River Crossings

Volume 17 **November/December 2008** **Number 6**

Tennessee Sued Over Paddlefish Regs

Tennessee's commercial roe (fish egg or caviar) fishermen recently filed a law suit against the Tennessee Wildlife Resources Agency (TWRA) over new restrictions that they claimed violated state and federal laws. The agency had passed the rules by a proclamation that the suit claimed is arbitrary and invalid because it is not supported by science or factual basis, and violates equal protection guarantees. "Not only did TWRA pass procedures with rules that are not supported, they deprived citizens of due process," said the fishermen's attorney Jim McKoon, because state policy dictates that "decisions such as these are public business and shall not be conducted in secret, and yet no public comment was provided for."

The agency's proclamation had increased the minimum size limit of paddlefish, reduced the length of the commercial season, continued to prohibit the commercial harvest of hybrid shovelnose sturgeon, and prohibited the use of certain gear. According to Allen Fine, of Leisure Caviar, another provision of the new restrictions closed the prolific Watts Bar Reservoir, on the Tennessee River, to commercial fishing, based on an outdated PCB advisory on catfish. Independent tests of paddlefish roe proved negative for toxic substances, said Fine. "We showed it to them," Fine said, "but they have an agenda, and it's clear what they're trying to do." Since the TWRA has not closed Watts Bar to recreational fishing, the agency violated the commercial fishermen's equal protection guarantees, the suit alleged. George Scholten, TWRA's commercial fisheries program coordinator, pointed out that TWRA does have a contaminant advisory listed for Watts Bar Reservoir and "recreational anglers are advised not to eat the fish from Watts Bar. Anglers can practice catch and release or they can choose to ignore the advisory and eat these fish - that's their decision. However, when a commercial fisher takes these fish and sells them to an unsuspecting consumer, the consumer has no idea of the risk they are taking. That's why Tennessee closes commercial fisheries with contaminant advisories and advises recreational anglers not to eat the fish."

Large paddlefish tagged by the Iowa Dept. of Natural Resources as part of the MICRA population study.

Then in late September, the Tennessee Wildlife Resources Commission (TWRC) surprised everyone by voting to remove all paddlefish size and season restrictions from their books. "We're getting out of the egg business," Commissioner Boyce Magli told the commercial fishermen. "The discussion of

Inside This Issue

TN Sued Over Paddlefish Regs	1	Felt Soled Waders Criticized	11
TN Man Guilty of Paddlefish Violation	3	Towboat Inspection Program Launched	12
Alien Crayfish and the Baitfish Industry	3	Western Energy Water Quality Concerns	12
AC Barrier vs Watershed Separation	4	OK/AR Poultry Wars Continue	13
State's Rights and Ballast Water	6	Mud Meter	13
VHS Mgmt/Science Needs Workshop	6	River Tunnel Collects PCBs	14
2008 Gulf Hypoxia Plan	7	Ecosystem Values	15
Coastal Restoration Progress/Concerns	8	Nature's Right To Exist	16
Colorado Water Project Concerns	9	Interactive Mapping Available for Kids	16
Worlds Largest Dam Removal Project	10	Climate Change Update	17
New Bio-Pesticide for Invasive Mussels	10	Meetings of Interest	20
Mosquitofish Threatens Amphibians	11	Congressional Action	20

paddlefish and our management of paddlefish takes up more time than any other two things we deal with", he said. "Think of the money the agency will save...Think of the manpower the agency can save...We can divert that money and manpower to bigger and more sauger, bigger trout..., he said. Commissioners in favor of the move also argued that the agency spends hundreds of thousands of dollars each year policing the taking of paddlefish and on paddlefish studies.

While some commercial fishermen were happy with the vote, others believe the commission went too far. "We were only one inch and one week apart," said Chattanooga fishermen Allen Fine of the size limits and season lengths. "We want to work with the agency", he said. The action by the TWRC doesn't open lakes that are closed to commercial fishing and it doesn't change any of the laws governing nets or other commercial fishing gear.

Commissioner Hugh Simonton, who voted against lifting the restrictions, volunteered to meet with commercial fishermen to try and work out an agreement that includes regulating the commercial taking of paddlefish. TWRA Chief of Fisheries Bill Reeves also disagreed with the commission's action, but believes it could allow both sides a cooling-off period. "This will put all sides in a position to be more considerate of the other side," Reeves said.

One downside for commercial fishermen could be an inability to export paddlefish roe. The U.S. Fish and Wildlife Service (USFWS) could intervene and stop exports because of the Convention on International Trade in Endangered Species known as CITIES. "I don't think they are going to allow any exports," Reeves said, "Not without any season or any size limits." TWRA officials state that the new regulations were implemented as part of a statewide management plan for paddlefish that includes stair-stepped length restrictions and harvest seasons based on the results of a 3-year study completed in 2005 by the U.S. Geological Survey Coop Unit at Tennessee Tech University. The $200,000 study was funded by the USFWS Office of Scientific Authority; the very office that approves or denies commercial fishermen's export permits.

In November, the TWRC passed a season and size limits that were requested by the commercial fishing industry. All though these regulations are better than nothing, Scholten suggested that the new season and size limit are only slightly better than nothing. "According to published, peer-reviewed literature, a 36" size limit will do little to improve the sustainability of Kentucky Lake's paddlefish fishery" Scholten says. "This size limit will allow recruitment overfishing to continue and the longer season will result in excessive losses to bycatch mortality." Bycatch mortality is an issue in paddlefish fisheries because netting mortality of paddlefish is high when the water temperature warms. Previously, TWRA had set season dates that would prevent netting during periods when water temperatures would be too warm but this was not considered when the new season was set.

According to Scholten, 80 licensed fishermen landed over 20,000 lbs. of paddlefish roe in 2007, which wholesales for at least $85/lb. Harvest of paddlefish and sturgeon roe in the U.S. in support of the international caviar trade skyrocketed after the fall of the Soviet Union when wholesale prices spiked. At that time, harvest of Russian sturgeon stocks went largely unregulated, leading to overharvest and collapse of wild sturgeon populations. MICRA and its member states, including Tennessee, have been working to prevent such a collapse of U.S. sturgeon and paddlefish stocks.

A primary reason for the formation of MICRA in the late 1980s was to protect interjurisdictional fish species such as the paddlefish. At that time paddlefish were being petitioned for listing under the federal Endangered Species Act, and the states formed MICRA as a cooperative effort to better coordinate interstate management in order to prevent the species from being so listed and thus removed from the commercial and recreational fishery. As part of that effort MICRA has been conducting a basinwide paddlefish population assessment since the early 1990s. Tennessee's regulation changes are thus not arbitrary at all, but resulted, in part, from MICRA's cooperative interstate management effort.

Tennessee's regulations were well researched, and are in the best interests of the public, as well as the commercial fishermen and the caviar industry. Without comprehensive regulation, commercial fishing will soon wipe out the paddlefish fishery in Tennessee

River Crossings

Published by

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

MICRA email: MICRA@fws.gov
MICRA Web Site: http://wwwaux.cerc.cr.usgs.gov/MICRA/

as happened earlier to the sturgeon fishery in the Soviet Union. If that happens, no one wins — not the TWRA, not MICRA, not the commercial fishermen, not the caviar industry, and certainly not the public!

