

# River Crossings

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## Black Carp Listed as an Injurious Species

The U.S. Fish and Wildlife Service (FWS) on October 18th added black carp (*Mylopharyngodon piceus*) to the list of injurious fish under the Lacey Act. This action prohibits live black carp, gametes, viable eggs and hybrids from being imported into or transported between the states of the continental U.S., the District of Columbia, Hawaii, the Commonwealth of Puerto Rico, or any territory or possession of the U.S.

“This is an attempt to head off a potential problem,” said H. Dale Hall, FWS Director. “Black carp have the potential to cause major damage to America’s native mussel populations, and we want to get out in front of the issue now. Stopping the transport of these fish is crucial to the future of our native aquatic species.”

Black carp, also known as snail carp, black amur, or Chinese roach, is a freshwater fish that inhabits lakes and lower reaches of large, fast moving rivers and associated backwaters, including canals and reservoirs. Black carp can grow to more than three feet in length, and individuals are known to live to at least 15 years of age. Adult black carp are bottom feeders that almost exclusively eat mollusks (mussels and snails) when available, but can eat insects, shrimp, commercial fish feeds and aquatic plants.

Powerful pharyngeal (throat) teeth permit the black carp to crush the thick shells of large mollusks, and one fish can consume a

few pounds of mussels each day. The mouth of an adult black carp is much larger than most native mollusk-eating fish — presenting a new threat to native mussel species.



*Black Carp*

Black carp originally entered the U.S. in 1973 as a “contaminant” in imported shipments of grass carp or other Chinese carp stocks. The second introduction of black carp took place in the early 1980s when it was used in fish production ponds in the southeastern U.S. for biological control of a parasite, and as a potential food fish. Since that time black carp have become more commonly used and transported, particularly during the late 1990s to control another species of snail-borne

parasite at primarily catfish and hybrid striped bass farms.

The FWS received a petition from the Mississippi Interstate Cooperative Resource Association (MICRA) to list the black carp under the injurious wildlife provision of the Lacey Act on February 24, 2000. That document outlined the potential impacts of black carp on native freshwater mussels and snails in the Mississippi River basin. A second petition containing the same request was received by the FWS and signed by 25 members of Congress representing the Great Lakes region. A follow-up letter indicated seven additional legislators supported the petition.

With this listing under the Lacey Act, live black carp, gametes, viable eggs and hybrids can now be imported only under FWS permit for scientific, medical, educational, or zoological purposes, or without a permit by Federal agencies solely for their own use; permits will also be required for the interstate transport of live black carp or viable eggs

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currently held in the U.S., for scientific, medical, educational, or zoological purposes.

This listing does not prohibit intrastate transport or possession of live fish within States, where not prohibited by the State. Any regulation pertaining to the use of these species within States continues to be the responsibility of each State. Also, the injurious wildlife listing does not prohibit the importation or transport of dead black carp. Additional information about injurious species and black carp can be found on the FWS Branch of Invasive Species web pages at: <http://www.fws.gov/contaminants/ANS/ANSInjurious.cfm>, and <http://www.fws.gov/contaminants/ANS/ANSSpecies.cfm>

Obviously this listing is welcome news to most MICRA members who have argued in favor of it for more than seven years. But the news comes with mixed emotions, because, as discussed in past issues of *River Crossings*, several black carp have already been captured from the wild, and so the species may already be established in some rivers of the Mississippi River Basin. Dr. Leo Nico, USGS/Biological Resources Division in Gainesville, FL summarized the concerns of resource managers related to black carp in the wild in the excerpted text below taken from a recent email circulated among participants reviewing the FWS's recently completed Asian Carp Management and Control Plan.

“...many native mussels and certain native aquatic snails in North America are imperiled and many are listed as Federally endangered or threatened species.....a recent review paper....reported that 202 of the 300 unionid mussel species within the United States and Canada are listed by the *Natural Heritage Network* as presumed extinct, possibly extinct, critically imperiled, imperiled, or vulnerable.....an earlier paper....listed 297 native freshwater mussels for North America. They concluded that, among these 297 species, 213 taxa (71.7%) were considered endangered, threatened, or of special concern. Prior to escape of Black Carp into the wild, imperiled mussels had already been subject to many perturbations (e.g., dredging of river channels, construction of dams, decreases in native host fishes, etc.). Consequently, the situation of escaped Black Carp and their effects on wild native mollusks is very different from captive Black Carp interactions with abundant, common snails inhabiting farm ponds.

‘Black Carp are an additional threat because they represent a totally new type of predator in natural riverine systems of North America. Black Carp grow to large size (>1.5 m long), specialize on mollusks, and large Black Carp, because of their mouth size and powerful pharyngeal teeth, are potentially capable of consuming even large and thick-shelled species. Unlike the common snails in ponds, native mussels in riverine systems are typically concentrated in beds on open substrates of the river channel and associated backwaters, sites where there often is little or no vegetative cover. It is conceivable that a few adult Black Carp could forage on open beds and significantly reduce a bed’s population by affecting recruitment by taking young mussels and even feeding on some of the larger individuals. Because many of these native mollusks are already imperiled, elimination of even a portion of the population may be enough to drive these mollusks to extinction. Considering the large numbers of aquatic mollusks in North America already imperiled, Black Carp

have the potential to harm many species of endangered and threatened mollusks, not just one or a few. One additional concern is that Black Carp may impact other native fishes upon which the mussels rely as hosts during the obligatory parasitic life stage. For example, the Freshwater Drum may be reduced in abundance due to similarities of diet with Black Carp. Freshwater Drum are host-fish for several mussel species.

‘The time scale needs to also be considered. You are likely aware that fish farmers want to keep ponds in production. Consequently, farmers use Black Carp and other snail-control measures with the aim of eliminating or reducing pond snails within a single season or year. In contrast, wild Black Carp populations measurable effects on native mollusks would likely not be observed over a single year — but rather — would be cumulative and occur over the course of several years. Elimination of 50% of pond snails within a 12-month period may not meet the management objectives of fish farmers, but elimination of 50% of mollusks

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in a single mussel bed in a stream may represent a major loss. Given that even triploid or sterile Black Carp may survive well over 15 years — the impact on certain native mollusk populations could escalate over time. Because Asian carps are also known to travel long distances, it is conceivable that a small group of Black Carp could potentially invade a small drainage in, for example, the state of Tennessee. If that small drainage contains an endemic population of a particular mussel species, then the invading Black Carp could have a marked effect on the mollusk’s survival, particularly if the mollusk is already imperiled.... Although Black Carp potential population size may not achieve that of the Bighead Carp (fish of somewhat similar large body size), Black Carp may become numerous in the wild and seriously threaten native mollusk populations....Some native mollusks — depending on their burrowing habits — will likely be less vulnerable to predation than others. However, it is likely that Black Carp foraging in riverine habitats, especially where there are mussel beds in moderately strong currents, will be able to root out mussels from the mud and sand—the digging by Black Carp partly aided by the river current.

‘Scientists, fish farmers, and conservationists all agree that Black Carp are highly effective in feeding on mollusks. This is why fish farmers want to use Black Carp to control common snails in their ponds. But efficiency of Black Carp in consuming large numbers of mollusks is also why many others are concerned that escaped Black Carp will result in the further decline of native, already imperiled mollusks....’

Black carp are very similar in appearance to the grass carp, commonly used for weed control in many farm and golf course ponds across the country. A key to the identification of Asian carp in the U.S. can be found on MICRA’s web site at: <http://www.waux.cerc.cr.usgs.gov/MICRA/>. Additional information on aquatic invasive species can also be found on the MICRA site as well as on the Mississippi River Basin Panel on Aquatic Nuisance Species site at: <http://www.waux.cerc.cr.usgs.gov/MICRA/MRB%20Panel%20on%20ANS.htm>. Readers are encouraged to learn to identify black carp and other aquatic invasive species and to destroy any that are found in the wild.

## Regulators Have ‘Orphaned’ the Mississippi River

Despite its mythical status as “America’s River,” the Mississippi has been effectively “orphaned” by government regulators who have failed to monitor and stem pollution from farms, cities, suburbs and other sources. That is the conclusion of a *National Academy of Science* (NAS) report released in mid October, marking the 35th anniversary of the signing of the Clean Water Act (CWA).

The sweeping study of the Mississippi River corridor by the *National Research Council* follows decades of deteriorating water quality from the river’s headwaters in northern Minnesota to its mouth at the Gulf of Mexico, where a hypoxic “dead zone” persists due to high concentrations of oxygen-depriving nutrients. In its analysis, the panel discovered two distinct Mississippi River corridors with unique environmental challenges. While the upper portion of the river is choked with sediment and other pollutants trapped behind dams and other flood controls structures, the lower Mississippi is starved of essential sediments necessary to maintain the river’s delta off the Louisiana coast.

Yet the greatest challenge facing the Mississippi, the NAS panel said, is “limited attention being given to monitoring and managing” the river’s water quality and the failure of the U.S.EPA to help states effectively address pollution through CWA programs. David Dzombak, the panel’s chairman and a professor of environmental engineering at Carnegie Mellon University, said the government’s lackluster performance in monitoring and targeting nonpoint source pollution “does not match the river’s significant economic, ecological and cultural importance.”

The panel noted that some CWA programs, such as the permitting of industrial plants under the National Pollution Discharge Elimination System (NPDES) “have successfully reduced much point-source pollution.” But the bulk of the remaining pollution problems stem from nonpoint sources — mainly nutrients and sediments that enter the river and its tributaries through runoff. “Nutrients, such as nitrogen and phosphorous from fertilizers, create significant water-quality problems in the river itself and contribute to an oxygen-deficient dead zone in the northern Gulf of Mexico,” the

authors said in a statement issued alongside the report.

To effectively address such problems, the panel recommends that EPA work closely with state agencies to coordinate pollution monitoring and mitigation efforts throughout the 10-state Mississippi River corridor. The panel also recommends that EPA forge stronger partnerships with the Department of Agriculture to improve programs aimed at reducing nutrient runoff from farms and livestock operations. The panel said many of the tools used by federal and state partners to clean up the Chesapeake Bay could be applied to the Mississippi River. “It’s an excellent model,” Dzombak said. “We think there’s much useful experience to draw upon, and we encourage EPA and the states to look at [Chesapeake Bay] as a model to follow.”

Environmental groups generally welcomed the report’s findings, saying they point to the need to address chronic stormwater runoff along the 2,300-mile river corridor. Sara Hopper, an attorney for *Environmental Defense* and a former staff member of the Senate Agriculture Committee, said in a statement, “This report shows why Congress must significantly increase funding for USDA conservation programs to improve water quality and to achieve other conservation goals, such as providing clean air, wildlife habitat and combating urban sprawl.”

The NAS report brief can be found online at: [http://dels.nas.edu/dels/rpt\\_briefs/miss\\_river\\_cwa\\_final.pdf](http://dels.nas.edu/dels/rpt_briefs/miss_river_cwa_final.pdf). The entire 284 page project report can be purchased online at: [http://books.nap.edu/catalog.php?record\\_id=12051](http://books.nap.edu/catalog.php?record_id=12051)

Source: Daniel Cusick, *Greenwire*, 10/16/07

## Mississippi River Plan Asks States to do More

States would bear primary responsibility for curbing nonpoint source pollution that sweeps off farms and streets in the Mississippi River Basin under a new federal plan for addressing the vast “dead zone” for marine life in the Gulf of Mexico. The *Mississippi River/Gulf of Mexico Watershed Nutrient Task Force plan* is aimed at revitalizing a hypoxic zone the size of New Jersey caused by excessive nitrogen and phosphorus pouring out of the Mississippi River.

High concentrations of nutrients mixing with warm gulf water causes seasonal dissolved oxygen levels to drop dramatically, smothering fish and other marine life. The hypoxia process begins with an explosion of nutrient-loving algae, which in turn settles and decays in subsurface waters. The decaying algae consume virtually all of the oxygen in the water column, usually at a rate faster than it can be replenished at the surface. The result is a broad, lifeless swath of the gulf that is biologically and economically bereft, according to experts who study the phenomenon.

Among other things, the new action plan increases both state and federal accountability for reducing pollution in the basin; shifts more responsibility to states for crafting and implementing nutrient reduction strategies; requires federal agencies to develop pollution reduction strategies around key federal projects, and improves tools for both tracking and reporting pollution.

The task force — which was headed by U.S. EPA — has set a goal for reducing the dead zone to a five-year running average of less than 5,000 square kilometers by 2015. Ben Grumbles, EPA's assistant administrator for water, said in a statement the Bush administration and its 10 state partners on the task force remain "committed to improving water quality and reducing nutrient pollution in America's largest watershed." But some experts remain skeptical that the new plan will improve conditions in the basin, and they are particularly critical of provisions placing more responsibility on states to develop and enforce tough pollution policies. "The only reason we have improved water quality across much of the nation to this point is because of the EPA's broad enforcement of the Clean Water Act," said Nancy Rabalais, one of the nation's foremost experts on the Gulf of Mexico dead zone and executive director of the Louisiana Universities Marine Consortium (LUMC). "Some states are just flat not going to institute the right levels to make a difference."

