere in the world and make measurements, you cannot avoid having to deal with humankind," Crutzen said. "That is the idea of the *Anthropocene*."

Over the past few years, the *Anthropocene* has thus become a defining idea of environmentalism. It does much in little space. It ends the separation of humanity from nature. It changes the discussion for a politicized electorate weary of global warming. It broadens the tent, encircling a host of realities: biodiversity loss, resource scarcity, population growth. And best of all, geologically speaking, it might even be true and has come to the attention of geologists. Humans are altering the face of the world, no doubt. But the world has had many faces over its eons. And so the question is set: Is humanity's touch mere makeup, or does it cut to the bone of deep time, in a pattern consistent with geology's demands?

It's not a problem to be resolved in an Internet minute, said Jan Zalasiewicz, a University of Leicester geologist who is leading a small band of academics considering whether to formally propose the *Anthropocene* as an epoch. But the world is not waiting for the geologists to decide, of course. Run a Web search for the *Anthropocene* and 520,000 results pop up. This year, more than 200 academic papers have used the term, many of them outside geology – or the hard sciences. The term made the cover of *The Economist* and *National Geographic*. The publishing giant *Elsevier* will soon launch a journal on the *Anthropocene*. It is a phenomenon.

If the I*nternational Commission on Stratigraphy*, the bureaucracy that rules on issues of geological time, decides that the world has entered an epoch dominated by man, the verdict will reverberate with a clamor matched by few academic findings. Zalasiewicz has pulled together a diverse group of geologists and academics to reflect the wide interest in the subject. The group subsists on shoestring funding, its members gathering on the fringes of large events. Its mandate is to decide whether there will be a decision: to vote, eventually, on whether to submit the *Anthropocene* to the grinding gears of the geological hierarchy. It's a process that will be wracked with scientific, and social, uncertainty. So far, the great value of the *Anthropocene* is that it has made humanity open its eyes and look at the legacy it's leaving, Phil Gibbard, University of Cambridge said.

In many ways, imagining the *Anthropocene* requires a grim creativity. Wipe every human from the planet, and it may be surprising how much of the world would return to its pre-civilization state. Rivers would break their bounds, bending to gravity's demands. Temperatures would fall, allowing displaced species to return. Farm crops would fail and cows would die. Even cities would erode, ground back into the mineral grist from which they're made.

The planet's cycles, whirring in an absence of humanity, could render moot even some of our most obvious changes. For example,

humans have increased atmospheric carbon dioxide (CO_2) by more than 100 parts per million over the past two centuries, causing a global temperature rise of about 0.9 °C. But end human emissions and CO_2 will, over geological time, retreat from the air, dragged into the ocean's depths through the chemical weathering of eroded minerals, borne down from the mountains.

There are technical issues of stratigraphy to consider, as well. For example, biologists warn that the Earth has begun a great wave of human-induced extinction. Because much of the geological record is divided by such extinctions, these losses seem an obvious indicator. There's one catch, though. Despite popular notions, geological divides are defined not by the disappearance of creatures, but by when evolution has filled their void.

One thing is certain. The mere presence of human activity is not enough. That chip has been spent. Without the rise of humans, our current epoch, the *Holocene* – which started 12,000 years ago, as the glaciers began to retreat – would be an unremarkable time within the *Pleistocene's* rhythm of ice ages, Gibbard said. But on July 16, 1945, in New Mexico, the United States ushered in the atomic age. Over the next decade and a half, the Soviet Union and the United States competed to build, and explode, ever-larger atmospheric bombs, until the countries agreed to halt airborne tests in the early 1960s. Those tests released a patina of radioactive particles – fallout – that is easily detected in the world's soil. Some common isotopes, like cesium-137, are often used to track environmental change. Many of these particles are irrelevant geologically, though. Their half-lives last for years or days, their radioactivity consigning them to a brief stay on the planet.

The global distribution of this detritus has made atmospheric testing a strong candidate for the *Anthropocene's* start. It helps that the testing coincides with what IGBP scientists call the *Great Acceleration*: the postwar period when oil- and coal-fired growth took off like a rocket throughout the world. By 1950, CO_2 emissions sat at 315 parts per million, barely outside the *Holocene's* normal variation; that soon changed. Synthetic fertilizers become common in farming. Dam construction boomed. "Each one of these bits of evidence ... may have a different beginning," said James Syvitski, a sedimentary geologist at the University of Colorado, Boulder, and the current chairman of IGBP. "But if you were to look at the ensemble of them, after World War II, you started to see the beginnings of the exponential curve."