Source: Robert Fritchey, National Fisherman, November 2008; Bob Hodge, Knoxville News Sentinel, 9/21/08; George Scholten, 12/15, 2008.

TN Man Pleads Guilty to Illegal Paddlefish Harvest

John F. Wood, U.S. Attorney for the Western District of Missouri, announced in September that a Memphis, TN man pled guilty in federal court to his role in a conspiracy to harvest the eggs of paddlefish caught in illegal nets at Table Rock Lake, process the eggs into caviar, and sell them to a Tennessee company. Thomas Jerry Nix, Jr., 39, formerly of Shell Knob, MO, submitted his guilty plea before U.S. Magistrate Judge James C. England to the charge contained in a July 9, 2008, federal indictment.

Nix admitted that, beginning in December 2007 and running through February 2008, following the paddlefish as they moved upstream to spawn, he and an unidentified co-conspirator set three gill nets in Table Rock Lake and used a Global Positioning System (GPS) receiver to mark their locations. Thereafter, every one to three days Nix and his co-conspirator returned to check the nets. When paddlefish were caught, Nix slit open the bellies of any females he suspected of containing roe, and extracted it from the fish by hand. He and his partner then sealed the roe in plastic bags and transported it to his residence in Shell Knob, where he processed the roe into caviar. In order to conceal their illegal activities, after removing the roe from the paddlefish, Nix and his partner sank the dead paddlefish carcasses in the lake by weighting them with rocks.

After processing the roe into caviar, Nix packaged the roe in plastic containers, weighed and labeled the containers with labels supplied by a Tennessee company, refrigerated the caviar and stored it in his residence. Periodically, Nix and his co-conspirator transported the paddlefish caviar from his residence in Shell Knob to three separate locations in Tennessee, where they sold it to a company engaged in the business of buying, processing and selling caviar. Between Jan. 11 and Feb. 11, 2008, Nix sold approximately 387 lbs. of paddlefish caviar to the Tennessee firm for a total of $35,820.

On the night of Feb. 17, 2008, agents of the Missouri Department of Conservation and the U.S. Fish and Wildlife Service apprehended Nix as he returned from his illegal commercial fishing on Table Rock Lake. Nix, who was in possession of 78.3 lbs of unprocessed paddlefish roe, admitted to taking paddlefish illegally, and stated that he had caught approximately eight paddlefish that night, from which he had taken the roe. Nix gave the agents consent to search his residence in Shell Knob, where they found an additional 91.32 lbs. of paddlefish roe that had been processed into caviar and packaged in containers labeled for sale to the Tennessee company.

The following day, Feb. 18, 2008, Nix led agents to the three gill nets that he had set in Table Rock Lake. The agents retrieved the nets, and released 17 live paddlefish caught in the them. Nix and his co-conspirator violated numerous Missouri laws and regulations, including prohibition on the use of gill nets for sport fishing, taking paddlefish out of season, engaging in commercial fishing without a commercial license and using gill nets where not permitted and leaving them unattended. Nix also violated federal regulations that prohibit commercial activities on Table Rock Lake without the permission of the U.S. Army, Corps of Engineers, which the defendant did not have. Finally, paddlefish roe were subject to U.S. Food and Drug Administration regulations concerning Hazard Analysis Critical Control Point (HACCP) plans. Improperly processed paddlefish roe were subject to contamination by B*otulinum brucella* and *Listeria monocyteogenes*. Because Nix did not have a HACCP plan or permit to process paddlefish roe, all of the paddlefish caviar which the defendant introduced into interstate commerce was "adulterated" under the Food and Drug Administration Act.

By pleading guilty, Nix agreed to forfeit to the government a 20-foot Bumblebee 200 Pro boat and trailer, with 225 HP Mariner motor, a GPS unit, and miscellaneous equipment such as three gill nets with anchors and a digital scale, all of which were used to commit the offense. Under federal statutes, Nix is subject to a sentence of up to five years in federal prison without parole, plus a fine up to $250,000. A sentencing hearing will be scheduled after the completion of a presentence investigation by the U.S. Probation Office.

Enforcement agents argue that poaching cases like this are just the "tip of the iceberg" of what is really going on in our rivers and lakes. They say that only a small number of the poachers are ever actually caught and prosecuted. If that is the case, stronger regulations and more enforcement measures are needed to keep the nation's valuable commercial fisheries populations from complete collapse as occurred in Russia after the collapse of the Soviet Union (See previous article).

Source: *News Release*, Office of the U.S. Attorney John F. Wood, Kansas City, MO, 9/10/08

Alien Crayfish Introduction and the Baitfish Industry

Introduction of alien crayfishes has caused severe impacts to freshwater ecosystems worldwide including declines of native biodiversity, elimination of fish and invertebrate habitat, alteration of trophic webs, and fisheries collapses. According to a recent Missouri Dept. of Conservation study (See Source for this article), the live bait trade is believed to be the primary vector for the introduction of alien crayfishes in North America. As a result, some U.S. states and Canadian provinces have banned the use of live crayfish as bait and some fishery scientists advocate a total U.S. ban.

Rusty Crayfish

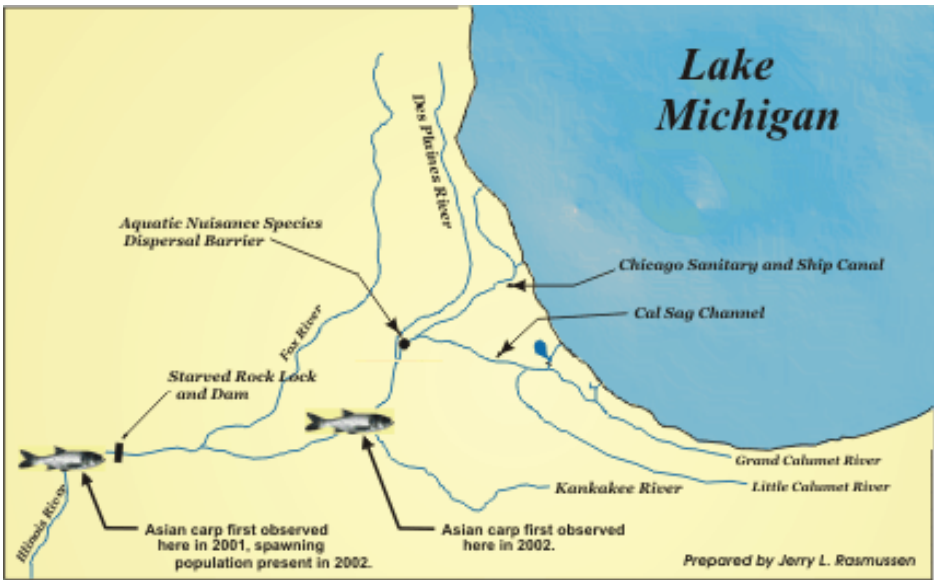
The state of Missouri has experienced problems with introduced alien crayfish. Missouri state policy allows legal sale of four native crayfish species and prohibits crayfish taken from the wild to be sold as bait. In 2002, all known or potential Missouri bait vendors (N = 370) were surveyed to determine if they sold crayfish. In 2003 and 2004, conservation agents visited 105 bait shops throughout the state and sampled crayfish for species identification. Most Missouri bait shops conducted legal sales, but three illegal species were detected, including the alien rusty crayfish (*Orconectes rusticus*). Additionally, two legal species that were prevalent in samples were sold at multiple locations outside of their known historical range.