Rabalais said the new action plan appears "to run counter to the strong recommendations of the National Academy" (see previous article). The plan, which is open for public comment until Jan. 4, is in part a response to long-held concerns that pollution reduction efforts on the Mississippi River have been hamstrung by lack of coordination and conflicting priorities among state and federal agencies. Grumbles called the revised document "a roadmap for real progress through coopera-

tive conservation, interstate collaboration and local innovation."

The Gulf of Mexico dead zone, first documented more than 20 years ago, has grown dramatically in recent years, from roughly 8,000 square kilometers in 2003 to more than double that size in 2006. Experts attribute the increase to both human and natural activity. This year's dead zone covered a contiguous area from easternmost Louisiana to Freeport, Texas, according to Rabalais. Only twice before, in 2001 and 2002, did the dead zone's size reach greater than 20,000 square kilometers, an area about the size of New Jersey.



View of the Upper Mississippi River near Prairie du Chien, WI.

According to the latest government data, the Ohio and Tennessee watersheds remain the largest contributors of both nitrogen and phosphorus, accounting for 40% and 38%, respectively, of total loading between 2001 and 2005. The Upper Mississippi Basin, north of Paducah, Ky., was the second-largest contributor of nutrient pollution, accounting for 39% of nitrogen and 26% of total phosphorus. The draft Gulf Hypoxia Action Plan can be found on line at: [http://www.epa.gov/msbasin/taskforce/pdf/2008draft\\_action\\_plan.pdf](http://www.epa.gov/msbasin/taskforce/pdf/2008draft_action_plan.pdf)

Source: Daniel Cusick, *Greenwire*, 11/21/07

### EPA Lacks Data to Assess 'Nonpoint' Permit Program

U.S. EPA lacks the data needed to assess a program aimed at curbing nonpoint source pollution that washes off streets, farmland and parking lots, the agency's inspector general said in a report in late September. At issue is the Total Maximum Daily Load (TMDL) program that requires states to gauge the health of water bodies, determine maximum pollution loads for each and then write discharge permits. But EPA lacks the statutory authority to regulate these "nonpoint" pollution sources and lacks

information about possible permit holders, the report says. So the agency cannot tell if the program is being properly implemented or whether the program is helping cleanse polluted waterways.

While the Clean Water Act is credited with scrubbing discharges from factories, sewage treatment plants and other "point" sources, EPA estimates that nearly 40% of the nation's waterways are still polluted. The agency is under court orders with 22 states to establish TMDLs if those states fail to do so. EPA says the program is expected to cost it and states nearly \$1 billion over the next 10 years.

But while EPA has a TMDL tracking system that lists all impaired waters and more than 24,000 TMDLs, the information is incomplete and does not allow the agency to see which National Pollution Discharge Elimination System (NPDES) permits need to include wasteload allocations. Ben Grumbles, EPA's water administrator, said the agency has struggled to assess TMDL implementation and effectiveness because multiple pollution-control measures are often used simultaneously to improve water quality.

Grumbles took issue with the IG's suggestion that EPA require annual reports on the progress of TMDL implementation, arguing it would be too expensive and not worth the effort.

Lucy Kafanov, *Greenwire*, 9/24/07

### EPA Falling Short on Prosecutions

The number of cases and criminal charges against polluters has fallen off under the Bush administration compared with past administrations, according to data from the US EPA and the Justice Department. Between fiscal years 2002 and 2006, the number of civil lawsuits filed against defendants who refuse to settle environmental cases fell 70%, compared with a four-year period in the late 1990s. New investigations and total convictions are also down by more than a third, allowing polluters to dismiss environmental laws without fears of prosecution.

Critics of the agency say this has emboldened polluters to flout U.S. environmental laws, threatening progress in cleaning the air, protecting wildlife, eliminating hazardous materials, and countless other endeavors overseen by the

EPA. “You don’t get cleanup, and you don’t get deterrence,” said Eric Schaeffer, who resigned as director of the EPA’s Office of Civil Enforcement in 2002 to protest the administration’s approach to enforcement and now heads the *Environmental Integrity Project*, a watchdog group. “I don’t think this is a problem with agents in the field. They’re capable of doing the work. They lack the political support they used to be able to count on, especially in the White House.”

The slower pace of enforcement mirrors a decline in resources for pursuing environmental wrongdoing. The EPA now employs 172 investigators in its Criminal Investigation Division, below the minimum of 200 agents required by the 1990 Pollution Prosecution Act, signed by President George H. W. Bush. The actual number of investigators available at any time is even smaller, agents said, because they sometimes are diverted to other duties, such as service on EPA Administrator Stephen L. Johnson’s eight-person security detail. Johnson, President Bush’s chief environmental regulator, foreshadowed a less confrontational approach toward enforcement when he served as the EPA’s top deputy in late 2004. “The days of the guns and badges are over,” Johnson told a group of farm producers in Georgia the day before Bush won reelection, according to a news account of the speech.

Administration officials said they are not ignoring the environment but are focusing on major cases that secure more convictions against bigger players. “We have been on an unprecedented run of success in the enforcement arena,” said Granta Y. Nakayama, EPA assistant administrator for enforcement and compliance assurance. “These are major cases we are pursuing.” Nakayama said that, in the past three fiscal years, the EPA has cut between 890 million and 1.1 billion pounds of air pollution through enforcement, making them “three of the four highest years in the agency’s history. . . . You’re seeing, I think, a historic period in terms of getting pollution out of the air.” He added that he hopes to boost the number of criminal investigators and said that, over the past five years, the agency has won convictions against 95% of the people indicted for environmental crimes.

Administration officials acknowledge taking a new approach to environmental enforcement by seeking more settlements and plea bargains that require pollution reductions through new equipment purchases or

participation in EPA compliance programs. Justice Department spokesman Brian Roehrka said the department secured \$13 billion in such corrective measures from polluters in 2005-06, up from about \$4 billion in the final two years of the Clinton administration. “Environmental prosecutions continue to be very important to the department,” Roehrka said. Settlements and judgments that impose corrective measures “protect the nation’s environment and safeguard the public’s health and welfare,” he said.

But House Energy and Commerce Committee Chairman John D. Dingell, whose panel oversees environmental enforcement, disagrees. “Where once a polluter could expect criminal prosecution, there are now civil settlements. Where once there were criminal penalties, there are now taxpayer subsidies,” Dingell (D/MI) said.

The environmental crimes unit at the Justice Department headquarters in Washington has grown to a record 40 prosecutors, and last year, it secured near-record highs in years of confinement and criminal penalties, Roehrka said. But environmental prosecutions by U.S. attorneys’ offices have sharply dropped as prosecutors facing new pressures on issues such as terrorism and immigration take away resources for environmental prosecutions and try to divert cases to the main Justice Department, EPA agents said. “Environmental crimes are simply not in the U.S. attorney’s top 10 priorities,” said one senior EPA official, who spoke on the condition of anonymity because he is not authorized to talk to the news media.

But prosecutors counter that the EPA has fewer agents and is bringing them fewer cases. “We’re not turning away environmental crimes in order to prosecute other crimes. They are just not being presented in the first place,” said Don DeGabrielle, the U.S. attorney in Houston. EPA memos show that investigators also have encountered new obstacles to their long-standing practice of directly referring cases to federal or state prosecutors. A new policy distributed May 25 requires agents to seek prior approval from the head of their division and establishes new paperwork procedures. This has slowed agents’ ability to make referrals, congressional investigators said. Nakayama said he was not “personally familiar” with the new policy and would look into it.

But the fact is that the number of environmental prosecutions plummeted from 919 in

2001 to 584 last year, a 36% decline, according to Justice Department statistics collected by Syracuse University’s *Transactional Records Access Clearinghouse*. Those same Justice Department data also show that the number of people convicted for environmental crimes dropped from 738 in 2001 to 470 last year. Similarly, the number of cases opened by EPA investigators fell 37%, from 482 in 2001 to 305 last year, according to data the EPA provided congressional investigators.

Sources: John Solomon and Juliet Eilperin, *Washington Post*, 9/30/07; and *Greenwire*, 10/1/07

### Agricultural Runoff and Frog Deformities

Minnesota schoolchildren in 1995 noticed that more than half the frogs in a pond they were studying had missing limbs or too many limbs. Scientists since then have figured out that a parasite plays a key role in this problem. But now according to a study funded by the *National Science Foundation* and published online in late September in the journal *Proceedings of the National Academy of Sciences*, scientists report that agricultural runoff such as fertilizers and animal waste can cause the deformities.

The more nitrogen, phosphorus or cattle droppings carried in the runoff flowing into ponds or lakes, the more algae forms, setting in motion a series of events in the waters where frogs live, said Pieter Johnson, study leader at the University of Colorado’s ecology and evolutionary biology department. The nutrients in the runoff stimulate the growth of algae, which in turn increases the population of snails. Microscopic parasitic worms called trematodes infect the snails — and more snails means more worms. The worms reproduce asexually inside the snails, which Johnson said are turned into “zombies” castrated by the parasites, allowing the worms to expel thousands of offspring. The worms then swarm over tadpoles — the water-dwelling larvae of frogs — and burrow at the spots where limbs are developing, forming cysts and causing developmental deformities. Predators such as large wading birds eat the infected frogs and spread the worm back into the ecosystem through defecation. Deformed frogs are more easily caught and eaten, benefiting the worm’s life cycle, Johnson said.

Many ecologists have expressed alarm over the plight of the world's amphibians and the role of human activities in their declining populations. "We continue to see malformed amphibians all over the place and yet very little is being done to address those questions or even understand them," Johnson said. While scientists had blamed parasitic infections for deformities seen in recent years in some types of amphibians, this study documented how runoff from farms and livestock ranches drives the process.



**Deformed Frogs**

(Pieter Johnson, Univ of Colo. Photos)

The study involved installing 36 artificial ponds in central Wisconsin, loading them with parasite-carrying snails and parasite eggs, and then putting different amounts of fertilizers into the ponds. "It was all well within the range of what you might find in an agricultural pond — a lot less in many cases," Johnson said. In ponds with added nutrients, the snail population grew by 50%, and those snails collectively had eight times as many parasite eggs as the ponds with no extra nutrients. The infection rates in frogs was 2-5 times higher in those ponds as in the ponds with fewer nutrients.

"Generally, there's over-application of these fertilizers," and that applies not just to farmers and ranchers, but to suburban homeowners, Johnson said. It takes just a little fertilizer to stimulate growth of grass in your yard, he said. The excess washes into the gutter and eventually to a body of water

where an algae-loving snail may be lurking to start the unhappy cycle again in an unsuspecting frog. The study didn't look at precisely how much fertilizer is too much — that could be the subject of a follow-up study, Johnson said. "The next step is to figure out how to optimize the trade-off," using some amount of nutrients to boost food production but "minimizing the increase in human and wildlife disease."

The findings not only have implications for worldwide amphibian declines, but also could help scientists better understand the spread of diseases such as cholera, malaria, West Nile virus and diseases affecting coral reefs. According to Johnson, in parts of Central and South America, when a lot of nutrients collect in water, it leads to a proliferation of mosquitoes good at transmitting malaria. Extra nutrients also likely boost the populations of mosquitoes that carry the West Nile virus, he said. Andrew Blaustein, zoologist from Oregon State University, hailed the study as one of the first to connect the "drastic" problem of fertilizers with the proliferation of parasites and several diseases that can deform amphibians and sicken humans.

Sources: Will Dunham, *Reuters*, 9/24/07; Heather Laroi, *Wisconsin State Journal*, 9/24/07; Bill Scanlon, *Rocky Mountain News*, 9/24/07; and *Greenwire*, 9/25/07

### Paying Farmers to Protect the Environment

Paying farmers to protect the environment — rather than just for their produce — will be an important way to ensure a rapidly increasing demand for food does not destroy the planet, the United Nations' Food and Agriculture Organisation (FAO) said in mid November. Paying for "environmental services" is set to be an important way to link two of humanity's greatest challenges: beating poverty and safeguarding the environment, FAO said.

"(Farming) has the potential to degrade the Earth's land, water, atmosphere and biological resources — or to enhance them — depending on the decisions made by the more than 2 billion people whose livelihoods depend directly on crops, livestock, fisheries or forests," said FAO Director-General Jacques Diouf. "Ensuring appropriate incentives for these people is essential," he said in his foreword to the agency's annual report *"The State of Food and*

*Agriculture"* which focused on environmental payments.

The FAO points out that many governments already subsidize farming, but rarely do so to protect the environment. "Current incentives tend to favor the production of food, fiber, and increasingly, biofuels, but they typically undervalue other beneficial services that farmers can provide," it said. The report concentrates on three particular "services": the storage of carbon dioxide in plants and soil which can help slow global warming; water provision from flood prevention and water filtration through roots and soil; and nature conservation.