Simply getting at all those fossil fuels was bound to leave a mark. For example, all the world's rivers move about 13 gigatons of sediment in a year, Syvitski said. Meanwhile, each year, humanity mines 9 gigatons of coal. ("Just coal," he added.) "There are 568,000 abandoned mines in the [United States] alone. Millions throughout the world," Syvitski said. It just seems improbable to think this isn't a global signal. "The more I check," he added, "the more I'm convinced."

If there is a global signal, it will ultimately be recorded where the continents meet the sea. Geological boundaries need a stratotype, a model rock, its Platonic ideal. It's quite possible the *Anthropocene's* stratotype is forming downstream of, say, New Orleans. "Most likely to be preserved are places that are subsiding and falling rapidly in sea level," Michael Ellis, head of climate change science at the British Geological Survey said. "In most instances, that means the big deltas of the world and the coasts. ... We know we are sending all sorts of things down to those sediments." First, the amount of silt has changed, as each year dams trap about 2.3 gigatons of sediment in reservoirs. The sediment that does reach the delta is rich in particulate forms of carbon and agricultural by-products, getting buried alongside that 1950s fallout. And then there's one of the community's favorite potential signals: the shift in isotope ratios that stems from the wholesale extraction of atmospheric nitrogen for fertilizers.

The change in the nitrogen cycle is truly global, scientists have recently found. A study published in *Science* late last year found a coherent signature of human-induced changes to nitrogen in the murk of a host of remote lakes and watersheds in the Northern Hemisphere. It's a model of the research prompted by the *Anthropocene*. Expect much more work like this, Syvitski said. Erle Ellis, a geographer at the University of Maryland, Baltimore County, has won grants to look at earth evolution on a global scale. More methods will be developed to connect the tools of biology and stratigraphy. Earlier this year, Michael Ellis began discussing a "pre-*Anthropocene*" biome project that would go back thousands of years to document what buried fossils and pollen say about the distribution of life before humanity's dominance. "All sorts of spinoffs are happening faster than I can keep up with," he said.

Still, it's possible that the *Anthropocene* is an idea before its geological time. There's a degree of uncertainty in the concept that could make even nongeologists a bit squeamish. Say the world takes a turn – solar power becomes too cheap to meter – and the beginning of the end of global warming appears. Industrial and organic farming mate and turn into high-yielding, sustainable agriculture. Population levels off. "If humanity does change course, one could view [the *Anthropocene*] not even as an epoch," said Will Steffen, the Australian climate scientist. "One could view it as a minor excursion from the *Holocene*." Alternatively, CO_2 will increase and the ice sheets could melt: Hello, *Anthropocene*.

That uncertainty goes to the heart of stratigraphers' concerns about the *Anthropocene*. Their code is not about prediction, about what humanity will do next. It's about the rock. "It can get very political," Gibbard said. "And the lesson is not to let it, if you can." It will be up to Zalasiewicz, the working group chairman, to navigate those politics. The *Geological Society of London* is preparing a volume with work supporting and criticizing the *Anthropocene* from a stratigraphic view. And it wants to pull in ecologists and biologists documenting human-induced changes to plants and wildlife. By 2016, expect a chunky book from the group on the pros and cons of the *Anthropocene*.

A vote on whether to propose the period would follow soon after. "That's my personal goal," Zalasiewicz said. Four years from now, there's no telling where the popularization of the *Anthropocene* will go. It is already serving as the basis for a historic joining of the four major global scientific organizations devoted to environmental change into a group called *Future Earth*, Syvitski said. Lawyers have begun to use it. Even clergy. "Nobody's waiting for that [stratigraphic] process," he said.

Source: Paul Voosen, *Greenwire*, 9/17/12

Climate Change Update

One of the hallmarks of global warming – the extent of sea ice coverage in the Arctic Ocean – has hit a new low (1.58 million mi^2) the *National Snow and Ice Data Center* (NSIDC) announced in late August. "By itself it's just a number, and occasionally records are going to get set," Walt Meier, an NSIDC scientist, said in a release. "But in the context of what's happened in the last

several years and throughout the satellite record, it's an indication that the Arctic sea ice cover is fundamentally changing." "The previous record (1.61 millon mi^2), set in 2007, occurred because of near perfect summer weather for melting ice," Mark Serreze, NSIDC's director, said in a statement. "Apart from one big storm in early August, weather patterns this year were unremarkable. The ice is so thin and weak now, it doesn't matter how the winds blow." Overall, the six lowest ice extents in the 30 year satellite record have occurred in the last six years.