Bait shop records revealed that crayfish were supplied by commercial sources in Missouri and six other states and were also obtained illegally from the wild. In a 2008 survey of U. S. and Canadian fisheries chiefs/admin-

istrators, 49% of respondents were aware of aquatic resource problems within their state or province in which bait-bucket introductions of alien crayfish species were the suspected cause, indicating that management of introduced crayfish is a widespread issue affecting agencies outside Missouri. Additionally, 61% of responding agencies reported existing regulations designed to address their alien crayfish problems.

In Missouri, management efforts following this study have focused on removing illegal species from bait shops; educating vendors on bait regulations, invasive species, and crayfish taxonomic identification; and on consideration of policy changes.

Source: DiStefano, R. J., M. E. Litvan and P. T. Horner. 2008. *The bait industry as a potential vector for alien crayfish introductions: problem recognition by fisheries agencies and a Missouri evaluation.* Missouri Department of Conservation Final Report. Columbia, MO.



Location of the Cal Sag and Chicago Sanitary and Ship Canal and Aquatic Nuisance Species Dispersal Barrier (Asian Carp Barrier) with respect to Lake Michigan and the Illinois River.

Asian Carp Barrier Concerns vs Watershed Separation

The electric Asian carp barrier in the Cal Sag and Chicago Sanitary and Ship Canal (CCSSC) was supposed to be the solution to keeping the invasive fish out of the Great Lakes, but the project has been plagued with delays, and has now run into additional problems. The U.S. Coast Guard is concerned that, at full power, the new permanent barrier creates unsafe conditions for deckhands working on barges passing through the half-mile long barrier zone.

For the past several years an "experimental" electric barrier has been operated in the canal as a stopgap measure to keep the carp out of Lake Michigan, while a larger, more powerful permanent barrier was constructed. The new $9 million permanent project designed to replace the experimental barrier was finished nearly 2.5 years ago. But federal officials now say they won't permanently activate the barrier until they are convinced that the canal's electrified waters are safe for use by barge operators.

Barge companies use the CCSSC to haul materials such as coal, sand, gravel and some petroleum products along the oversized ditch originally built a century ago to carry Chicago's sewage wastes downstream into the Illinois River. After electrical sparking was noted between barges passing through the barrier zone, the U.S. Coast Guard in January 2005 asked the U.S. Army Corps of Engineers (Corps), who operates the barrier, to shut it down.while safety tests were conducted. The Corps declined, and the Coast Guard settled for a new set of rules for boats operating in the barrier zone, including a life-jacket requirement and no stopping to hitch or unhitch barges in the electrified area. The Coast Guard and barge industry also agreed that the new, more powerful barrier can be temporarily activated in an emergency if the weaker experimental barrier fails, though only if operated at about one-quarter of its designed electrical strength — equal to the original experimental barrier's strength.

Since the sparking issue was raised, there have been no new safety incidents reported, but the studies continue. Nearly $1 million has been spent examining such things as what would happen to someone fell off of a barge into the electrified water of the barrier zone. According to government documents, the U.S. Navy's Experimental Diving Unit investigated these concerns at a cost of $100,000, including more than a year of computer modeling and analysis. In the end the Navy concluded that similar to falling into icy water you might be incapacitated and die — or, you might not. The Coast Guard is still reviewing the study which has not been released to the general public.

The ongoing concern that the electrified water will cause sparking between linked or passing barges has been especially troubling to barges carrying flammable cargoes. Additionally, the barrier was built just upstream from a coal-fired power plant, and there are concerns that sparks could fly into its dusty coal loading zone setting off a fire or explosion. To address the latter concern, the Corps spent $330,000 two years ago installing a set of energy-sucking metal mats on the canal bottom to keep the electrical current from bleeding into the loading area.

"We believe we've significantly solved the problem," says Chuck Shea, the Corps' barrier project manager. But the Coast Guard, which has final say on the matter, isn't convinced. Shea says, "I don't have final say on turning it on or off. . . . We've done a great deal of testing over several years and compiled a number of reports that are being reviewed up the chain (of command) in the Corps and the Coast Guard." The latest electricity tests in the area around the power plant were completed in April. Now the Coast Guard is considering a batch of additional tests. "Different temperatures could reflect different results," says Coast Guard Lt. Erick R. Johnson.

As all this testing continues, some Great Lakes advocates are running out of patience with the way the Corps is handling the project, noting that the Asian carp could destroy what's left of the lakes' ecological integrity and multibillion-dollar fishing and tourist industries. "They are not looking out for the public's interest," charges Tom Marks of the New York chapter of the *Great Lakes Sport Fishing Council*. "They're looking out for the barge operators."

"It's just an ongoing saga," says Phil Moy, a former Corps employee who now works for the University of Wisconsin Sea Grant and serves as co-chairman of an advisory panel of

scientists, government employees and Great Lakes advocates that has been pushing to get the barrier built for the better part of a decade. Members of that panel feel left out of some of the safety discussions that the Corps and Coast Guard are having with the barge industry. "It does seem to me that a lot of discussions have been going on between the Coast Guard, the Corps and the river carriers without the involvement of the rest of the panel," says Moy. "Maybe that's appropriate. Maybe it's not."

Then this summer, the *American Waterways Operators* (AWO), a barge industry group, wrote a letter to the federal government protesting the length of time the Corps planned to allow the new barrier to be temporarily turned on at the lower power level so the old corroding experimental barrier could be shut down and refurbished. The barge industry's letter to the Coast Guard (found on the Federal Register) makes it clear that the barge industry has been willing to work with the federal government on safety tests. But it also has been lobbying to keep the new barrier from being permanently turned on for at least four years.

Letter author and AWO vice president Lynn Muench said in an interview that she would like to see the electrical barrier removed and replaced with something considered safer, such as a barrier that shoots bubbles or noise into the water. She says her industry is sensitive to what is at stake in terms of the damage the carp could do to the lakes. But she says she doubts the electrical barrier will work in the first place. "If they already proved (the barrier) has an ability to basically kill people if they fall in the water, why would you want that to stay there? I don't want it to stay there," she says. "We have professional crews going over that on a regular basis." Muench stated in her letter that the AWO would remain firmly opposed to operating the new barrier until all safety tests were completed and the Coast Guard verifies that the barrier area is safe for barges.

"We're still thinking of other possible tests that could be done in winter," says the Coast Guard's Johnson. But the tests are being conducted with the barrier operating at only a quarter of its strength. If the Coast Guard eventually is convinced the barrier is safe to operate at that level, it likely will require more tests before the barrier is authorized to operate at its designed strength. "That's going to really be the difficult part — moving that voltage up," says Moy. Nobody is offering a time frame for that to happen.

But there are other problems. The barrier site, located in a heavily industrialized corner of suburban Chicago, was picked because it sits on a particularly narrow section of canal below where it forks into five separate channels connecting to Lake Michigan. One barrier here, it was thought, could solve the problem for all five upstream waterways. But the Des Plaines River runs parallel to the canal, only yards away in some places, at the barrier site. And the Des Plaines flows into the Asian carp-infested Illinois River, and biologists concede that it too will one day fill with carp.