**Streamside buffer provided on farmland in Minnesota under the Conservation Reserve Program to filter pollutant laden runoff from croplands before reaching the stream..**

One of the first such payment schemes was the Conservation Reserve Program, a 1985 program to pay U.S. farmers to retire cropland from farming for 10-15 years. The report says hundreds of schemes now exist in rich and poor countries, mostly in the forest management sector. As deforestation is estimated to produce at least 18% of global greenhouse gas emissions, a potentially huge growth area would be in paying poorer countries not to chop down their forests. That option is now allowed only to a limited extent by the Kyoto Protocol, but countries meeting in Indonesia in December to discuss global climate change initiatives for after 2012 will consider whether it should be expanded.

Environmental payments to farmers do not have to be linked to them stopping farming, but can be an incentive to make it less damaging, such as encouraging "shade-grown" coffee rather than intensive production where forest canopies are destroyed. The report stresses the drawbacks as well as potential benefits of environmental payment schemes, for example the risk that they may reduce food output for hungry populations.

“The impact of a PES (payment for environmental services) approach on the poor is highly dependent on who holds the rights to use resources,” the report says — noting the risk that such schemes might benefit relatively wealthy landowners more often than the extremely poor who own nothing.

Sources: Robin Pomeroy and Philippa Fletcher, *Reuters*, 11/15/07; and *Greenwire*, 11/15/07

### Utility Agrees to Pay Rent for MT Riverbeds

Washington-based *Avista Corp.* has agreed to pay the state of Montana \$4 million per year in rent to use state-owned riverbed on the Clark Fork River impounded by two of their hydroelectric dams. The dams located in northwest Montana and north Idaho include the Noxon Rapids Dam and reservoir, and the Cabinet Gorge Dam, which actually sits in North Idaho near the state line but stores miles of river water in Montana. The agreement was reached shortly before going to trial over the issue.

At issue was whether private owners of dams should pay rent for the state-owned land underneath their hydroelectric dams and the rivers that generate electricity. MT Attorney General Mike McGrath has argued that utilities are no different from ranchers who use state-owned land to graze cattle. Ranchers pay the state rent for the land and so should the utilities, he said. “If someone has a grazing lease, they pay,” he said. “If they drill oil or gas on state land, they pay a lease fee and a royalty fee.” McGrath said the state has an obligation to maximize the profits from those lands, which includes charging rent to the power generators

The deal requires *Avista* to make annual payments of \$4 million from 2007 through 2016. After that the rent payment would be negotiated. *Avista's* 350,000 ratepayers in Eastern Washington and North Idaho, who buy electricity generated by the two large dams, would be asked to cover the cost through a rate increase of less than 1%, said *Avista* spokesman Hugh Imhof. Any increase, however, would require approval by state regulators. *Avista* agreed to the settlement because trials carry the risk of losing, which could have cost the company more money, said Imhof. “We have an obligation to serve our customers, and the state was demanding \$8.4 million in future rental payments,” he said. “For us, it made sense to moderate that.”

McGrath called the settlement a “very fair” agreement and good for the people of Montana. “Both sides worked very hard to get to this point,” he said. The money will be used to fund public schools in Montana. Imhof said *Avista* faced a claim in excess of \$200 million and decided to settle rather than follow through with the damages trial.

Another dam owner, *PacifiCorp*, recently agreed to pay the state \$50,000 in rent for its Bigfork Dam on the Swan River. So *Avista's* decision to settle leaves the state battling one lone holdout — *PPL Montana*, the state’s largest owner of hydroelectric dams — which remains a defendant in the ongoing trial. McGrath said the *Avista* settlement only strengthens the state’s case. But David Hoffman, a *PPL* spokesman, said *Avista's* settlement didn’t change anything for his company’s court case, which he predicted would be lengthy and ultimately end up before the Montana Supreme Court. “We’re in for some long litigation,” he said.

*PPL* owns 10 dams that generate power from state-owned waters in Montana, and sells the power on the unregulated, wholesale market. Its customers include Montana’s largest electric utility, *NorthWestern Energy*. The state is seeking \$6.2 million yearly rent from *PPL*, McGrath said. Negotiations with that company have essentially ended, and the trial is continuing before state District Judge Thomas Honzel in Helena.

*PPL Montana* said its riverbed dams are governed by the federal licenses it holds, not the state, and they have operated the dams rent-free for decades. *PPL* also argued that irrigators and river guides do not have to pay to use the river, but state officials dismissed that notion, saying those users have a significantly smaller impact on the river. Judge Honzel already has ruled on some of the other disagreements in the case. He earlier declared that lands under the dams are state-owned and that the rivers passing through them are navigable, which means they are state waters. Honzel also ruled that lands flooded by the dams are not state-owned and therefore the state cannot charge rent for them.

Nonetheless, *Avista* agreed to pay some rent for the Montana land flooded by the Cabinet Gorge Dam, which sits just west of the Idaho-Montana border. It also agreed to pay rent for land occupied by the Noxon Rapids Dam and the Clark Fork River. McGrath said that the state charged more for the land occupied by the dam because

that land directly generates income for the company. He said the state charged less for the land under the river and even less for the land flooded.

But the settlement with *Avista* is not entirely final. Honzel and the state Land Board, the panel of five elected officials that manages state lands, must agree to it. The settlement also has several caveats: If *PPL* comes out of the current trial owing less in rent for its larger dams, the state will lower *Avista's* rent. However, the agreement stipulates that the rent will not go above \$4 million, regardless of the outcome of the trial. In addition, the agreement requires *Avista* and the state to revisit the rent in 10 years. At that time, both sides will negotiate a rental payment to last the remainder of *Avista's* federal license to operate the dam, about another 35 years, Imhof said.

*Avista* sells no electricity in Montana. The company owns several other dams in the Northwest but does not pay state rent on those dams, Imhof said.

Sources: Jennifer McKee, *Billings Gazette*, 10/24/07; and *Greenwire*, 10/23 and 10/24/07

### TU Protests WY Oil and Gas Leases

Citing dwindling Yellowstone cutthroat trout numbers, Trout Unlimited (TU) is protesting some proposed oil and gas leases being offered by the U.S. Bureau of Land Management (BLM) across Wyoming. “Development of these leases could have a lasting negative impact on wild and native trout from one end of Wyoming to the other,” said Kathy Lynch, TU’s Western energy counsel in Jackson.

The lease sales, planned for December, could open drilling access to parcels in Park, Big Horn, Carbon, Sweetwater and Uinta counties, Lynch said. One parcel near Clark, near the Wyoming-Montana border, is part of the Line Creek drainage, Lynch said. That parcel, which is near the Clarks Fork of the Yellowstone River, is close to thriving populations of Yellowstone cutthroat trout, she said. Such a parcel should warrant



Yellowstone cutthroat trout (NPS Photo)

special attention from BLM and potential developers and may not be appropriate for development, she said.

Parcels in Big Horn County include some along the Greybull River, also a native Yellowstone cutthroat fishery, Lynch said. There is “high potential” for coalbed methane development in some of the lease areas in Big Horn County she said. Further she said she was unaware of any BLM studies about the potential consequences of extensive coalbed methane development in that part of the Bighorn Basin.

Andrew Tkach, a BLM spokesman for the Cody field office, said there was “small potential” for coalbed methane development in the Bighorn Basin and that only small projects on private land are under way. The Wyoming Department of Environmental Quality’s Water Quality Division regulates discharges of water from methane wells through its own permit system, Tkach said. “BLM also monitors discharges of produced water as possible, during field compliance work,” he said.

But Lynch said such monitoring by BLM is not always thorough enough and depends on the number of projects and available staff in a given area. Steven Hall, a spokesman for the BLM’s state office in Cheyenne, said he was confident the agency had enough personnel to ensure adequate monitoring. Not all parcels offered for lease are developed, Hall said.

“Various stipulations and mitigation measures will be implemented on a site or specific area basis when an application to drill is received,” said Chet Wheelless, a BLM fisheries biologist in Worland. All of the lease parcels for sale in the Cody area include wildlife habitat protection stipulations where applicable, including a 500-foot riparian buffer area, said Gretchen Hurley, a geologist with the BLM’s Cody field office. Hurley said the Cody office “would work collaboratively with TU and the well applicant through the use of best management practices, as feasible, to mitigate potential impacts to native trout and trout habitat.” Lynch said her group would welcome such collaboration but added that TU did not have a standard set of recommended management practices. She said TU supports responsible energy development, but she would like to see the lease process overhauled to allow for more detailed analysis and input by all parties.

Sources: *AP/Billings Gazette*, 11/25/07; and *Greenwire*, 11/26/07

## Dogs Sniff Out Quagga Mussels

The California Department of Fish and Game is training dogs to sniff out the quagga mussel, an invasive freshwater mollusk that could wreak havoc on the state’s water system. A relative of the quagga, the zebra mussel has colonized the Great Lakes and much of the Midwest and has cost the power industry there \$3 billion.

Quaggas are small – the size of a thumbnail – but they can clog pipes and disrupt the food web in lakes, rivers or streams. Quaggas spread quickly by attaching themselves to the surface of boats, so Fish and Game officials have stepped up detection at checkpoints and public education efforts. That’s where the dogs come in, with an unusual ability to sniff out the pest. “The dogs can find the patch of quagga in a couple of minutes. They are very helpful and fast,” said Lynette Shimek, a game warden. The dogs can detect the tiny shells on boat trailers in areas as remote as the cracks behind the wheels. A trained dog costs between \$8,000 and \$12,000, and another \$6,000 a year to maintain. But Shimek said using dogs to search for invasive species can save the department about 800 work hours.



*Quagga mussels attached to a boat hull.*

Edwin Grosholz, an invasive species biologist at the University of California, Davis, said the quagga is potentially disastrous for the state’s pumping and irrigation systems. “They attach to the walls in canals and cover water pipes,” he said. “They literally grow on the inside of all the pipes. Water can’t be pumped, and when they reach abundance in certain places, they can really begin to shut down systems.”

Quagga mussels arrived in the U.S. in the 1980s, carried to the Great Lakes through ballast water in ships from Europe. They then spread to lakes and rivers across the country, showing up in the Colorado River

last January, and were subsequently detected in lakes in San Diego and Riverside counties. The Metropolitan Water District in Southern California has spent \$2.8 million to control the quagga, and recently approved another \$6 million.

The economic impact of the invasive quagga mussel can be measured, but Grosholz said it’s harder to figure out the ecological impact of an introduced species. San Francisco Bay already is home to about 250 introduced species, so Grosholz said some may wonder why we should care about preventing others from taking hold. In many cases, ecosystems don’t function as well with new species as native species,” he said. “Introduced species can change the properties of the whole system — make it difficult for native species and make it easier for other invasive species.”

So Fish and Game field officers as well as the dogs are being trained to spot mussels; and they’ll be stepping up inspections at checkpoints statewide. Boaters are advised to drain and dry hulls, outboard motors, outdrive units and buckets. Six dogs will be trained by the end of the year, and a total of 22 in the next three years, at an estimated cost of \$250,000. Funding comes partly through the general fund, and partly from donations through CalTIP, a nonprofit group that encourages citizens to report polluters and poachers. Trainer Chip Johnson said the challenge is to find the right dog and match it with the right owner to form the perfect partnership. “These are family dogs. We can’t have vicious dogs that bite kids,” he said.

Source: Ngoc Nguyen, *Sacramento Bee*, 10/25/07

## Lake Treated for Invasive Species

Early this fall California officials poisoned out an entire lake in the Sierra Nevadas to rid its waters of northern pike, an invasive species in that state. The northern pike, a gamefish in the Midwest, is considered an invasive in Lake Davis because it preys on the lake’s prized trout fishery. California Department of Fish and Game crews used 16,000 gallons of a new formulation of Rotenone (a toxic chemical used to kill fish) that has successfully killed northern pike in other reservoirs. Officials gathered nearly 50,000 pounds of dead fish after poisoning the lake



Northern pike first appeared in Lake Davis in 1994, probably dumped by an unwitting angler trying to introduce a new sport fish prized for its fight, state officials said. But the fish devastated the lake's famous trophy trout and tourist industry. Biologists have grown increasingly concerned in recent years that if the pike escaped the lake, they would also ravage California's weakened salmon and steelhead populations downstream.

The state first poisoned Lake Davis in 1997, but pike reappeared 18 months later, either reintroduced illegally by a rogue angler or having survived the first poisoning attempt. "This time, we continue to monitor the lake and keep our fingers crossed," department spokesman Steve Martarano said. "We did everything possible, and we continue to hope that we did enough. "We're not claiming victory yet. But we're hopeful we got rid of the pike this time," he said.

Martarano said northern pike accounted for about 6% of the dead fish removed. Eighty-two percent of the dead fish were bullhead, a type of catfish, and less than 0.5% were trout. "We found mostly big trout," Martarano said. "We believe the smaller trout were eaten by the pike." Once the poison can no longer be detected, the lake and its tributaries will be restocked with more than 950,000 trout.