Meanwhile, large amounts of methane, a potent greenhouse gas (GHG), may be trapped under the Antarctic ice sheet and could add to global warming if a melt there releases the gas into the atmosphere, according to a new study. An international team of scientists say it is likely that microorganisms turned the continent's large deposits of organic carbon into methane, and that methane would most likely be trapped under the ice. In their paper published in late August in the journal *Nature*, the researchers from the universities of Bristol, Utrecht, California, and Alberta said the gas could be released into the atmosphere as rising global temperatures thaw the ice sheet, in turn further fueling global warming. "The Antarctic ice sheet could constitute a previously neglected component of the global methane hydrate inventory although significant uncertainty exists," wrote the scientists. Methane remains in the atmosphere for as long as 15 years. Levels of the gas have been rising in recent years following a period of stability since 1998.

Rising seawater temperatures forced an unprecedented shutdown in mid-August of a nuclear reactor on the Connecticut coast. *Dominion Resources Inc.* was forced to shutter Unit 2 of its *Millstone* nuclear plant in Waterford because water being drawn from Long Island Sound was too hot to cool emergency diesel generators and other safety-related equipment. *Dominion* has recorded a steady rise in water temperatures at the plant since 1975, but the warmth recorded this summer topped all, utility spokesman Ken Holt said. The plant's operating license requires that the 37-year-old reactor be shut down if cooling water tops 75 ^{o}F. "In previous summers, you get a week where it approaches the limit, but this summer it's been closer to the limit longer than any other summer on record," Holt said.

The *National Weather Service* said this summer was the third warmest on record since 1895 and caused the most trouble for nuclear reactors in the Northeast and Midwest, a challenging situation compounded by a record drought across the Great Plains. In Illinois, the twin-unit Braidwood plant was on alert after its 2,500-acre cooling pond warmed to more than 100 ^{o}F. Jake Crouch, a scientist at NOAA's *National Climatic Data Center*, said the warming trend makes it likely that the U.S. will see more summers just like this. "It's like this will be the new normal, as opposed to what we've seen in the past," Crouch said.

Michael Hightower, lead researcher for *Sandia National Laboratories' Water for Energy Project*, said warming is exacerbated in shallow water bodies, such as Long Island Sound, where the *Millstone* plant is located. Nuclear plants adjacent to large open bodies of water, he said, are less likely to feel the effect of rising temperatures because water there is traditionally cold. *Millstone's* closure suggests the warming trend is speeding up and spreading, Hightower said. "It's suggesting that the trends are accelerating, so we're seeing it in more and more areas and more and more parts of the country," he said. "I wouldn't say that every coastal power plant is going to have a problem, but power plants that are in shallower regions – bays, estuaries – that are in places that have traditionally warmer water temperatures will see this as a bigger issue."

Kevin Trenberth, head of the climate analysis section at the *National Center for Atmospheric Research*, said it is likely that man-made global warming made *Hurricane Sandy* stronger than it otherwise would have been. Ocean temperatures along the East Coast were roughly 5 ^{o}F above normal as Sandy approached, and about 1 degree of that can be attributed to global warming, Trenberth said. Warmer ocean temperatures mean warmer air, which holds more moisture as it heats up, providing more energy for a storm like Sandy. "With higher temperatures in the ocean and warmer air, the potential for the storm is simply to be greater, more intense, with especially heavier rainfall as a consequence," Trenberth said. "This, I think, is very clear. There is the role of global warming in this." Jonathan Overpeck, co-director of the University of Arizona *Institute of the Environment*, agreed. Several recent analyses have concluded that a huge swath of the East Coast is a sea-level rise hot spot. Seas from Cape Hatteras, N.C., to Boston are rising three to four times faster than the global average, according to one study published this summer in *Nature Climate Change*. By the end of the century, that could add 7 to 12 inches of sea-level rise within the hot spot by 2100, on top of the 1 meter, or roughly 3.3 feet, that many scientists project will occur globally by 2100.