The problem is the waters of the canal and the Des Plaines River have a history of merging during large floods. "I've personally observed the Des Plaines in a flood, and water was coming across and dropping into the canal," says Dr. Rip Sparks, a scientist with the Illinois Natural History Survey who is also a member of the barrier advisory panel. Sparks said the water was deep enough to carry young fish. A potential remedy to this problem is a system of berms or levees between the two waterways. The Corps, which struggled for years to find the funds to build the new barrier, has approval from Congress to look into additional projects to keep the carp out of the lakes.

Some time ago we raised concerns in this newsletter that any electric barrier would likely be ineffective in preventing the movement of small fish because they are less susceptable to electric shock than larger individuals. This would certainly be the case if the barrier is kept from operating at anything less than full power. We also stated in the past, as have many biologists, that the only real solution to the problem is creation of a physical barrier to separate the Great Lakes from the Mississippi River Basin watershed. A panel of scientists and engineers, convened by Chicago Mayor Richard Daley 2003, agreed with us. And this is the solution now also being recommended by a study completed by the *Alliance for the Great Lakes*, an advocacy group.

The Great Lakes salmon fishery could turn into a carp fishery like this if the Asian carp invasian succeeds as it has in other areas.

"If you want to protect the Great Lakes, this is what you have to do. Invaders like Asian carp are unpredictable, but their effects are catastrophic and irreversible," said Joel Brammeier, *Alliance* vice president and lead author of the study. "You've got to remove their pathway." The *Alliance* says further that while the electric barriers, which deliver a non-lethal jolt to fish, have been effective, they are not a long-term solution. Besides that, the new barrier has a design life of only 20 years, and then it will have to be refurbished or replaced.

The Great Lakes and Mississippi River watersheds were historically separated by a "mini continental divide" located just west of downtown Chicago. Re-establishing such a divide would mean big changes in the way that barges and recreational boats operate, because there would no longer be a direct waterway link between Lake Michigan and the Mississippi River Basin. It would also require expensive sewage treatment upgrades because at least some of the city's effluent would begin flowing back into Lake Michigan. Possible changes needed to achieve separation of the two watersheds include erecting concrete walls and constructing more shipping locks, according to the *Alliance* study. The study does not make explicit recommendations, but calls on the Corps and Environmental Protection Agency to conduct further study.

EPA spokeswoman Phillippa Cannon said, "We welcome suggestions from the *Alliance* and look forward to reading its report". "The EPA is very concerned about the impact of invasive species on the health of the Great Lakes. Limiting their spread is important for protecting the Lakes and we need to look at all options for controlling their movement," she said. But Corps spokeswoman Lynne Whelan in Chicago would not comment specifically on the *Alliance* study. She said the Water Resources Development Act of 2007 authorizes a Corps study that includes looking at ecological separation of the watersheds, but no funding has been authorized.

The *Alliance's* study, funded by the *Great Lakes Fishery Commission* and *Great Lakes*

Fishery Trust, gives general cost ranges for some projects. The cost of the most complicated measures, such as installing a sterile lift to transfer barges between the two watersheds, is listed only as "expensive." Although locks could enable shipping to pass while blocking invasive species, any type of barrier would slow traffic and cost money, said Stuart Theis, executive director of the *United States Great Lakes Shipping Association*. Still, he would cautiously support efforts to separate the two watersheds.

Sources: Dan Egan, *Milwaukee Journal Sentinel*, 10/5/08; Sophia Tareen, *Associated Press*, 11/12/08; and *Greenwire*, 11/12/08 and *Greenwire*, 10/7/08

Court Upholds States' Rights to Regulate Ballast Water

The 6th U.S. Circuit Court of Appeals, based in Cincinnati, has upheld a 2005 Michigan state law requiring that shippers either certify that they will not discharge ballast water in Michigan ports, or that they be equipped to kill live organisms prior to discharge. Nine U.S. and Canadian shippers and industry groups had sought to block the Michigan law on constitutional grounds, saying it interfered with interstate commerce. But the three-judge panel rejected such arguments, saying Michigan had a "legitimate state interest in protecting its waters from further introductions of [aquatic nuisance species] from ballast-water discharges by ocean going vessels."

Michigan officials, as well as environmental groups that have lobbied for tougher ballast discharge standards, hailed the ruling as a positive development for the Great Lakes. Industry officials expressed worry that other states will read the decision as a license to forge ahead with their own ballast water laws, creating a patchwork of regulations that could prove difficult for shippers to meet as they move through the interconnected lakes that touch eight state borders.

Noah Hall, executive director of the *Great Lakes Environmental Law Center* and a law professor at Wayne State University in Detroit, said the decision "clearly established that states have the authority to take legal action to control ballast water pollution." A University of Notre Dame study published in July estimates that invasives cost the Great Lakes region's economy more than $200 million a year

Discharges of ballast water, used to improve the stability of empty or lightweight ships during oceanic voyages, have become one of the leading sources of water pollution and invasive species introductions in North America, yet the U.S. Government has been slow to respond to the growing problem. While U.S. and Canadian law requires vessels to dump ballast water at sea and refill their tanks with saltwater, the laws do not require sterilization of ballast water to destroy potentially harmful invasives. As a result, individual states such as Michigan and Minnesota have passed their own regulations, often in the face of opposition from shipping companies, which complain about the challenges of meeting state and local ballast water regulations in a worldwide shipping economy and the cost of installing expensive technology to keep invasives from being introduced in Great Lakes ports.

Stuart Theis, executive director of the *United States Great Lakes Shipping Association*, one of the challengers to the Michigan law, said compliance with multiple state laws would "create a chaotic situation" for vessel owners, crews and shippers of goods and services throughout the Great Lakes Basin. While acknowledging that states "have some justification to be frustrated with the lack of action on the part of the federal government" in addressing marine vessel pollution and invasive species, Theis said, "we as an industry are trying to say this is the wrong way to do this."

In April, the U.S. House of Representatives passed by a wide margin the nation's first comprehensive measure to address ballast water discharges in the Great Lakes, including provisions requiring that vessels discharge ballast water from foreign ports at least 200 miles offshore and install ballast water treatment equipment by no later than 2013. But the bill has not cleared the Senate, and the Bush administration has opposed the measure because it lacks discharge exemptions for recreational vessels.

Meanwhile, advocacy groups are pushing for EPA to adopt the tough ballast water standards developed by the *International Maritime Organization* that place specific limits on the number of live organisms that can be discharged into a receiving port's waters.

Changes in ballast water regulations in the Great Lakes are important to the ecology of the Mississippi River Basin because the connecting channels in Chicago provide for easy passage of Great Lakes invasives, such as the zebra mussel and other such ballast borne species, into the Mississippi River Basin.

Source: Daniel Cusick, *Greenwire*, 11/24/08

VHS Management and Science Needs Workshop

Since its first appearance in the Great Lakes in 2005, Viral Haemorrhagic Septicaemia (VHS), has been detected in a variety of freshwater fish in Canadian and American waters. VHS, thought to be introduced into the Great Lakes via ballast water dumping, is considered by many nations and international organizations to be one of the most important viral pathogens of finfish (Office International des Epizooties 2007). But VHS is not an isolated threat: it is representative of a large number of aquatic pathogens that have been, or could be, introduced into the Nation's waterways with potentially dire consequences.