Such a treatment and recovery is obviously very expensive, so anglers and the public are encouraged to obey all state and federal game and fish laws and not to move fish or any other aquatic organism from one water body to another. As with Lake Davis, the implications of such an act can be extremely costly and devastating to the fishery both in the lake stocked and in adjacent waters.

Source: *AP/Los Angeles Times*, 10/28/07

### Microbe Found That Destroys PCBs in Water

University of Maryland researchers recently discovered a microbe in the Baltimore harbor that survives by eating chemical pollutants called PCBs in water, thus breaking them down into something less dangerous. The microbes live off and subsequently destroy the PCBs in a fashion similar to how humans breathe oxygen and convert it into carbon dioxide, University of Maryland researcher Kevin Sowers said. At the end of this process, the microbe has stripped one of the chlorine atoms out of the PCB molecule, making the chemical more

vulnerable to other creatures that might break it down completely, he added.

The process takes several decades. But the same microbe is found all over the world, Sowers said. His theory is that these microbes evolved to rely on some PCB-like chemical that was in the environment naturally and then took to PCBs when humans started dumping them into our rivers. PCBs, whose full name is polychlorinated biphenyls, are industrial chemicals, which were made from the 1920s until their manufacture was banned in 1977.

Over the years, PCBs were spilled into rivers, where they were eaten by bottom-feeding fish and then inadvertently eaten by creatures, including people, that eat fish. In humans, the chemicals have been linked to cancer and reproductive problems. Health authorities warn against eating PCB contaminated fish. Scientists would like to get rid of the PCBs built up in these waters, but these chemicals were engineered so they would not break down. That used to be a good thing; but now it's a problem.

Sowers said the goal of his team's research is to supercharge the reproduction of the newly found microbes and others like it so they can be injected en masse into PCB-contaminated rivers, lakes and streams. Sowers is experimenting with ways to do that, looking at adding other chemicals the microbes rely on to grow. Still, it could be years before that goal is reached, he said. Thinking ahead, Sowers said, he cannot foresee any danger that these cleanup microbes might become a problem when PCBs are gone. "Once they're done eating the PCBs, essentially they're going to stop living," he said.

Sources: David A. Fahrenthold, *Washington Post*, 10/15/07; and *Greenwire*, 10/15/07

### KY Paddlefish Caviar Advisory

Kentucky officials issued an advisory in early July urging only limited consumption of paddlefish caviar from the Ohio River because it may be contaminated with chemicals. Three Kentucky agencies joined together to issue the fish consumption advisory, saying pregnant women, women of childbearing age and children should eat no paddlefish flesh or eggs from the river because they contain elevated levels of mercury, chlordane and the cancer-causing chemical polychlorinated biphenyls, or PCBs.

"Most people who consume caviar eat only a small amount, but, still, our recommendation for this special population is for no consumption," said Guy F. Delius, assistant director of the Kentucky Division of Public Health Protection and Safety. Others should eat no more than six meals per year.

Paddlefish and their eggs have made Kentucky's list of contaminated fish every year since at least 1999. The latest advisory listed a number of Ohio River fish species that should be eaten only on a limited basis because of contaminants, but paddlefish and their eggs were of special concern, Delius said. The advisory involves the stretch of Ohio River along Kentucky's entire northern border.

The most prized source of caviar is the beluga sturgeon, found in the basins of the Black and Caspian seas. But overzealous fishing recently prompted the U.S. Fish and Wildlife Service to declare the beluga a threatened species. As beluga have become rare, the market for North American caviar has grown, including that from the paddlefish, named for its long, paddlelike snout. James Tidwell, chairman of Kentucky State University's aquaculture program, said Ohio River caviar is sold across the nation.

Paddlefish, among the largest fish in the U.S., feed on plankton and can reach weights of more than 200 pounds, and because of their feeding habits most are taken either by snagging or in nets. Mark Marraccini, spokesman for the Kentucky Department of Fish and Wildlife Resources, said commercial fishing accounts for most of the state's annual paddlefish catch. One paddlefish can yield as much as \$800 worth of eggs, and annual income for those who catch them can range from \$100,000 to \$400,000, according to the Indiana Department of Natural Resources.

Indiana wildlife officials arrested 12 people this summer for catching paddlefish from Ohio River tributaries, a violation of state law. In Indiana, commercial fishermen can catch paddlefish from the main stem of the Ohio River, but not from tributaries. Those arrested were charged with illegal sale of a wild animal, money laundering and commercial fishing in closed water. Indiana has a less restrictive advisory on paddlefish than Kentucky, recommending its residents eat no more than one meal per month because of contaminants found in fatty tissue and eggs.

Source: Roger Alford, *AP*, 7/7/07

## Transgenic Trees Draw Contaminants From Groundwater

Genetically modified plants can be an important tool for cleaning up groundwater contaminated with common industrial pollutants, University of Washington (UW) researchers said in mid October. The UW scientists have modified poplar trees to pull cancer-causing trichloroethylene from groundwater and break it down into harmless salt, water and carbon dioxide. Used as an industrial degreaser, trichloroethylene (TCE) is the third most common groundwater pollutant at Superfund sites.

“The results have been amazing,” said UW scientist Sharon Doty, whose work — along with that of the British group — was published online in the *Proceedings of the National Academy of Sciences*. The poplar trees Doty’s team created were able to extract more than 90% of TCE from test solutions that contain concentrations of the chemical well above levels normally observed at Superfund sites. In comparison, nonengineered poplar trees were able to take up only 3% of the TCE.

The modified poplars also showed significant ability to remove other common industrial chemicals from groundwater. They removed chloroform, used to treat drinking water, nine times faster than conventional poplars, and vinyl chloride, used to make plastics, three times faster, she said. And while the “normal” poplars were unable to remove TCE from air, the modified plants absorbed 79% of TCE gas during a week-long experiment.

The genetically modified poplar trees owe their success to a gene, normally found in rabbit livers, that governs production of an enzyme that is able to break down TCE. Normal poplar trees are able to produce the enzyme, cytochrome P450, in small amounts. But by inserting the rabbit gene into the poplar trees, Doty’s team created trees that produced significantly more of the enzyme. Japanese researchers have used a human version of the gene to produce P450 in a modified rice that degrades common herbicides.

The results offer hope that plants may become a practical — and relatively inexpensive — tool for environmental clean-up. Scientists have been pursuing the technique, known as “phytoremediation,” since the early 1990s, but have been

frustrated because most of the plants tested grow too slowly and take up too little of the pollution to be practical. But there are still lingering environmental concerns related to phytoremediation, mostly centered around how to prevent the modified plants from mixing with wild, unmodified trees.

Doty and her colleagues believe the poplar trees present little risk because, although fast-growing, they take many years to flower and falling branches normally do not take root in soil. But not everyone agrees. “We do have lots of sites in the environment that are polluted and they are a problem,” said Doug Gurian-Sherman, senior scientist with the *Union of Concerned Scientists*. “I think the basic issue here is that we don’t want to substitute one problem for another by putting transgenic trees in the environment unless we can be fairly confident they don’t cause problems.”

There is not enough experimental data to determine how easily the poplar trees might crossbreed with wild relatives, Gurian-Sherman said. “The honest answer in biology, given what we know about the trees and the gene in these trees in the environment, is — we really don’t know.” And as it now stands, Gurian-Sherman said he was not confident federal regulators could accurately assess the risk of such approaches. “Right now, the main authority in the federal government for assessing these trees, [the Agriculture Department] has dropped the ball on numerous occasions.”

Source: Lauren Morello, *Greenwire*, 10/16/07

## Southeastern Turtle Smuggling

A Florida couple pleaded guilty in late October to federal wildlife smuggling charges, admitting that they helped in a scheme to sell hundreds of turtles protected by the states of Alabama and Tennessee. Cheryl Lynn Arnold and James F. Wilder, who live in Barefoot Bay, FL, admitted that they helped Arnold’s ex-husband smuggle endangered and protected turtles in 2002 and 2003 from Mobile County Alabama to Louisiana, where selling the animals was legal.

The Lacey Act makes it a federal crime to transport wildlife that has been taken against the laws of a state or another country. Senior U.S. District Judge Charles Butler Jr. set sentencing for February. A preliminary calculation of advisory sentencing guidelines

in Arnold’s case suggests she faces up to six months’ incarceration. “I think she’ll be probation-eligible,” defense attorney Neil Hanley said. The worst-case scenario for Wilder sets his penalty range at 15 to 21 months because of an extensive record of petty crimes that includes convictions for forgery, theft, worthless checks and unauthorized use of a credit card. Defense lawyer Richard Shields said he plans to seek probation for his client, as well.

According to court records, Arnold and Wilder assisted Carol Gene Arnold in several transactions beginning in December 2002. In two cases, according to records, Cheryl Arnold wrote checks to undercover law enforcement investigators posing as turtle dealers. In December 2002 and three times in 2003, Wilder and Cheryl Arnold helped Carol Arnold load the turtles into a Dodge four-door pickup truck that took them to Louisiana. The animals had been illegally trapped in Tennessee or Alabama, according to court documents.

Carol Arnold, who awaits sentencing in December, said earlier this year that he has bought and raised turtles — legally — for 30 years, selling them to Louisiana turtle farms that supply pet stores. He said the turtles he buys range from \$1 to \$3 apiece and that he usually doubles his money. Smuggled animals listed in the indictment include alligator snapping turtles, soft shell turtles, an Alabama map turtle, Eastern box turtles, red-eared or Cumberland sliders, Southern painted turtles, Ouachita map turtles, yellowbelly sliders, common musk turtles, common snapping turtles and false map turtles.

Sources: Brendan Kirby, *Mobile Press-Register*, 10/23/07; and *Greenwire*, 10/24/07

## Critical Bird Habitat Protection Lagging

A 50-year federal effort to protect wetlands and grasslands for waterfowl and other migrating birds has managed to achieve only 25% of its acreage goals and risks losing vital habitat to agriculture unless it quickly changes course, the Government Accountability Office said in a late September report. At issue is the U.S. Fish and Wildlife Service (FWS) bid to protect 12 million acres in the prairie pothole region of the north-central U.S.

It would take 150 years and billions of dollars for the FWS to meet its goal at the

current rate, the report says. But a rush for farmland may mean the FWS “may only have several decades before most of its goal acreage is converted to agricultural uses,” it warns. The FWS started protecting wetlands and grasslands in the late 1950s. Since then, the agency has bought 700,000 acres and put more than 2.3 million acres in easement. But that lags far behind the goal of 12 million acres the agency says is necessary to sustain the region’s population of 4.2 million breeding duck pairs.

“Potholes” are small, sometimes seasonal, wetlands or marshes that form in depressions that glaciers created thousands of years ago. Birds rely on the small wetlands when migrating. The prairie pothole region includes parts of Iowa, Minnesota, Montana, North Dakota and South Dakota. It provides breeding ground for more than 60% of key migratory bird species, including the piping plover, whooping crane and other threatened or endangered species.

Part of the problem for FWS is keeping pace with rising land prices. The report recommends increasing the cost of Duck Stamps, reauthorizing the new wetlands loan act or providing more money from the Land and Water Conservation Fund. Required for waterfowl hunters, the Duck Stamp program was launched in 1934 to raise money for wetlands conservation.

Bills have been introduced in the House and Senate that would generate more money for wildlife refuges through Duck Stamps. H.R. 2735 from Reps. Don Young (R/AK) and Mike Thompson (D/CA) would increase the price of a federal duck stamp from \$15 to \$25. The September/October issue of *River Crossings* introduced the idea for such a stamp for fish habitat conservation, but at a much lower price (i.e., \$1-5).

Source: Allison Winter, *Greenwire*, 9/28/07

## Global Warming and the “Other” Water Problem

Who could have thought that we’d be seeing serious drought related water issues in the Northwest, Midwest, Southeast and Southwest U.S. all at the same time. But the fact is that we are beginning to see water wars everywhere, with the most recent leading to threats of lawsuits in such normally wet areas as Georgia, Florida and Alabama. Even some towns in the Tennessee Valley are without water. All of this may or may not be related to global warming or

climate change — no one really knows for sure. But scientists sometimes refer to the effect that a hotter world will have on this country’s freshwater supplies as the *other* water problem.

For most people, global warming commonly evokes the specter of rising oceans submerging our great coastal cities, while the steady decrease in mountain snowpack seems to be more of a modest worry. But not all researchers agree with this ranking of dangers. Steven Chu, a Nobel laureate and the director of the *Lawrence Berkeley National Laboratory*, remarked last Spring that diminished supplies of freshwater might prove a far more serious problem than slowly rising seas. Last summer, for instance the snowpack in the Sierra Nevada, which provides most of the water for Northern California, was at its lowest level in 20 years. Chu noted that even the most optimistic climate models for the second half of this century suggest that 30-70% of the snowpack will disappear. “There’s a two-thirds chance there will be a disaster,” Chu said, “and that’s in the best scenario.”