New York Mayor Michael Bloomberg endorsed President Obama in early November saying that New York's experience with *Hurricane Sandy* had led him to back the candidate with the stronger record on climate change. "Mayor Bloomberg is stating what so many of us know: responding to climate change will require leadership beyond traditional politics," said *Environment America* Executive Director Margie Alt in a statement. She praised Bloomberg for "his own leadership" on the issue. The mayor has expanded the scope of New York's climate change task force, among other things, in an attempt to boost the city's efforts to prepare for more frequent extreme weather events. Joe Mendelson, director of climate and energy policy at the *National Wildlife Federation*, said that *Hurricane Sandy* has "realigned American politics when it comes to climate change." "Sandy has also brought into focus that politicians risk their well-being when the impacts of climate change are ignored," he added. Senator Bernie Sanders (I/VT) released a statement in early November calling Sandy "a wakeup call for all Americans that we must act to reverse global warming." Sanders pledged to do "everything I can" to champion legislation in the next Congress that would reduce heat-trapping emissions.

Meanwhile, man-made GHGs – not natural variability – are causing changes in the saltiness of the ocean, according to a study led by the *Scripps Institution of Oceanography*. Earlier this year, scientists found that parts of the ocean are getting saltier due to increased evaporation, while fresher areas are becoming more diluted from increased rainfall, faster than expected. That finding is important not just for marine life, but for everyone, because salinity is a direct indicator of the global water cycle – if patterns of rainfall and evaporation are changing in the ocean, they're changing on land, as well. While many experts suspected that the change was due to the large increase of GHGs in the atmosphere since the Industrial Revolution, natural climate variations like *El Niño*, solar fluctuations and volcanic eruptions could play a role.

A team at *Scripps and Lawrence Livermore National Laboratory* conducted a formal "detection and attribution analysis" to see how much of the salinity changes in the past 50 years could be explained by natural variability versus humans burning fossil fuels,

and the results were clear. "There is a less than 5 percent chance it's coming from natural variability," said David Pierce, a climate researcher at *Scripps* and lead author of the paper, which was published in *Geophysical Research Letters*. When the climate models tested what salinity patterns would look like with the level of GHGs observed before the Industrial Revolution and natural climate variability, they were nowhere close to the salinity patterns observed between 1955 and 2004. They were much closer to the real thing when the amounts of GHGs known to have been emitted in the past century were added to the equation. The researchers did this analysis for ocean temperature before, which produced similar results. Analyzing salinity and temperature together generates an even stronger signal that global warming is the source. They also analyzed the impact through the water column from the surface down to 2,300 feet. They found that the strongest signal occurred within 400 feet of the surface.

"That is what you would expect to see if it was a human effect," Pierce said. Changes in rainfall and evaporation will be seen closer to the surface, while other natural processes like ocean circulation come from the bottom. Raymond Schmitt, a physical oceanographer at *Woods Hole Oceanographic Institution*, said the paper confirms what many scientists had suspected. "I don't think there is any other credible explanation," he said. "There are no spaceships arriving to pour salt in the ocean, no aliens with salt shakers up in the sky." On a serious note, Schmitt said that since the models underestimate actual conditions, it implies they aren't computing the water cycle quite right. "I suspect real anthropogenic effect is even larger than what the models are showing," he said. Schmitt recently returned from a six-week research cruise looking at the saltiest region of the Atlantic Ocean, which is called the salinity maximum. "I was surprised at how salty it had gotten," he said. "It was much saltier than observed previously. We think we have a new record high for the area."

The *American Meteorological Society* (AMS) is taking a bolder stance on climate change, now insisting that there exists "unequivocal evidence" of global warming – and that human activity is the "dominant cause." The organization, whose membership runs the gamut from broadcast weather forecasters to climate scientists, released its updated climate change statement in late August. It replaces the 2007 version, which found that humans had "significantly contributed" to warming water, air and land temperatures, a trend itself documented by "adequate evidence." The updated statement said that, while each year over the past 10 years is not necessarily hotter than the one before it, evidence shows that all of the 10 warmest years prior to 2011 occurred since 1997, with 2005 and 2010 the warmest two years in more than a century. Human activity is making all the difference by emitting chlorofluorocarbons, methane, nitrous oxide and CO_2, the statement said, emphasizing the latter and pointing to rising CO_2 atmospheric concentration due to fossil fuel combustion and deforestation. "It was a careful and thorough process with many stages of review and one that included the opportunity for input from any AMS member before the draft was finalized," said Keith Seitter, AMS' executive director.