Given the potential impacts of VHS and other pathogens on aquatic ecosystems the Great Lakes science and management community came together recently to identify knowledge gaps and form a coordinated response strategy. Representatives from the Ontario Ministry of Natural Resources (OMNR), the Great Lakes Fishery Commission (GLFC), and the International Joint Commission's Council of Great Lakes Research Managers (CGLRM) met at a 1.5 day workshop on March 12-13, 2008 in Toronto, Ontario. Workshop participants agreed on the short-list of science needs that follows:

Validating quantitative PCR testing – The only accepted diagnostic test for VHS is cell culture, which can detect viable (infective) virus in the sample, but it takes 28 days. A polymerase chain reaction (PCR) test can be done in 1 day and is 10,000 times more sensitive than cell culture, making it more suitable for the rapid, high volume testing that is needed. However, a positive result indicates only that the fish was exposed to VHS, not that it is carrying viable virus. Validating the quantitative PCR test and getting it approved for use as the primary diagnostic tool would improve efficiency, enable higher volume through-put analysis and provide a solid basis on which to make management decisions that inevitably affect people's lives and livelihoods. In the interim, PCR can be used to screen large numbers of samples quickly, with those testing positive sent for cell culture testing.

Improved diagnostic infrastructure and efficiency – More laboratories that can conduct diagnostic testing for pathogens are needed (e.g., 3 or 4 more), as is the ability to diagnose infections by a wider range of pathogens (i.e., more diagnostic tests). Participants rec-

ognized that infrastructure needs can't be met in the near term; at a minimum, more staff for existing facilities would help, and more funding is needed for PCR screening to determine which samples should be sent along for cell culture. Immediate diagnostic efficiencies might be possible by coordinating efforts among existing labs. Additionally, designing and incorporating robotics into the diagnostic process would enable higher volume analysis for all pathogens of interest.

Biological studies and treatment – There is a need to learn more about the mechanisms of transmission (vectors/pathways) for VHS and other aquatic diseases. Controlled experiments to determine the best disinfection protocols (e.g., for hatcheries, boats, etc.) are also needed.

Decision Analysis – There is an immediate need to conduct a decision analysis (risk assessment) based on the current state of science around VHS and other aquatic pathogens. A decision analysis would help clarify and prioritize uncertainties about the risks associated with specific aquatic pathogens. The results of a decision analysis would provide input into cost-benefit analyses and other socio-economic analyses. A decision support tool based on these analyses is needed to help managers decide when and how to respond to aquatic disease threats and to provide a clearer understanding of science needs. The best case scenario would be for all jurisdictions to agree that a decision analysis needs to be done and for all to collaborate on the same one.

More and better surveillance/monitoring - Surveillance/monitoring can help determine the extent of the disease distributions in the Great Lakes region and provide a better understanding of their long-term impacts on fish populations. Statistically valid surveillance protocols based on clear management goals must be developed to enable more confident conclusions to be reached. Current levels of sampling are inadequate and not always methodically executed. Good sampling protocols will mean collecting more samples from more locations and from more fish species. Increased funding will be required to meet this need.

Source: Abraham, D. and L. Greig. 2008. *Viral Haemorrhagic Septicaemia in the Great Lakes Region Management and Science Needs Workshop Proceedings*. Prepared for the International Joint Commission, the Ontario Ministry of Natural Resources and the Great Lakes Fishery Commission. Prepared by *ESSA Technologies*, Richmond Hill, Ontario. 11 pp.

2008 Gulf Hypoxia Plan

More than 30 years after passage of the Clean Water Act, a large area of low dissolved oxygen or hypoxia continues to form during the summer in the Gulf of Mexico off the coasts of LA and TX. Scientists from the *Louisiana Universities Marine Consortium* found the size of the 2008 Gulf of Mexico dead zone to be 20,720 km^2 (about 8,000 mi^2), making it the second largest on record since measurements began in 1985.

The hypoxia is primarily caused by excess nutrients originating in the cities, farms, and industries of the central part of the Mississippi River Basin. These nutrients are carried by stormwater and waste water discharges into rivers and ultimately into the Gulf of Mexico. Once there, the nutrients support extensive growths of algae that deplete the oxygen in the water when they die, sink to the bottom, and decompose. The condition is exacerbated by the stratification of the water column — the result of warmer, low salinity surface waters that isolate the organic-rich, high salinity bottom waters from the surface, and prevent oxygen exchange with the atmosphere.

Coordinated efforts to address the hypoxia problem have been going strong for a decade, thanks to the *Mississippi River/Gulf of Mexico Watershed Nutrient Task Force* (Task Force) and its partners throughout the Mississippi/Atchafalaya River Basin (MARB). The Task Force recently released its 2008 Action Plan which outlines and updates national strategies to reduce the size of the hypoxic zone (also known as the dead zone).

The 2001 Task Force Action Plan established a goal of reducing the 5-year running average size of the hypoxic zone to less than 5,000 km^2 (about 1,900 mi^2) by 2015. Task Force members also agreed to develop strategies to reduce nutrients entering the Gulf of Mexico, particularly the amount of nitrogen, by 30%. A pledge was also made to implement 11 management actions and to assess progress every five years. The required reassessment began in 2005 and culminated in the release of the 2008 Action Plan in June.

The 2008 Action Plan updates and expands the Task Force's existing national strategy and revises and reaffirms the following three goals:

- Coastal Goal - reduce the size of the Gulf of Mexico hypoxia zone;
- Within Basin Goal - restore and protect the waters of the 31 states and tribal lands within the MARB; and
- Quality of Life Goal - improve the communities and economic conditions across the MARB.

The 2008 Action Plan also identifies 11 key actions (listed below) to help meet its goals. These actions encourage and advance the continued implementation of cost-effective, voluntary, incentive-based best management practices and conservation practices at the local and regional level — actions to both reduce the export of nutrients into the water and to reduce those nutrient loads once they enter public waterways. The first three actions are intended to accelerate the reduction of nitrogen and phosphorus, while the remainder are meant to advance the science, track progress and raise awareness of the problem.

Action 1 - Complete and implement comprehensive nitrogen and phosphorus reduction strategies for states within the MARB encompassing watersheds with significant contributions of nitrogen and phosphorus to the surface waters of the MARB, and ultimately to the Gulf of Mexico.

Action 2 - Complete and implement comprehensive nitrogen and phosphorus reduction strategies for appropriate basin-wide programs and projects. Target first those programs and projects with significant federal lead or co-implementation responsibilities.

Action 3 - While developing comprehensive state and federal nitrogen and phosphorus reduction strategies and continuing current reduction efforts, examine and, where possible, implement opportunities to enhance protection of the Gulf and local water quality through existing federal and state water quality, water management and conservation programs.

Action 4 - Develop and promote more effi-

cient and cost-effective conservation practices and management practices for conserving nutrients within the MARB watershed and evaluate their effectiveness at all scales beginning with local watersheds and aggregating them up to the scale of the MARB.

Action 5 - Identify and, where possible, quantify the effects of the hypoxic zone on the economic, human and natural resources in the MARB and Northern Gulf of Mexico, including the benefits of actions to reduce nitrogen and phosphorus and the costs of alternative management strategies.

Action 6 - Coordinate, consolidate and improve access to data collected by state and federal agencies on Gulf Hypoxia and MARB program activities and results.