In the Southwest this past summer, the outlook was equally sobering. A catastrophic reduction in the flow of the Colorado River would impact some 30 million people who depend on that water wreaking chaos in seven states: Colorado, Utah, Wyoming, New Mexico, Arizona, Nevada and California. An almost unfathomable legal morass might well result, with farmers suing the federal government; cities suing cities; states suing states; Indian nations suing state officials; and foreign nations (by treaty, Mexico has a small claim on the river) bringing international law to bear on the U.S. government. In addition, a lesser Colorado River would almost certainly lead to a considerable amount of economic havoc, as the future water supplies for the West’s industries, agriculture and growing municipalities are threatened.

When people began taking measurements of Colorado River flows in the early 1920s, the region happened to be in the midst of an extremely wet series of years, and the river was misjudged to have an average flow of 17 million acre-feet per year — when in fact its average flow would often prove to be significantly less. Part of the legacy of that misjudgment is that the seven states that divided up the water entered into a legal partnership that created unrealistic expectations about the river’s capacity. But there is another, lesser-known legacy. As the 20th

century progressed, many water managers came to believe that the 1950s, which included the most severe drought years since measurement of the river began, were the marker for a worst-case situation.

But recent studies of tree rings indicate that the dry times of the 1950s were mild and brief compared with other historical droughts. The latest research effort, published in the journal *Geophysical Research Letters* in late May, identified the existence of an epochal Southwestern megadrought that, if it recurred, would prove calamitous. One such drought occurred in the 1150s, Peter Binney, an Aurora, CO water manager said. “They think that’s when the Anasazi Indians were forced out. We see drought cycles here that can go up to 60 years of below-average precipitation.” What that would mean today, he said, is that states would have to make a sudden choice between agriculture and people, which would lead to bruising political debates and an unavoidable blow to the former. Binney says that as much as he believes that some farmers’ water is ultimately destined for the cities anyway, a big jolt like this would be tragic. “You hope you never get to that point,” he said, “where you force those kinds of discussions, because they will change for hundreds of years the way that people live in the Western U.S. If you have to switch off agriculture, it’s not like you can get back into it readily. It took decades for the agricultural industry to establish itself. It may never come back.”

An even darker possibility is that a Western drought caused by climatic variation and a drought caused by global warming could arrive at the same time. Or perhaps they already have. Next spring, the United Nations’ Intergovernmental Panel on Climate Change (IPCC) will issue a report identifying areas of the world most at risk of droughts and floods as the earth warms. Freshwater shortages are already a global concern, especially in China, India and Africa. But the IPCC, will note that many problem zones are located within the U.S., including California and the Colorado River basin.

These assessments follow on the heels of a number of recent studies that analyze mountain snowpack and future Colorado River flows. Almost without exception, recent climate models envision reductions that range from the modest to the catastrophic by the second half of this century. One study in particular, by Martin Hoerling and Jon Eischeid, suggests the region is

already “past peak water,” a milestone that means the river’s water supply will now forever trend downward.

Roger Pulwarty, a highly regarded climatologist at the National Oceanic and Atmospheric Administration (NOAA), is convinced that the economic impacts could be profound. The worst outcome, he suggests, would be mass migrations out of the region, along with bitter interstate court battles over the dwindling water supplies. But well before that, if too much water is siphoned from agriculture, farm towns and ranch towns will wither. Meanwhile, Colorado’s largest industry, tourism, might collapse if river flows became a trickle during summertime. Already, warmer temperatures have brought on an outbreak of pine beetles that are destroying pine forests; Pulwarty wonders how many tourists will want to visit a state full of dead trees. “A crisis is an interesting thing,” he said. In his view, a crisis is a point in a story, a moment in a narrative, that presents an opportunity for characters to think their way through a problem. A catastrophe, on the other hand, is something different: it is one of several possible outcomes that follow from a crisis. “We’re at the point of crisis on the Colorado,” Pulwarty concluded. “And it’s at this point that we decide, O.K., which way are we going to go?”

Last June, Bradley Udall, head of the *Western Water Assessment*, a bureau located in the Boulder, CO offices of NOAA, testified before a Senate subcommittee that was seeking to understand how severe the country’s freshwater problems might become in an era of global warming. Udall stated that the Colorado River Basin is already two degrees warmer than it was in 1976 and that it is foolhardy to imagine that the next 50 years will resemble the last 50. Lake Mead, the enormous reservoir in Arizona and Nevada that supplies nearly all the water for Las Vegas, is half-empty, and statistical models indicate that it will never be full again. “As we move forward,” Udall said, “all water-management actions based on ‘normal’ as defined by the 20th century will increasingly turn out to be bad bets.”

Udall wants to connect the disparate members of the water economy in a way that has never really been done before, so that utility executives, scientists, environmentalists, business leaders, farmers and politicians can begin discussing how to cope with the inevitable shortages of fresh water.

“We have a very short period of time here to get people educated on what this means,” Udall said. “Then once that occurs, perhaps we can start talking about how do we deal with it.”

But Peter Binney is already dealing with it in Aurora, CO — the 60th-largest city in the U.S. Binney said, “We have to find a new way of meeting the needs of all this population that’s turning up and still satisfy all of our recreational and environmental demands.” Aurora has a population of 310,000 now, Binney said, but that figure is projected to surpass 500,000 by 2035. In the 20th century all of our great dams and reservoirs were built — “heroic man-over-nature” achievements, he said, that control floods, store water for droughts, generate vast amounts of hydroelectric power and enable agriculture to flourish in a region where the low annual rainfall otherwise makes it difficult. And in constructing projects like



**Lake Powell and Glen Canyon Dam showing low water levels and the typical “bathtub ring” that marks where higher water levels once were.**

the Glen Canyon Dam — which backs up water to create Lake Powell, the vast reservoir in Arizona and Utah that feeds Lake Mead — the builders went beyond the needs of the moment. “They gave us about 40 to 50 years of excess capacity,” Binney says. “Now we’ve gotten to the end of that era.” At this point, every available gallon of the Colorado River has been appropriated by farmers, industries and municipalities. And yet the region’s population is expected to keep booming.

For example, California’s Department of Finance recently predicted that there will be 60 million Californians by midcentury, up from 36 million today. “In Colorado, we’re sitting at a little under five million people now, on our way to eight million people,” Binney said. Western settlers, who apportioned the region’s water long ago, never could have foreseen the thirst of its cities. Nor, he said, could they have anticipated our

environmental mandates to keep water “in stream” for the benefit of fish and wildlife, as well as for rafters and kayakers.

The West’s predicament, though, isn’t just a matter of limited capacity, bigger populations and environmental regulations. It’s also a distributional one. Seventy-five years ago, cities like Denver made claims on — and from the state of Colorado received rights to — water in the mountains; those cities in turn built reservoirs for their water. As a result, older cities have access to more surface water (that is, water that comes from rivers and streams) than newer cities like Aurora, which have been forced to purchase existing water rights from farmers and mining companies. Towns that rely on groundwater (water pumped from deep underground) face an even bigger disadvantage. Water tables all over the U.S. have been dropping, sometimes drastically, from overuse. In the Denver area, some cities that use only groundwater will almost certainly exhaust their accessible supplies by 2050.

The biggest issue is that agriculture consumes most of the water, as much as 90% of it, in a state like Colorado. “The West has gone from a fur-trapping, to a mining, to an agricultural, to a manufacturing, to an urban-centric economy,” Binney explained. As the region evolved, however, its water ownership for the most part did not. Because the supply of water in the West can’t really change, water managers spend their time looking for ways to adjust its allocation in their favor. One option is to try to buy water rights in the mountains (most likely from farmers who were looking to quit agriculture), then build a new reservoir and a long supply line to the city. But obvious hurdles include environmental and political resistance, as well as an engineering difficulty: water is heavy, far heavier than oil, and incompressible. So a system to move it long distances (especially if it involves tunneling through mountains or pumping water over them) can cost billions. Without help from the federal government, which has largely gotten out of the Western dam-and-reservoir-building business, it would be unwise to pursue such a project.

Another practice, that Aurora is turning to, and which is sometimes used in Europe, is to drill wells alongside a river and pull river water up through them, using the gravel of the riverbank as a natural filter — sort of like digging a hole in the sand near the ocean’s edge as it fills from below. Half of

Aurora's water rights are on the South Platte River and the city pours its treated wastewater back into that river, as do other cities in the Denver metro area. This gives the South Platte a steady, dependable flow. So Binney and the township reasoned that they could conceivably, and legally, go some 20 or 30 miles downstream on the South Platte, buy agricultural land near the river, install wells there and retrieve their wastewater. Thus they could create a system whereby Aurora would use South Platte water; send it to a treatment plant that would discharge it back into the river; go downstream to recapture water from the same river; then pump it back to the city for purification and further use. The process would repeat, ad infinitum. Aurora would use its share of South Platte water "to extinction," in the argot of water managers. A drop of the South Platte used by an Aurora resident would find its way back to the city's taps as a half-drop in 45 to 60 days, a quarter-drop 45 to 60 days after that and so on. For every drop the town used from the South Platte, over time it would almost — as all the fractional drops added up — get another.

Many towns in the U.S. have a supply that includes previously treated water. For example, the water from the Mississippi River, is reused many times by municipalities as it flows downstream. But as far as Binney knows, no municipality in the U.S. has yet built the kind of closed loop that Aurora envisions. Water from wells in the South Platte will taste different, because of its mineral and organic content, so Binney's engineers will have to make it mimic mountain snowmelt to the extent possible. This system, capitalizing on the city's own wastewater to supply its drinking water needs is being marketed by Binney and his colleagues under the name "Prairie Waters." The system will involve building a 34-mile-long pipeline from the downstream South Platte riverbanks to a treatment facility in Aurora, at a cost of three-quarters of a billion dollars, making it one of the most expensive municipal infrastructure projects in the country.

"What we're doing now is trading high levels of treatment and purification for building tunnels and chasing whatever remaining snowmelt there is in the hills, which I think isn't a wise investment for the city," Binney said. "I would expect that what we're going to do is the blueprint for a lot of cities in California, Arizona, Nevada — even the Carolinas and the Gulf

states. They're all going to be doing this in the future."

But what will happen to a river's aquatic organisms under such a scenario. That is the big question. Obviously, such a water depleting system deserves careful environmental review — especially with regard to the instream flow and pollution control needs of our native fish and wildlife species.

Meanwhile in Nevada, Pat Mulroy, the head of the *Southern Nevada Water Authority* — arguably the most influential and outspoken water manager in the country — is approaching the water shortage problem in another way by challenging the historical water-sharing agreements that no longer suit the modern West (meaning they don't suit Las Vegas). Las Vegas is almost certainly more vulnerable to water shortages than any metro area in the country. Over the past year, it has become conceivable that Lake Mead, the Las Vegas water supply, could eventually drop below the level of the water authority's intake pipes. So the water authority recently hired an engineering firm to drill through several miles of rock in order to create a deeper intake pipe near the bottom of the lake.

But Mulroy is not gambling the entire future of Las Vegas on this project. One catchphrase of the water trade is that water flows uphill toward money, which is another way of saying that a city with ample funds can, at least theoretically, augment its supplies indefinitely. In a tight water market like that of the West, this isn't an absolute truth, but in many instances money can move rivers. The trade-off is that new water tends to be of lower quality (requiring more expensive purification) or far away (requiring more expensive transport). Thanks to Las Vegas's growth — the metro area is now at 1.8 million people — cost is currently no object. As an example, the city's cash reserves have made it possible for Mulroy to pay Arizona \$330 million for water she can use in emergencies and to plan a controversial multibillion-dollar pipeline to east-central Nevada, where the water authority has identified groundwater it wants to extract and transport. Wealth allows for the additional possibility of a sophisticated trading scheme whereby Las Vegas might pay for a desalination plant on the Pacific Coast that would transform seawater into potable water for use in California and Mexico. In exchange, Nevada could get a portion of their Colorado River water in Lake Mead.

So money does make a kind of sustainability possible for Las Vegas. On the other hand, buying water is quite unlike buying anything else. At the moment, water doesn't really function like a private good; its value, which Peter Binney calls "infinite," is often only vaguely related to its price, which can vary from 50 cents an acre-foot (what Mulroy pays to take water from Lake Mead) to \$12,000 an acre-foot (the most Binney has paid farmers in Colorado for their rights). Moreover, water is so necessary to human life, and hence so heavily subsidized and regulated, that it can't really be bought and sold freely across state lines.

*Enron* tried to start such a water market called *Azurix* in the late 1990s, only to see it fail spectacularly. The more successful water markets have instead been local, like one in the late 1980s in California, where farmers agreed to reduce their water use and sell the savings to a state water bank. Mulroy and Binney agree that a true free-market water exchange would create too many winners and losers. "What you would have is affluent communities being able to buy the lifeblood right out from under those that are less well heeled," Mulroy said. More practical, in her mind, would be a regional market that gives states, cities and farmers greater freedom to strike mutually beneficial agreements, but with protections so that municipalities aren't pitted against one another.