The paper predicts global sea levels will continue to rise – bolstered by melting ice sheets – but without uniformity at all locations, and that oceans will continue to warm. More frequent and fierce rain and snow incidents will occur, separated by longer periods with no precipitation, the statement said. It also calls for increased global climate research and enhanced climate forecasting efforts. A survey of AMS members earlier this year found 89 percent of respondents agree that global warming is occurring, while only 59 percent linked it to human activity. The society's climate change statements are updated every five years.

Meanwhile, average Americans have become more likely to link extreme weather events to climate change, according to a report released in early October by researchers at Yale and George Mason universities. Seventy-four percent of Americans said "global warming is affecting weather in the U.S.," according to a survey taken in August and September, compared with 69 percent who agreed with that statement in a March survey, the report says. The survey of 1,061 adults has an error margin of 3 percentage points. Those surveyed were also asked what kind of weather they have seen accelerating and whether they link it to climate change. Seventy-three percent said this summer's record heat was worsened by climate change. Sixty-one percent said they had seen U.S. weather change for the worse over the past several years. The most interesting finding in this fall's survey, he said, was that more Americans are agreeing that climate change is behind extreme weather than they were six months ago.

U.N. climate chief Christiana Figueres told a Washington, D.C., audience at the *Carbon Forum North America* conference on October 1 that the U.S. can either help write the next chapter of international climate policy or it can wait until the rest of the world has set rules it will have to abide by. Figueres said China, the European Union, Australia, New Zealand, and Latin American countries including Mexico are ahead of the U.S. in measures to address climate change. "Both the U.S. and the international interests are better served by the active participation in the design and construction of the market mechanisms of both the U.S. government and the U.S. private sector," Figueres said. "Solving climate change is no doubt going to require, as so many efforts have in the past, American ingenuity and American know-how," she added.

Bill Ruckelshaus, who was EPA's first administrator under President Nixon, said in a recent interview that the public would bring about action on climate change, not politicians. Nixon was pushed to act on clean air and clean water not because they were his top priorities, Ruckelshaus said, but because the public would not allow him to ignore the issues. "And if the public begins to think we're not protecting their health or protecting the environment strongly enough, they could demand action," he said. "That's what will result in action, I think." He said he supported current EPA Administrator Lisa Jackson's plans to regulate GHGs from major-emitting sectors under existing law but hoped Congress would pass legislation to price carbon, as well. "If we're going to get serious about reducing carbon, we're going to have to make it cost more," he said.

Additionally, two other former U.S. EPA Administrators Christine Todd Whitman and Carol Browner wrote in the November 8 *New York Times* that President Obama should devote some of his newly won political capital to energy and climate change. Whitman, who was President George W. Bush's first EPA administrator, said a CO_2 cap-and-trade bill remains the best solution for tackling climate change and should still be "on the table." In a separate *Times* op-ed, Browner, the former Clinton administration EPA chief and former Obama energy and climate adviser, wrote that climate and energy "stand out as major pieces of unfinished business for the Obama administration." Browner did not call on Obama to push for cap-and-trade legislation, but instead proposed that he "work for a clean energy future by using his executive authority and leveraging existing energy laws." "As he did with the car companies, the president should use the existing authority to work with the elec-

tric utilities and power plants to craft a sector plan to reduce carbon pollution and secure greater energy efficiency while providing business certainty," Browner wrote.

Sources: Nina Chestney, *Reuters*, 8/29/12; *ClimateWire*, 9/6/12; Paul Voosen, *Greenwire*, 8/27/12; Hannah Northey and Hema Parmar, *Greenwire*, 9/14/12; Lauren Morello, *Greenwire*, 10/31/12; Jean Chemnick, *Greenwire*, 10/1, 10/9, 11/2, 11/8 and 11/9/12; Laura Petersen, *Greenwire*, 11/5/12; Hema Parmar, *Greenwire*, 8/28/12; and *Greenwire*, 7/8 and 8/30/12

Climate Change, Wildlife, and Wildlands Toolkit

The *Climate Change, Wildlife, and Wildlands Toolkit for Formal and Informal Educators* is an updated and expanded version of the popular *Climate Change, Wildlife, and Wildlands Toolkit for Teachers and Interpreters* first published in 2001 and distributed in all 50 states, the U.S. territories, and over a dozen countries across the world. The new kit is designed for classroom teachers and informal educators in parks, refuges, forest lands, nature centers, zoos, aquariums, science centers, etc., and is aimed at the middle school grade level. The U.S. EPA, in partnership with six other federal agencies (National Park Service, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration, USDA/Forest Service, U.S. Geological Survey, Bureau of Land Management), developed the kit to aid educators in teaching how climate change is affecting our nation's wildlife and public lands, and how everyone can become "climate stewards."