Action 7 - Track interim progress on the actions to reduce nitrogen and phosphorus by producing an annual report on federal and state program nutrient reduction activities and results.

Action 8 - Continue to reduce existing scientific uncertainties identified in the Science Advisory Board and workgroup reports regarding source, fate, and transport of nitrogen and phosphorus in the surface waters of the MARB to continually improve the accuracy of management tools and efficacy of management strategies for nutrient reduction.

Action 9 - Continue to reduce uncertainty about the relationship between nitrogen and phosphorus loads and the formation, extent, duration and severity of the hypoxic zone, to best monitor progress toward, and inform adaptive management of, the Coastal Goal.

Action 10 - Promote effective communications to increase awareness of hypoxia and support the activities of the Task Force.

Action 11 - In five years (2013) reassess nitrogen and phosphorus load reductions, the response of the hypoxic zone, changes in water quality throughout the MARB, and the economic and social effects, including changes in land use and management, of the reductions in terms of the goals of this Action Plan. Evaluate how current policies and programs affect the management decisions made by industrial and agricultural producers, evaluate lessons learned, and determine appropriate actions to continue to implement or, if necessary, revise this strategy.

The 2008 Action Plan can be found on the Web at: www.epa.gov/msbasin/ actionplan.htm). Because many of the recommended actions of the plan are beyond the scope of existing state and federal water quality and conservation efforts, they will achieve only limited progress without additional financial (and in some cases legislative) support. Therefore, the plan also includes a description of the "critical needs" — additional funding and analyses that are essential to achieve significant reductions in the size of the hypoxic zone. The Task Force recognizes that it is facing an uphill battle, but they feel that the adaptive nature of the 2008 Action Plan will be its greatest strength.

In support of the 2008 Action Plan's recommended measures to reduce nutrient input to the Gulf, the *Natural Resource Defense Council* (NRDC) believes that small streams and wetlands need greater protections. Their recent report, entitled: "*Missing Protection: Polluting the Mississippi River Basin's Small Streams and Wetlands*," notes that two recent Supreme Court rulings, along with policy directives from the Environmental Protection Agency (EPA) and the U.S. Army, Corps of Engineers (Corps), have raised questions about whether the Clean Water Act's protections extend to a host of "non-navigable" and "isolated" waterways.

This loophole is particularly troubling in relation to the problem of nutrient pollution in the Mississippi River Basin. Small waterways such as wetlands and streams play important roles both as conduits and as sinks for this nutrient pollution and thus for helping to curb the Gulf's hypoxia problem. Evidence shows that while much of the nutrient pollution that reaches the Gulf comes from runoff that enters headwater streams, small streams and wetlands can also intercept and remove nutrients from the water before they get to major river systems and the Gulf. They also provide drinking water, prevent floods, provide habitat for fish and wildlife, and filter out other pollutants.

According to the NRDC, Congress must pass the broadly-supported Clean Water Restoration Act, a bill that will re-establish protections for the nation's water bodies by:

- Reaffirming the historic understanding of the Clean Water Act that the law extends beyond traditionally navigable waters;
- Ensuring the law's protections apply to all of the waters of the U.S. that had been covered by the agencies' longstanding regulations; and,
- Explaining why Congress has ample constitutional authority over the nation's waters, as defined in the Act, including so-called "isolated" waters, headwater streams, small rivers, ponds, lakes and wetlands.

To help limit the damage until Congress can fix the law, the report urges that the EPA and the Corps immediately enforce the existing law to the fullest extent that the Supreme Court's decisions allow.

Source: *NonPoint Source News Notes #85*, November 2008; and *NRDC News Release*, 10/26/08

Coastal Wetland Restoration Progress/Concerns

The U.S. Army, Corps of Engineers (Corps) recently proposed spending $66.4 million to rebuild wetlands along the Mississippi River-Gulf Outlet (MR-GO) and in Lake Borgne and also to armor part of the lake's shoreline. The projects are being funded with money appropriated by Congress in 2005 to close the MR-GO, but represent only a small part of expected efforts to reverse the erosion caused by the 40-year-old shipping shortcut to the Industrial Canal. The restoration plans are the preferred alternative of the Corps' draft environmental impact statement (EIS) released in late October. After a 45-day public comment period, agency officials will update the EIS and submit it to Congress. Construction could begin within 18 months.

The Corps also has embarked on a broader study of how to restore wetlands and land features lost to erosion caused by ships and barges using the MR-GO and by construction of the ill-fated shipping channel itself. That study was authorized by the 2007 Water Resources Development Act (WRDA), but Congress must still approve and appropriate money for any projects it recommends.

The 2007 WRDA also ordered deauthorization of the MR-GO as a navigation channel. A $24.7 million rock dike is to be built across the channel at Bayou la Loutre in St. Bernard Parish by June 1, 2009. The Corps already has spent about $5 million of the $75 million appropriated by Congress in 2005 for a small wetlands-restoration project and some armoring along the MR-GO.

There also is a federal-state plan to build a diversion of Mississippi River water near Violet to help restore wetlands in that area. That project would be financed under other federal and state programs. This first MR-GO restoration project was delayed until this year in part by arguments between the Corps and U.S. Sen. David Vitter (R/LA), over whether the money approved by Congress should be used for restoration or for maintenance of the shipping channel. Vitter, supported by

U.S. Sen. Mary Landrieu (D/LA), and other members of the state's congressional delegation, added language to a 2006 supplemental appropriation specifying the money be spent on restoration.

When complete, the projects will have built 9.3 miles of shoreline protection and 5.2 mi^2 of wetlands, with about half the wetlands created in open water and half existing wetlands "nourished" with dredged sediment.

But despite this progress, coastal restoration is now threatened by towboat and ship anchorage area dredging needs. In fact, the Breaux Act Task Force recently voted to close the West Bay diversion on the Mississippi River — the most effective existing sediment diversion in fighting coastal erosion — unless an alternative source of money is found to pay for dredging sediment from anchorages located just down river. The Corps contends opening the diversion has resulted in sediment filling in anchorages — essentially parking spots for boats — used by as many as 30 ships near Pilottown at Head of Passes near the river's mouth. Corps officials estimated it will cost $140 million — about 20% of all money available in the remaining life of the small-project coastal restoration grant program — to dredge the anchorages through 2023.

The decision thus threatens the entire future of coastal restoration in Louisiana, said Garret Graves, chairman of the state's Coastal Protection and Restoration Authority and a non-voting member of the federal-state task force. "This project is going to set an incredible precedent," Graves said. "It's not an option for us to shut down navigation. Billions of dollars of this nation's economy rely on the navigation interests using the river. But it's also not an option to bankrupt the (Breaux Act) program, and that's what this is doing." If the Corps requires eight recently authorized large land-building diversions to pay the cost of dredging sediment deposits, it would increase their cost from an estimated $700 million to $4.9 billion, he said. Graves supported spending the $10.9 million necessary for immediate dredging, but urged the Corps to pay that cost, rather than billing the restoration program.