But even if drought conditions ease over the next year or two, some experts think the odds are greater that Lake Powell, the 27-million-acre-foot reservoir that supplies Lake Mead, will drop to unusable levels before it ever fills again, and Mulroy doesn't immediately dismiss the possibility. She is certain that the reduced circumstances of the two big Western reservoirs are tied to global warming and that Las Vegas is this country's first victim of climate change. An empty Lake Mead, she began, would mean there is nothing in Lake Powell.

"It's well outside probabilities," she said — but it could happen. "In that case, it's not just a Las Vegas problem. You have three entire states wiped out: Arizona, California and Nevada. Because you can't replace those volumes with desalted ocean water." What seems more likely, she said, is that the legal framework governing the Colorado River would preclude such a dire turn of events. Recently, the states that use the Colorado reached a tentative agreement that guarantees Lake Mead will remain partly full under current conditions, even if upstream

users have to cut back their withdrawals as a result. The deal supplements a more fundamental understanding that dates to the 1920s.

If the river is failing to carry a certain, guaranteed volume of water to Lee's Ferry (where official measurements are taken), which is just below Lake Powell, the river's lower-basin states (Nevada, Arizona and California) can legally force the upper-basin states (Colorado, Wyoming, New Mexico and Utah) to reduce or stop their water withdrawals. This contingency, known as a "compact call," sets the lower-basin states against the upper, but it has never occurred. And it is deeply feared by many water managers, because it would ravage the fragile relationship among states and almost certainly lead to a scrum of lawsuits. Yet, last year water managers in Colorado began meeting for the first time to discuss the possibility. Mulroy denied that there would be a compact call, but she pointed out that Las Vegas's groundwater and desalination plans were going ahead anyway for precautionary reasons.

When asked if limiting the growth of the Las Vegas metro area wouldn't help Mulroy bristled. "This country is going to have 100 million additional people in it in the next 25 to 30 years," she replied. "Tell me where they're supposed to go. Seriously. Every community says, 'Not here,' 'No growth here,' 'There's too many people here already.' For a large urban area that is the core economic hub of any particular area, to even attempt to throw up walls? I'm not sure it can be done." Besides, she added, the problem isn't growth alone: "We have an exploding human population, and we have a shrinking clean-water supply. Those are on colliding paths. This is not just a Las Vegas issue. This is a microcosm of a much larger issue."

Americans, she went on to say, are the most voracious users of natural resources in the world. Maybe we need to talk about that as well. "The people who move to the West today need to realize they're moving into a desert," Mulroy said. "If they want to live in a desert, they have to adapt to a desert lifestyle." That means a shift from the mindset of the 1930s, when the federal government encouraged people to settle in the West, plant water-intensive crops and make it look like the East Coast. It means landscapes of parched dirt. It means mesquite bushes and palo verde trees for vegetation. It means recycled water. It means gravel lawns

It's not unreasonable to assume that if things continue as they have — with so much water going to agriculture; with conservation only beginning to take hold among residents, industry and farmers; with supplies diminishing slowly but steadily as the Earth warms; with the population growing faster than anywhere else in the U.S.; and with some of our most economically vital states constricted by antique water agreements — the region will become a topography of crisis and perhaps catastrophe.

This is an old prophecy, dating back more than a century to one of the original American explorers of the West, John Wesley Powell, who doubted the territory could support large populations and intense development. (Powell presciently argued that river basins, not arbitrary mapmakers, should determine the boundaries of the Western states, in order to avoid inevitable conflicts over water.) An earlier explorer, J. C. Ives, visited the present location of Hoover Dam, between Arizona and Nevada, in 1857. The desiccated landscape was "valueless," Ives reported. "There is nothing there to do but leave."

But Roger Pulwarty, for his part, rejects the notion of environmental determinism. Nature, in other words, isn't inexorably pushing the region into a grim, suffering century. Things can be done. Redoubling efforts to prevent further climate change, Pulwarty says, is one place to start; another is getting the states that share the Colorado River to reach cooperative arrangements, as they have begun to discuss, for coping with long-term droughts. Other parts of the solution are less obvious. To Peter Gleick, head of the *Pacific Institute*, a nonprofit based in Oakland, CA, that focuses on global water issues, whether we can adapt to a drier future depends on whether we can rethink the functions, and value, of fresh water.

Can we can do the same things using less of it? How we use our water, Gleick believes, is considerably more complex than it appears. First of all, there are consumptive and nonconsumptive uses of water. Consumptive use, roughly speaking, refers to water taken from a reservoir that cannot be recovered. "It's embedded in a product like a liter of Coca-Cola, or it's contaminated so badly we can't reuse it," Gleick says. In agriculture, the vast majority of water use is also consumptive, because it evaporates or transpires from crops into the atmosphere. Evaporated water may fall as rain 1,000 miles away — that's how Earth's water cycle

works — but it is gone locally. A similar consumptive process characterizes the water we put on our lawns or gardens: it mostly disappears. Meanwhile, most of the water used by metropolitan areas is nonconsumptive. It goes down the drain and empties into nearby rivers, like Colorado's South Platte, as treated wastewater.

Gleick calls the Colorado River "the most complicated water system in the world," and he isn't convinced it will be easy, or practical, to change the laws that govern its usage. "But I think it's less hard to change how we use water," he says. He accepts that climate change is confronting the West with serious problems. (He was also one of the country's first scientists, in the mid-1980s, to point out that reductions in mountain snowpack could present huge challenges.) He makes a persuasive case, however, that there are immense opportunities — even in cities like Las Vegas, which has made strides in conservation — to reduce both consumptive and nonconsumptive demand for water. These include installing more low-flow home appliances and adopting more efficient irrigation methods. And they include economic tools too: for example, many municipalities have reduced consumption by making water more expensive (the more you use, the higher your per-gallon rate).

The U.S. uses less water than it did 25 years ago, Gleick points out: "We haven't even paid too much attention to it, and we've accomplished this." To go further, he says he believes we could alter not only demand but also supply. "Treated wastewater isn't a liability, it's an asset," he says. We don't need potable water to flush our toilets or water our lawns. "One might say that's a ridiculous use of potable water. In fact, I might say that. But that's the way we've set it up. And that's going to change, that's got to change, in this century."

Among Colorado's water managers, Aurora's *Prairie Waters* project is considered both innovative and important not on account of its technology, but because it seems to mark a new era of finding water sources in the drying West. It also proves that the next generation's water will not come cheap, or come easy. Binney says, "We've decoupled land use from water use. Water is the limiting resource in the West. I think we need to match them back together again." There was a decent amount of water out there, he went on to explain, but it was a false presumption that it could sustain all the farms, all the cities, all the rivers.

Something will have to give. It was also wrong to assume, he said, that cities could continue to grow without experiencing something akin to a religious awakening about the scarcity of water. Soon, he predicted, we will be talking about our “water footprint” just as we now talk about our “carbon footprint”.

Indeed, any conversations about the one will in short order expand to include the other, Binney went on to say. Many water managers have known this for a while. The two problems — water and energy — are so intimately linked as to make it exceedingly difficult to tackle one without the other. It isn't just the matter of growing corn for ethanol, which is already straining water supplies. The less water in our rivers, for instance, the less hydropower our dams produce. The further the water tables sink, the more power it takes to pump water up. The more we depend on coal and nuclear power plants, which require huge amounts of water for cooling, the larger the burden we place on supplies.

Meanwhile, it is a perverse side effect of global warming that we may have to emit large volumes of carbon dioxide to obtain the clean water that is becoming scarcer because of the carbon dioxide we've already put into the atmosphere. A dry region that turns to desalination, for example, would need vast amounts of energy (and money) to purify its water. While wind-powered desalination could perhaps meet this challenge — such a plant was recently built outside Perth, Australia — but it isn't clear that coastal residents in, say, California would welcome such projects. Unclear, too, is how dumping the brine that is a by-product of the process back into the ocean would affect ecosystems.

Similar energy and political challenges face other plans, and that's where the more water rich regions of North America and transportation of water gets controversial. In past years, various schemes have arisen to move water from Canada or the Great Lakes to arid parts of the U.S. Beyond the environmental implications and construction costs (probably hundreds of billions of dollars), such continental-scale plumbing would require stupendous amounts of electricity. Just pumping water from the *Prairie Waters* site to Aurora will cost a small fortune. And yet, fears that such plans will resurface in a drier, more populous world are partly behind current efforts by the Great Lakes states to certify a pact that protects their fresh water from outside exploitation.

But drought-ravaged states in the Southeast and Southwest are starting to explore options for tapping the five Great Lakes, the largest source of freshwater in the world, for their future water needs. In fact, New Mexico Gov. Bill Richardson (D), a candidate for president, suggested in October that water from the lakes could be pumped to thirsty states like his own in the future. The upper Midwest (specifically Wisconsin) is “awash in water”, Richardson said. But regional governors have been consistently resistant to the idea, with fellow Democratic Gov. Jennifer M. Granholm of Michigan giving a resounding “no” to Richardson's proposal. Richardson's staff later made it clear he wasn't in favor of any federal move to transfer water from the Great Lakes. But with wildfires raging in Southern California and levels in the Colorado River continuing to drop, “you're going to see increasing pressure to gain access to this [water] supply,” said Aaron Packman, a professor of civil and environmental engineering at Northwestern University.

In response, the leaders of the eight Great Lakes-area states and two Canadian provinces have proposed a regional water compact that would strengthen a ban on water diversions from the lakes. But such a proposal would have to work through state legislatures and Congress. And at least 36 states will face water shortages within five years, government projections show, presenting states with the daunting task of managing their dwindling supplies. The shortages are due to myriad factors, including drought, temperatures, urban sprawl, waste and excess. The U.S. used more than 148 trillion gallons of water in 2000, the latest figures available from the U.S. Geological Survey. That includes residential, commercial, agriculture, manufacturing and every other use — almost 500,000 gallons per person.

To counter the trend, leaders across the country are attempting to take control of the factors they can like wastewater. Florida's environmental chief, Michael Sole, is seeking legislative action to get municipalities to reuse their wastewater as in Aurora, CO, while California is pushing conservation as the cheapest alternative to importing more water from Western states.

Meanwhile, a Sierra Club-affiliated group warned in October that the Canadian government should take steps to ensure that country's freshwater supplies are protected. The *Gordon Water Group* said in a recent report that government action to protect

Canada's freshwater has been “sorely lacking” for 20 years, while pressure from pollution and falling levels in the Great Lakes have increased. The group recommended that the government should tighten loopholes that allow bulk water exports, promote conservation and develop a national water inventory.

And two Michigan Republicans told Congress in early November that under no circumstances would states undergoing droughts be able to divert water from the Great Lakes. Don't even consider using a seemingly harmless bill to study the nation's water usage as cover to begin the process, they said. Their comments came as Congress studies the *21st Century Water Commission Act* [H.R. 135 introduced by John Linder (R/GA)], which would authorize a study of how the nation uses water, where it comes from and how long it will last. The legislators expressed concern that the bill is a pretext to find a way for more arid states to draw water from the Great Lakes. “I don't think I'm being too alarmist about this,” said Rep. Candice Miller. “Do not look to the Great Lakes to solve the nation's water problems.” Rep. Vern Ehlers, also a member of the House Subcommittee on Water Resources and Environment, said if other states attempted a water grab Michigan would “call up the militia and take up arms.” “We feel that serious about it,” Ehlers added.

In early November, Linder, who proposed the water commission for the third time, tried to allay fears that Great Lakes water would be diverted or that states' rights would be trampled. “This is not to establish any new federal policy to tell the people of the Great Lakes what to do with their water,” he said, adding that the commission is more about getting people to talk about conservation — how to capture and reuse water.

But Miller wasn't buying it. She noted that the panel talking about the legislation included speakers from Arizona, Georgia and Texas — and none from the Great Lakes region. And she noted that the commission and a possible national water policy were being proposed by Linder, who represents a drought-stricken area. So, Miller said: “Forgive me if I, as a representative of the Great Lakes State, become concerned when I hear people promoting a national water policy or strategy. But the only logical conclusion I can come to is that such a commission is a subversive attempt to divert water from the Great Lakes to other parts of

the U.S. “And I do not intend to let that happen.”

But she may not be able to stop the commission. Similar legislation was passed by the House in the last Congress, over Miller’s objections, but got bottled up in the Senate. This year, it was included in an energy bill approved by the House, though the Senate, again, hasn’t taken it up. Miller asked the bill’s supporters if they would be willing to add a provision specifically saying the commission wouldn’t recommend diverting water from the Great Lakes. Some supporters were somewhat in agreement, though they generally were against taking any point of discussion off the table. That wasn’t good enough for Miller. “I’m very parochial about this,” she said.

Miller may find supporters for her argument from some lower Missouri River states who have expressed similar concerns in the past that Missouri River water could similarly be diverted by upper Missouri River states or Indian tribes to the southwest. And so, this “other water problem” related to freshwater supplies, climate change and global warming isn’t going to go away anytime soon. And resource managers need to be aware that instream flows and adequate water supplies for wildlife species are also threatened, and probably so in parts of the U.S. that in the past we never could have imagined possible — such as the Southeast.