The new toolkit's materials are grounded in government approved, current information (including IPCC reports, *US Global Change Research Program* assessments, recent research by federal agencies) on climate science and impacts to wildlife and their habitats in specific eco-regions of the U.S.

Specifically, it features:
- Environmentally/user friendly packaging (DVD);
- An easy to understand overview of the science of climate change in question/answer format;
- A glossary of climate change terms to build vocabulary;
- Case studies of 11 eco-regions in the U.S., highlighting regional impacts to habitats and wildlife, and information on what kids can do to help;
- A 12-minute, high-definition video on climate science, impacts on, and solutions for wildlife and wild lands; segmented for ease of use in any setting;
- Classroom activities keyed to national science standards, developed by participants in the 2008 *Albert Einstein Distinguished Educator Fellowship Program;*
- Additional updated materials and hands-on activities from EPA's popular climate change education resources library;
- Links to a wide variety of educational resources developed by all 7 federal agencies for use in formal and informal settings; and
- Up-to-the-minute graphics developed by federal agencies at the forefront of the climate change issue

The new case studies and activities have been reviewed by scientists and educators in all 7 agencies involved in the creation of the kit. The collaboration of the 7 federal agencies and bureaus working together to develop an educational kit on climate change is unprecedented. The results of the effort are of the highest quality in the areas of climate science, environmental education, and stewardship information.

See: http://www.globalchange.gov/resources/educators/toolkit/materials

Meetings of Interest

Mar. 3-6: 33rd Annual Midwest Aquatic Plant Management Society (MAPMS) conference, Marriott Cleveland Downtown at Key Center, OH. See: www.mapms.org.

Mar. 12-13: International Didymo Conference, Providence, RI. See: http://www.stopans.org/Didymo_Conference_2013.htm.

Mar. 25-30: 78th North American Wildlife and Natural Resources Conference, Crystal Gateway Marriott, Arlington, VA. See: http://www.wildlifemanagementinstitute.org/index.php?option=com_content&view=article&id=348&Itemid=61

Apr. 2-4: 1st National Adaptation Forum (NAF): Action today (climate change) for a better tomorrow. Denver Marriott City Center, Denver CO. See: http://www.nationaladaptationforum.org/

Apr. 21-25: 18th International Conference on Aquatic Invasive Species, Sheraton-on-the-Falls Hotel in Niagara Falls, Ontario, Canada. See: www.icais.org. For more information contact: The Invasive Species Centre, Elizabeth Muckle-Jeffs, elizabeth@theprofessionaledge.com, 1-800-868-8776 or 613-732-7068

Apr. 21-26: Groundwater Quality Conference (GQ13), University of Florida, Gainesville, FL. See: www.conference.ifas.ufl.edu/GQ13

Apr. 24-26: 45th annual Mississippi River Research Consortium, Radisson in La Crosse, Wisconsin. See: http://mrrc.ngrrec.org/

May 1-3: Steinbeck and the Politics of Crisis: Ethics, Society, and Ecology Conference, San Jose, CA, See: http://tinyurl.com/steinbecksanjose2013.

June 14-17: 19th International Interdisciplinary Conference on the Environment, Portland, OR, See: http://ieaonline.org/?page_id=68

Jul. 21-25: 7th International Symposium on Sturgeons, co-hosted by Vancouver Island University (VIU) and the City of Nanaimo, Canada. See: http://iss7.viu.ca/call-for-papers-abstracts.

Jul. 29 – Aug. 2 : 5th National Conference on Ecosystem Restoration (NECR), Renaissance Schaumburg Convention Center Hotel, Chicago, IL. See: www.conference.ifas.ufl.edu/NCER2013

Congressional Action Pertinent to the Mississippi River Basin

Information on new Congressional action will be included in the next issue of *River Crossings* after the new Congress convenes in January.