The West Bay diversion allows 20,000 cubic feet per second of sediment-laced water to flow into the bay, with a goal of creating 10,000 acres of wetlands during its first 20 years of operation. The original plan was to expand it to 50,000 cubic feet per second in a few years to speed the filling process. A Plaquemines Parish official warned the state board that threatening the diversion sends the wrong message to Congress at a time when Louisiana needs billions of federal dollars for coastal restoration projects. "If you send out this message that you are considering closing the largest diversion in Louisiana, what you're looking at is a political disaster in Congress," said P. J. Hahn, the parish director of coastal zone management. Several state and national environmental groups also criticized the decision.

The Coastal Restoration Program will restore many of the wetlands lost to coastal erosion and construction of shipping canals displayed in this NASA photo. The sediments needed to restore these wetlands and portions of the river's delta are currently deposited directly into the Gulf of Mexico by way of the shipping canals.

"Restoration projects will change the coastal landscape. We can't back off from inevitable trade-offs," said Maura Wood, of the *National Wildlife Federation*. "We must solve these problems, not just give up." "The fact that this decision contemplates closure of this diversion without more substantial scientific review is shocking and cannot be allowed to stand," said Steven Peyronnin, executive director of the *Coalition to Restore Coastal Louisiana*.

"Sediment is a critical ingredient for coastal restoration and a problem for navigation," said Paul Harrison, coastal Louisiana project manager for the *Environmental Defense Fund*. "Despite more than a century of controlling the Mississippi River, the Corps cannot stand up today and show how sediment in the river works. Not only has it led to terrible and uninformed decisions on West Bay, it is crippling hope of restoring the coast. Their failure to take this bull by both horns is inexcusable."

The Corps' New Orleans district commander, Col. Alvin Lee, said state officials earlier signed a cost-sharing agreement that made the Breaux Act program responsible for those costs. Even without the signed agreement, Lee said, existing Congressional authorization language prohibits the Corps from paying to keep the anchorages clean of sediment because they sit outside the river's navigation channel.

The Breaux Act program — whose official title is the Coastal Wetlands Planning, Protection and Restoration Act — will have $682 million available through its authorized life, which ends in 2020. In its vote on West Bay, the task force set aside $11 million of that money to dredge the anchorages in 2009 and $28.6 million to close the diversion if an alternative source of dredging money is not found at the end of three years.

The Corps already has developed three alternatives for closing the diversion. A team of officials from Breaux Act agencies — the Corps, Environmental Protection Agency, National Marine Fisheries Service, U.S. Fish & Wildlife Service, Natural Resources Conservation Service and the state — also will conduct a study looking for financing alternatives or ways to reduce shoaling caused by the project.

George Duffy, president of *NSA Agencies Inc*., a marine shipping firm, urged the task force to pay for the dredging of the anchorages, saying the line of parking spots near Pilottown is important for ships seeking shelter from storms and hurricanes. Duffy said the anchorage area never required dredging before the West Bay diversion opened in 2003. "We could anchor over 30 vessels there," he said. "Now we're down to five or six deep draft, and in some parts of the lower end, we're down to 12 feet of water. "Even offshore supply boats can't get in that area."

Sources: Mark Schleifstein, *New Orleans Times-Picayune*, 10/24 and 11/7/08; *Land Letter*, 9/4/08; and *Greenwire*, 10/24 and 11/7/08

Colorado Water Storage Project Raises Concerns

River advocacy groups hope that a scathing U.S. Environmental Protection Agency (EPA) assessment of a massive water-storage project in northern Colorado stalls or kills the proposed project. The EPA said the Northern Integrated Supply Project (NISP) in the

foothills near Ft. Collins, CO "will have substantial and unacceptable impacts to aquatic resources of national importance." The federal agency also said the NISP is not in compliance with Clean Water Act guidelines and asks the U.S. Army Corps of Engineers to hold off on issuing any permits allowing the project to move forward.

Gary Wockner, spokesman for the river advocacy group, *Save the Poudre Coalition*, said he is heartened by the EPA's conclusion. "This basically means the EPA wants the Corps to stop this and look at other alternatives," Wockner said. The EPA is among thousands who have commented about the NISP for the draft Environmental Impact Statement, which is needed to determine if the project can go forward.

The project is a $420 million undertaking that involves building two reservoirs. Glade Reservoir, north of Fort Collins, and the Galeton Reservoir, east of Ault, would supply 40,000 acre-feet of water to 15 municipalities and water districts across northern Colorado. The Northern Colorado Water Conservancy District is scheduled to build the project.

District spokesman Brian Werner said the EPA's concerns are not a surprise and the district is working to fix the problems cited by the agency. "We're addressing all those concerns now," Werner said. Several agricultural groups support it. But environmental groups — including the *Save the Poudre Coalition* — claim the diversion of peak spring and summer water flows from the Cache la Poudre River could damage parkland and wildlife habitat.

Sources: Monte Whaley, *Denver Post*, 11/21/08; and *Greenwire*, 11/24/08

World's Largest Dam Removal and Restoration Project

Removal of four dams on the Klamath River is being billed by *American Rivers* (a river advocacy group) and others as the "biggest dam removal and river restoration effort the world has ever seen". *PacifiCorp* has agreed to remove four dams on the Klamath River, as part of a broader effort to restore the river and revive its ailing salmon and steelhead runs and aid fishing, tribal and farming communities.

The *Agreement in Principle* released in mid November is intended to guide development of a final settlement agreement in June 2009 and includes provisions to remove *PacifiCorp's* four mainstem dams in 2020, a century after the construction of the first dam, Copco 1. Dam removal will re-open over 300 miles of habitat for the Klamath's salmon and steelhead populations and eliminate water quality problems caused by the reservoirs.

Rebecca Wodder, president of *American Rivers*, said "We have not popped the champagne cork yet, but we have put a bottle on ice. The initial agreement is a huge step toward a healthy Klamath River Basin. *American Rivers* looks forward to working out remaining details in the final negotiations. This will be the world's biggest dam removal project. But ultimately, this isn't about tearing down dams. It is about restoring one of the most important rivers on the west coast, boosting local economies, and revitalizing fishing, tribal and farming communities. By removing these dams, *PacifiCorp* is making a responsible decision and will save its customers money. With this commitment in place, there is no turning back."

Specific provisions of the agreement include:
- *PacifiCorp* agrees to contribute as much as $200 million to cover the cost of removing its four dams and restoring the river.
- Dam removal funds would be obtained from ratepayers in Oregon and California before removal begins. The impact to customer bills will be less than 1%.
- If the costs of dam removal exceed *PacifiCorp's* contribution, California and Oregon together would contribute up to $250 million. Current estimates of dam removal costs range between $75 million and $200 million.
- In accordance with all applicable environmental laws, the Secretary of the Department of the Interior will assess the method and impacts of dam removal, and will make a final determination on the benefits and costs of dam removal by March 31st, 2012.
- California and Oregon will make similar determinations shortly after the federal government.

Federal legislation will be required to implement provisions of the initial agreement. The legislation will establish the transfer of the dams to the federal government, although an independent third-party will be identified to actually remove the dams.

PacifiCorp's four dams produce a nominal amount of power, which can be replaced using renewables and efficiency measures, without contributing to global warming. A study by the California Energy Commission and the Department of the Interior found that removing the dams and replacing their power would save *PacifiCorp* customers up to $285 million over 30 years.

The dams, built between 1908 and 1962, cut off hundreds of miles of once-productive salmon spawning and rearing habitat in the Upper Klamath, which was once the third most productive salmon river on the west coast. The dams also create toxic conditions in the reservoirs that threaten the health of fish and people.