Sources: Jon Gertner, *New York Times Magazine*, 10/21/07; Todd Spangler, *Detroit Free Press*, 11/9/07; Tim Jones, *Chicago Tribune*, 10/28/07; Brian Skoloff, *AP/Houston Chronicle*, 10/26/07; *CBC News/CBC.ca*, 10/26/07; and *Greenwire*, 10/22, 10/29 and 11/12/07

## Climate Change Update

Carbon dioxide (CO<sub>2</sub>) increases in the Earth’s atmosphere have outpaced scientists’ predictions by 35% since 2000, in part because of global economic growth and less efficient use of fossil fuels, a new study shows. But a significant portion of the increase — about 18% — occurred because land and water are less able to absorb the heat-trapping gas than they have been in the past, according to research by Australian and British scientists published in late October in the *Proceedings of the National Academy of Sciences*.

“The new twist here is the demonstration that weakening land and ocean sinks are contributing to the accelerating growth of atmospheric CO<sub>2</sub>,” said Chris Field, a co-author and director of the Carnegie Institution’s global ecology department. Fifty years ago, natural land and ocean “carbon sinks” took in about 600 kilograms of every metric ton of CO<sub>2</sub> emitted into the atmosphere. In 2006, that number fell to 550 kg per metric ton, according to the lead author, Pep Canadell, executive director of the *Global Carbon Project* at Australia’s *Commonwealth Scientific and Industrial Research Organization*. “In addition to the growth of global population and wealth, we now know that significant contributions to the growth of atmospheric CO<sub>2</sub> arise from the slowdown of natural sinks and the halt to improvements in carbon intensity,” he said. Canadell and his colleagues based their analysis on data gathered by the United Nations and the National Oceanic and Atmospheric Administration (NOAA).

Between 2000 and 2006, the level of CO<sub>2</sub> in the atmosphere grew by 1.93 parts per million (ppm), the biggest annual increase since scientists began continuous monitoring of CO<sub>2</sub> levels in 1959. In comparison, atmospheric CO<sub>2</sub> levels rose by about 1.58 ppm per year in the 1980s and 1.49 ppm in the 1990s. The total level of atmospheric CO<sub>2</sub> is now 381 ppm. United Nations and Bush administration reports have said conditions would be “manageable” if atmospheric concentrations stabilized around 450 ppm.

Meanwhile, Lake Superior has begun showing some of the world’s most tangible evidence of global warming. The lake’s average winter ice cover is 50% smaller than it was 100 years ago according to a study by Jay Austin and Steve Colman, both of the *Large Lakes Observatory* at the University of Minnesota Duluth. They said that until the last decade or so, harsher winters and cooler average temperatures caused Lake Superior to substantially freeze over in winter, but a warming climate has caused ice cover to diminish. “Ice reflects sunlight back out into space, and it can’t be used to heat up the lake,” Austin said. “If you take away the ice, you allow the lake to warm up earlier.”

Less ice also exposes the surface of Lake Superior to more evaporation. The scientists say this undoubtedly played a role in the lake reaching record low monthly levels over the summer, as the region was also in the grip of a drought. NOAA data showed that Lake

Superior dipped 1.6 inches below the previous low for September reached in 1926, Cynthia Sellinger, deputy director of NOAA’s Great Lakes Environmental Research Laboratory, said. Meanwhile, Army Corps of Engineers calculations, which use a different measuring technique, showed that the lake is 4 inches below the record, said Scott Thieme, chief of hydraulics and hydrology for the Detroit District office. The lake’s recent low levels have caused problems for recreational boats and the commercial shipping industry. Shipping channels are overdue for dredging, wetlands are drying up and beaches are reverting to marshes.

John Magnuson of the University of Wisconsin-Madison has also reported that the region’s inland lakes are losing days of winter ice cover. Twenty years ago, lakes that lost their ice by April 15 were roughly in the latitude of the Twin Cities. But that “ice-out” line has marched steadily north, until in recent years, lakes 100 miles north of the Twin Cities lost their ice by April 15.

The gradual rise in temperatures and sea levels across the globe has led to mass extinctions in the Earth’s past, according to researchers from the University of York in England. Their study compared sea temperatures — divided into 10-million-year periods — to the number of species and overall biodiversity present during those times. They found that four of the five last mass extinctions on Earth over the last 520 million years can be attributed to warmer tropical seas, indicating a warmer planet. “We found that, over the fossil record as a whole, the higher the temperatures have been, the higher the extinctions have been,” said ecologist Peter Mayhew, co-author of the research published in the British journal *Proceedings of the Royal Society B*. The study indicates a natural 60-million-year climate cycle that sways from a warmer “greenhouse” to a cooler “icehouse.”

Sources: John Flesher, *AP/San Francisco Chronicle online*, 10/1/07; Larry Oakes, *Minneapolis Star Tribune*, 10/30/07; Lauren Morello, *Greenwire*, 10/23/07; and *Greenwire*, 8/4, 10/1 and 10/24/07

## MICRA Coordinator Retires

Jerry Rasmussen, MICRA Coordinator since the group was organized in Branson, MO (April 1991), will retire on January 3, 2008 after a 37 year career working to preserve and protect the rivers of the Mississippi



River Basin. After receiving degrees from Iowa State University and Colorado State University, he began his career as a District Biologist for the Tennessee Game and Fish Commission in January 1971. Later he worked for the Missouri Dept. of Conservation and the Midwest Research Institute in Kansas City, before beginning his career with the federal government in 1976.

Hired by the U.S. Fish and Wildlife (FWS) Service in October of that year, he became Coordinator for the Upper Mississippi River Conservation Committee (UMRCC). As UMRCC Coordinator he also served as Chairman of the multi-agency Environmental Work Team that created the precedent setting Upper Mississippi River Environmental Management Program (EMP). In 1987 he left the UMRCC to organize the EMP's Long Term Resource Monitoring Program (LTRMP), headquartered in La Crosse, WI. Nearly Twenty-one years later, and after a few name changes, the offspring of the EMP and the LTRMP continue to care for the Upper Mississippi River's natural resources.

Rasmussen was reassigned by the FWS to Columbia, MO in 1991 when he became Coordinator for MICRA. As MICRA Coordinator he has been a one person operation handling the group's organizational matters, planning, budgeting, and

developing and preparing their documents, including *River Crossings*. While continuing to serve as MICRA Coordinator in 1994, he was also assigned to the White House for the 1993 flood recovery effort. That endeavor made important contributions to numerous buyouts of flood plain lands in the Basin many of which were then converted to wetlands and natural floodplains, and to the formation and establishment of the Missouri River's Big Muddy National Fish and Wildlife Refuge.



*Jerry Rasmussen*

In 2000, Rasmussen became a casualty of MICRA's efforts to get the black carp listed as an injurious species under the federal Lacey Act. Accused of conflict of interest

because he was MICRA's Coordinator and MICRA was attempting to get his employing agency (FWS) to act on a natural resource issue, Rasmussen was reassigned to other duties within the agency for an 18 month period during which MICRA struggled to survive.

Reinstated in 2002, he returned to his former duties as MICRA Coordinator, and then in 2003 he also assumed the duties of Coordinator for the Mississippi River Basin Panel on Aquatic Nuisance Species (MRBP), a federally sponsored group hosted by MICRA. The efforts of both MICRA and the MRBP contributed to the recent listing of the black carp as an injurious species under the federal Lacey Act (see story elsewhere in this issue of *River Crossings*).

Never one to walk away from a fight to protect the Nation's important natural resource issues, and always putting the "critters first", Rasmussen has weathered numerous battles involving everything from expanded navigation to flood plain management and invasive species issues. He says he doesn't feel old enough to retire, but the calendar says it's time to move on. Although he has no immediate plans, we're sure that he will find something to keep him interested and involved in natural resource management in one way or another.

### Meetings of Interest

**Jan 24-25:** Mississippi River Basin Panel on Aquatic Nuisance Species, Renaissance Nashville Hotel, Nashville, TN, Contact: [ijrivers@aol.com](mailto:ijrivers@aol.com)

**Mar. 18-20:** UMRCC/LMRCC Joint Meeting, Holiday Inn, Collinsville, IL. Contact: [scott\\_yess@fws.gov](mailto:scott_yess@fws.gov)

**Apr. 6-10:** National Shellfisheries Association, Providence, RI, <http://shellfish.org/meetings.htm>

**Apr. 6-10:** International Association for Landscape Ecology, U.S. Division, Madison, WI, <http://www.cof.orst.edu/org/usiale/madison2008/index.htm>

**Apr. 9-13:** Benthic Ecology Meeting 2008, Providence, RI., <http://www.benthicecology2008.uconn.edu/main.htm>

**Apr. 10-12:** Southwestern Association of Naturalists, Memphis, TN, [http://www.biosurvey.ou.edu/swan/55th\\_meeting\\_announcement.pdf](http://www.biosurvey.ou.edu/swan/55th_meeting_announcement.pdf)

**Apr 16-19:** Association of Southeastern Biologists, Spartanburg, IL, <http://www.asb.appstate.edu/meeting.php>

**May 12-13:** American Institute of Biological Sciences, Washington DC, <http://www.aibs.org/annual-meeting/>

**May 25-30:** North American Benthological Society, Salt Lake City, UT, <http://www.benthos.org/index.cfm>

**May 26-30:** Society of Wetland Scientists, Washington, D.C., [http://www.sws.org/2008\\_meeting/index.html](http://www.sws.org/2008_meeting/index.html)

**Jun. 20-24:** American Society of Naturalists, Minneapolis, MN, <http://www.evolution2008.org/>

**Jun. 29-Jul. 3:** American Malacological Society, Carbondale, IL, <http://www.malacological.org/meetings/next.html>

**Jul. 13-17:** Society for Conservation Biology, Chattanooga, TN, <http://www.utc.edu/Academic/ConferenceforSocietyofConservationBiology>

**Jul 23-28:** American Society of Ichthyologists and Herpetologists and Society for the Study of Amphibians and Reptiles, Montreal, CA, <http://www.asih.org/annualmeetings> and <http://www.dce.k-state.edu/conf/jointmeeting/>

**Aug. 13-17:** Short Course on Geostatistical Analysis of Environmental Data, University of Florida, Gainesville. See: <http://conference.ifas.ufl.edu/soils/geostats/index.html>; Contact: Jhanna Crutchfield, (352) 392-5930, Fax: (352) 392-9734, [jhanna@ufl.edu](mailto:jhanna@ufl.edu)

**Aug. 17-21:** American Fisheries Society 138th Annual Meeting, Ottawa, Ontario. Contact: Betsy Fritz, [bfritz@fisheries.org](mailto:bfritz@fisheries.org), (301) 897-8616, ext. 212.

## Congressional Action Pertinent to the Mississippi River Basin

## Climate Change

**S. 280.** Lieberman (I/CT) and 6 Co-Sponsors and **H. R. 620.** Olver (D/MA) and 17 Co-Sponsors.. Establishes a market-driven system of GHG tradeable allowances to support the deployment of new climate change-related technologies to ensure benefits to consumers from the trading in such allowances, and for other purposes.

**S. 309.** Sanders (I/VT) and 10 Co-Sponsors. Reduces emissions of carbon dioxide (CO<sub>2</sub>), and for other purposes.

**S. 317.** Feinstein (D/CA) and Carper (D/DE). Establishes a program to regulate the emission of GHGs from electric utilities.

**S. 485.** Kerry (D/MA) and Snowe (R/ME). Establishes an economy-wide global warming pollution emission cap-and-trade program to assist in transitioning to new clean energy technologies, protect employees and affected communities, protect companies and consumers from significant increases in energy costs, and for other purposes.

**S. 1018.** Durbin (D/IL) and 2 Co-Sponsors and **H.R. 1961.** Markey (D/MA) and 7 Co-Sponsors. Addresses security risks posed by global climate change and for other purposes.

**S. 1168.** Alexander (R/TN) and Lieberman (I/CT). Establishes a regulatory program for sulfur dioxide, nitrogen oxides, mercury, and CO<sub>2</sub> emissions from the electric generating sector.

**S. 1177.** Carper (D/DE) and 7 Co-Sponsors. Establishes a national uniform multiple air pollutant regulatory program for the electric generating sector.

**S. 1201.** Sanders (I/VT) and 3 Co-Sponsors. Reduces emissions from electric power plants, and for other purposes.

**S. 1321.** Bingaman (D/NM) and **H. R. 2556.** Wilson (R/NM). Enhances the energy security of the U.S. by promoting biofuels, energy efficiency, and carbon capture and storage, and for other purposes.

**S. 1389.** Obama (D/IL) and 2 Co-Sponsors. Authorizes the National Science Foundation to establish a Climate Change Education Program.

**S. 1554.** Collins (R/ME) and Lieberman (I/CT). Addresses challenges relating to energy independence, air pollution, and climate change.

**S. 1766.** Bingaman (D/NM) and 5 Co-Sponsors. Reduces GHG emissions from the production and use of energy, and for other purposes.

**S. 2191.** Lieberman (I/CT) and 8 Co-Sponsors. Directs the Administrator of the USEPA to establish a program to decrease emissions of GHGs, and for other purposes.

**S. 2204.** Whitehouse (D/RI) and Boxer (D/CA). Assists wildlife populations and wildlife habitats in adapting to and surviving the effects of global warming, and for other purposes.

**S. 2211.** Whitehouse (D/RI) and Boxer (D/CA). Ensures the recovery, resiliency, and health of ocean, coastal, and Great Lakes ecosystems, and for other purposes.

**S. 2307.** Kerry (D/MA) and Snowe (R/ME). Amend the Global Change Research Act of 1990, and for other purposes.

**S. 2355.** Cantwell (D/WA). Amends the National Climate Program Act to enhance the ability of the U.S. to develop and implement climate change adaptation programs and policies, and for other purposes.

**H. R. 906.** Udall (D/CO) and Inglis (R/SC). Promotes and coordinates global climate change research, and for other purposes.

**H. R. 1590.** Waxman (D/CA) and 126 Co-Sponsors. Reduces GHG emissions and protects the climate.

**H. R. 2337.** Rahall (D/WV). Promotes energy policy reforms and public accountability, alternative energy and efficiency, and carbon capture and climate change mitigation, and for other purposes.

**H. R. 2338.** Dicks (D/WA) and 2 Co-Sponsors. Establishes the policy of the Federal Government to use all practicable means and measures to assist wildlife populations in adapting to and surviving the effects of global warming, and for other purposes.

**H. R. 2420.** Lantos (D/CA) and 25 Co-Sponsors. Declares the U.S. policy on international climate cooperation, to promote clean and efficient energy technologies in foreign countries, and to establish the International Clean Energy Foundation.

**H. R. 2701.** Oberstar (D/MN) and 14 Co-Sponsors. Strengthens the Nation's energy security and mitigates the effects of climate and ensures sound water resource and natural disaster preparedness planning, and for other purposes.

**H. R. 2809.** Inslee (D/WA) and 17 Co-Sponsors. Ensures that the U.S. leads the world baseline in developing and manufacturing next generation energy technologies, to grow the economy, create new highly trained, highly skilled American jobs, eliminate American overdependence on foreign oil, and address the threat of global warming.

**H. R. 2950.** Wilson (/NM). Reduces our Nation's dependency on foreign oil by investing in clean, renewable, and alternative energy resources, promoting new emerging energy technologies, developing greater efficiency, and creating a Strategic Energy Efficiency and Renewables Reserve to invest in alternative energy, and for other purposes.

**H. R. 3220 and 3221.** Pelosi (D/CA) and 18 Co-Sponsors. Moves the U.S. toward greater energy independence and security, developing innovative new technologies, reducing carbon emissions, creating green jobs, protecting consumers, increasing clean renewable energy production, and modernizing our energy infrastructure.

**H. R. 4226.** Gilchrest (R/MD) and Olver (D/MA). Accelerates the reduction of GHG emissions in the U.S. by establishing a market-driven system of GHG tradeable allowances that will limit GHG emissions in the U.S., reduce dependence upon foreign oil, and ensure benefits to consumers from the trading in such allowances, and for other purposes.

## Conservation

**S. 50.** Isakson (R/GA). Amends the Internal Revenue Code of 1986 to provide economic incentives for the preservation of open space and conservation of natural resources, and for other purposes.

**S. 241.** Wyden (D/OR) and Akaka (D/HI). Authorizes the Interior Secretary to enter into coop agreements to protect natural resources of units of the National Park System through collaborative efforts on land inside and outside of units of the National Park System.

**S. 272.** Coleman (R/MN). Amends P.L. 87-383 to reauthorize appropriations to promote the conservation of migratory waterfowl and to offset or prevent the serious loss of important wetland and other waterfowl habitat essential to the preservation of migratory waterfowl, and for other purposes.

**S. 919.** Menendez (D/NJ) and 4 Co-Sponsors. Reauthorizes USDA conservation and energy programs and certain other programs to modify the operation and administration of these programs, and for other purposes.

**S. 1424.** Schumer (D/NY) and 3 Co-Sponsors, and **H. R. 2419.** Peterson (D/MN). Provides for the continuation of agricultural programs through fiscal year 2013, and for other purposes.

**S. 2223.** Baucus (D/MT). Amends the Internal Revenue Code of 1986 to provide additional tax incentives to promote habitat conservation and restoration, and for other purposes.

**S. 2228.** Lugar (R/IN) and 7 Co-Sponsors. Extends and improves agricultural programs, and for other purposes.

**S. 2302.** Harkin (D/IA) and **H.R. 2419** Peterson (D/MN). Provides for the continuation of agricultural programs through fiscal year 2012, and for other purposes.

**H. R. 2735.** Young (R/AK) and Thompson (D/CA). Provides additional funding for operation of national wildlife refuges through increased Duck Stamp price.

**H. R. 3036.** Sarbanes (D/MD). Amends the Elementary and Secondary Education Act of 1965 providing grants that would allow states to develop environmental education in schools and help train environmental teachers who would also serve as mentors to students.

**Endangered Species Act (ESA)**

**S. 658.** Thomas (R/WY) and 4 Co-Sponsors. Improves the processes for

listing, recovery planning, and delisting, and for other purposes.

**S. 700.** Crapo (R/ID) and 16 Co-Sponsors and **H. R. 1422.** Thompson (D/CA) and 3 Co-Sponsors. Amends the Internal Revenue Code to provide a tax credit to individuals who enter into agreements to protect the habitats of endangered and threatened species, and for other purposes.

**H. R. 110.** J. Davis (R/VA). Imposes limitations on wetlands mitigation activities carried out through the condemnation of private property.

**H. R. 1917.** Heger (R/CA). Enables Federal agencies to rescue and relocate members of any threatened species that would be taken in the course of certain reconstruction, maintenance, or repair of Federal or non-Federal man-made flood control levees.

**H. R. 2530.** McMorriss Rogers (R/WA) and 12 Co-Sponsors. Better informs consumers regarding costs associated with compliance for protecting endangered and threatened species.

**H. R. 3459.** Markey (D/MA). Amends the ESA to require the Director of the USFWS to publish a summary statement of the scientific basis for a decision concerning the listing or de-listing of an endangered species or the designation of critical habitat, and for other purposes.

**Federal Water Pollution Control Act (FWPCA) Amendments:**

**S. 134.** Allard (R/CO) and Salazar (D/CO), **H. R. 186.** Musgrave (R/CO) and **H.R. 317.** Salazar (D/CO). Authorizes construction of the Arkansas Valley Conduit in the State of Colorado, and for other purposes.

**H. R. 720.** Oberstar (D/MN) and 3 Co-Sponsors. Authorizes appropriations for State water pollution control revolving funds, and for other purposes.

**Invasive Species**

**S. 336.** Durbin (D/IL) and 7 Co-Sponsors and **H. R. 553.** Biggert (R/IL) and 24 Co-Sponsors. Requires the Secretary of the Army to operate and maintain as a system the Chicago Sanitary and Ship Canal dispersal barriers.

**S. 725.** Levin (D/MI) and Collins (R/ME). Amends, improves and reauthorizes the

Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA).

**S. 726.** Levin (D/MI) and 7 Co-Sponsors. Amends the Lacey Act to prohibit the importation and shipment of certain species of carp.

**S. 791.** Levin (D/MI) and 6 Co-Sponsors and **H.R. 1350.** Ehlers (R/MI) and 12 Co-Sponsors. Establishes a collaborative program to protect the Great Lakes, and for other purposes.

**S. 1578.** Inouye (D/HI) and Stevens (R/AK). Amends the NANPCA to establish vessel ballast water management requirements, and for other purposes.

**S. 1949.** Reid (D/NV) and 3 Co-Sponsors. Directs the Interior Secretary to provide loans to certain organizations in certain States to address habitats and ecosystems and to address and prevent invasive species.

**H. R. 83.** Biggert (R/IL). Amends the Lacey Act, to add certain species of carp (black, bighead, silver and largescale silver) to the list of injurious species that are prohibited from being imported or shipped.

**H. R. 260.** Ehlers (R/MI). Establishes marine and freshwater research, development, and demonstration programs to support efforts to prevent, control, and eradicate invasive species, as well as to educate citizens and stakeholders and restore ecosystems.

**H. R. 767.** Kind (D/WI) and 12 Co-Sponsors. Protects, conserves, and restores native fish, wildlife, and their natural habitats at national wildlife refuges through cooperative, incentive-based grants to control, mitigate, and eradicate harmful nonnative species, and for other purposes.

**H. R. 801.** Kirk (R/IL) and 20 Co-Sponsors. Amends NANPCA to require application to all vessels equipped with ballast water tanks the requirement to carry out exchange of ballast water or alternative ballast water management methods prior to entry into any port within the Great Lakes, and for other purposes.

**H.R. 889.** Miller (R/MI). Amends the NANPCA to establish vessel ballast water management requirements, and for other purposes.

**H. R. 2423.** LaTourette (R/OH) and 4 Co-Sponsors. Provides for the management and treatment of ballast water to prevent the introduction of nonindigenous aquatic species into coastal and inland waters of the U.S., and for other purposes.

**Public Lands**

**H. R. 1463.** Udall (D/CO) and Trancredo (R/CO). Provides for restoration activities on Federal lands under the jurisdiction of the Interior or Agriculture Depts, and for other purposes.

**H. R. 1484.** Tancredo (R/CO) and Udall (D/CO). Provides consistent enforcement authority to federal agencies (BLM, NPS, FWS and FS) to respond to violations of regulations regarding the management, use, and protection of public lands under their jurisdiction, and for other purposes.

**Water Resources**

**S. 564.** Feingold (D/WI) and McCain (R/AZ). Modernizes water resources planning, and for other purposes.

**S. 752.** Nelson (D/NE) and 3 Co-Sponsors and **H. R. 1462.** Udall (D/CO) and 4 Co-Sponsors. Authorizes the Secretary of the Interior to participate in the implementation of the Platte River Recovery Implementation Program for Endangered Species in the Central and Lower Platte River Basin and to modify the Pathfinder Dam and Reservoir.

**S. 1116.** Salazar (D/CO) and 3 Co-Sponsors. Facilitates the use for irrigation and other purposes water produced in connection with development of energy resources.

**S. 1248.** Boxer (D/CA) and **H. R. 1495.** Oberstar (D/MN) and Johnson (R/TX). Authorizes the Secretary of the Army to construct various projects for improvements to rivers and harbors of the U.S., and for other purposes.

**S. 2156.** Bingaman (D/NM) and 3 Co-Sponsors. Authorizes and facilitates the improvement of water management by the Bureau of Reclamation, to require the Secretary of the Interior and the Secretary of Energy to increase the acquisition and analysis of water-related data to assess the long-term availability of water resources for irrigation, hydroelectric power, municipal, and environmental uses, and for other purposes.

**H. R. 68.** McIntyre (D/NC). Amends the Water Resources Development Act of 1976 to allow the Secretary of the Army to extend the period during which beach nourishment for water resources development projects may be provided.

**H. R. 135.** Linder (R/GA) and 5 Co-Sponsors. Establishes the 21st Century Water Commission to study and develop recommendations for a comprehensive water strategy to address future water needs.

**H. R. 307.** Pearce (R/NM). Imposes limitations on the authority of the Interior Secretary to claim title or other rights to water

absent specific direction of law or to abrogate, injure, or otherwise impair any right to the use of any quantity of water.

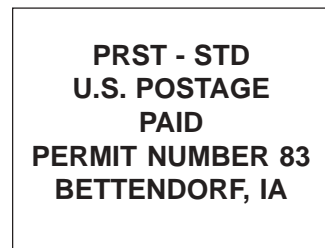
**H. R. 574.** Whitfield (R/KY). Ensures the safety of residents and visitors to Lake Barkley, KY, improves recreation, navigation, and the economic vitality of the lake's region, and establishes a pilot program to maintain its pool elevation at 359 feet until after the first Monday in September.

**H. R. 591.** Musgrave (R/CO). Amends the Cache La Poudre River Corridor Act to designate a new management entity, make certain technical and conforming amendments, enhance private property protections, and for other purposes.

**H. R. 1180.** Udall (D/CO). Assures that development of certain Federal oil and gas resources will occur in ways that protect water resources and respect the rights of the surface owners, and for other purposes.

**H. R. 2277.** Lamborn (R/CO) and Tancredo (R/CO) and **H.R. 1833.** Salazar (D/CO). Authorizes the Interior Secretary to conduct a feasibility study relating to long-term water needs for the area served by the Fryingpan-Arkansas Project, CO, and for other purposes.

Sources: <http://www.gpoaccess.gov/bills/index.html>; and <http://thomas.loc.gov/cgi-bin/thomas>



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