The separate Klamath River Basin Restoration Agreement, announced in January, includes provisions for irrigation water allocations, delivery of water for national wildlife refuges, the rebuilding of fish populations and assistance to impacted communities. *American Rivers*, along with 24 other stakeholders, are parties to the Basin Agreement.

Meanwhile, Peter Moyle, a nationally known conservation biology professor at the University of California, Davis, in a study released in mid November, says most of California's native salmon, steelhead and trout species face extinction by the end of the century unless the state acts quickly to provide adequate freshwater and habitat. Twenty of 31 species are in sharp decline, including the Sacramento River winter run of chinook salmon, the Sierra's California golden trout and coastal coho, the study says.

Decades of lax controls on farming, logging, grazing, mining and road-building have filled and polluted streams, while the removal of streamside vegetation has warmed the water and harmed fish, the study says. For the past 50 years, ocean salmon that spawn in rivers from the Klamath south to the Sacramento have been blocked by dams and deprived of water diverted to farms and cities by state and federal water projects.

The fish advocacy group *California Trout*, which commissioned the study, will use the results to try to persuade legislators and the governor to help the state's Fish and Game Department to better carry out its mission of conserving California's wild fish. Removal of the Klamath River dams will also assist in recovery efforts.

Source: *American Rivers, Klamath Dams to be Removed Under New Deal*, 11/13/08; and Jane Kay, *San Francisco Chronicle*, 11/20/08

New Bio-Pesticide for Invasive Mussels

In a project funded by the U.S. Department of

Energy (DOE), researchers have developed an environmentally safe bacterial toxin to control zebra and quagga mussels, two non-native, invasive species that have found their way into the waterways of 25 states over the past two decades.

The new bio-pesticide was derived from a common soil bacterium by researchers at the New York State Museum (NYSM) Field Research Laboratory in Cambridge, NY. When ingested in large quantities, the bacterium is lethal to zebra and quagga mussels, but it is harmless to non-target organisms, including native freshwater mollusks. In experimental treatments of zebra and quagga mussels, the bio-pesticide achieved a 98% mortality rate in service water systems at a New York power plant. The addition of the bacterium to the water supply showed no effects on humans.

Existing methods used by power-plant operators to control zebra and quagga mussels include chemical "molluscicides," chlorination, filtration, and pre-oxidation of intake water. Use of the new bacterial toxin is economically competitive with these other methods while having minimal effect on native species. It is expected that application of the bacterial toxin will allow power plant operators to reduce or eliminate the use of chlorination that can harm aquatic ecosystems.

The project was funded by DOE's Office of Fossil Energy and managed by the National Energy Technology Laboratory (NETL). Production of commercial quantities of the toxin is now being carried out at *Marrone Organic Innovations* (MOI), a private laboratory in California. MOI and NYSM will now use a $500,000 grant from the *National Science Foundation* to continue the work started with NETL and improve the bio-pesticide for even higher mussel kill.

Source: *DOE Fossil Energy Communications Office Newsalert*, 10/2/08

Mosquitofish Threaten Some Amphibians

The mosquitofish used in the fight against the insect-borne West Nile virus is also impacting amphibian populations which are already struggling to survive. California scientists have learned that the mosquitofish has an insatiable appetite for tadpoles — including those of the threatened red-legged frog and the endangered Santa Cruz long-toed salamander.

The voracious guppy-like mosquitofish, which consumes an estimated 500 mosquito larvae a day, is the foundation of local mosquito control programs. It is so effective that the Santa Clara County Vector Control (SCCVC) buys it by the hundreds of pounds each year, then distributes it to residents for free to use in their back yard pools and ponds. Given its effectiveness, environmentalists say it's impractical to ban the non-native fish.

"Frog populations have disappeared from a lot of the places where the fish were introduced,'' said University of California-Davis biologist Sharon P. Lawler, who has studied the problem. Fish are just one of many assaults against the amphibians, which have declined because of disease, habitat destruction, pesticide use, pollution and other invasive species like bullfrogs and crayfish.

University of California biologist Jeff Wilcox, steward of the San Jose-based *Blue Oak Ranch Reserve*, described picking up some tadpoles and tossing them into a stream: "The mosquitofish swarmed them like a school of piranhas and tore them into bits in a matter of a few seconds. What they can't eat, they harass," he said. Studies show that tadpoles in ponds with mosquitofish suffer greater injuries and weigh 34% less than their fish-free counterparts.

Mosquitofish (Gambusia affinis)
Duane Raver, USFWS drawing

The fish, introduced to California in the 1920s, is a remarkably hardy creature, able to survive places that few other fishes would tolerate. And because they are omnivores, they forage through the winter after mosquitoes are long gone, so do not have to be resupplied every year. "It's a terrific tool, in the right circumstances. It's biological control. It means we use fewer pesticides,'' said SCCVC director Tim Mulligan.

The fish has become established over the decades, environmentalists say, and it would be infeasible to ban it. And, ridding a pond of the fish is a big effort, said Jeff Alvarez of *The Wildlife Project*, which works with local water districts to eliminate the fish. First the pond is drained, then each fish is caught, and the fragile amphibians are captured and moved into an artificial pool. Weeks later, once the pond is refilled, the amphibians are returned, Alvarez said.

To slow its spread in the wild, Santa Clara and most other counties, following the lead of California Department of Fish and Game, two years ago banned release of mosquitofish into natural waters, such as ponds, creeks and marshes, because of its taste for fragile species. It is a violation of state regulations for private citizens to release mosquitofish in state waters without a permit. But authorities acknowledge there is no oversight once the mosquitofish are distributed. They find their way there through flooding or human carelessness, say environmentalists.

"They can disperse," said Jeff Miller of the *Center for Biological Diversity*, an environmental advocacy group based in San Francisco. "That's the concern.'' And people unwittingly help the fishes' migration. People see a stranded fish and want to save it,'' Lawler said. "It might make sense to the individual fish…but it could end up in sensitive frog habitat," he said.

To kill the mosquitofish, Mulligan recommends super-chlorinating the water. Or letting the fish dry out. Just don't flush it down the toilet or bathtub. For the sturdy mosquitofish, this is yet another possible escape route to open waters. "Some have survived sewage treatment," Mulligan said.
Sources: Lisa M. Krieger, *San Jose Mercury News*, 9/30/08; and *Greenwire*, 10/1/08

Felt-Soled Waders Criticized

Trout Unlimited (TU), at its annual meeting in September, asked fishing equipment manufacturers to stop producing felt-soled waders and wading shoes by 2011 to help stop the spread of aquatic nuisance species (ANS) by anglers in America's rivers and streams. New technology and materials provide viable alternatives to felt, and some manufacturers are already using these newer materials on wading shoes and angling products, TU said.

Many waders, wading boots and shoes used by anglers have felt-soled bottoms that are used to provide traction while walking in water. Felt is a material that transmits ANS such as New Zealand mud snails, the invasive algae called didymo and the parasite that causes whirling disease, a disease fatal to trout. Felt soles can very easily become impregnated with mud and other organic matter, and become difficult or impossible to clean and disinfect.

"While the elimination of felt soles on waders

and boots will not entirely prevent the spread of ANS, this action will help reduce the risk and help protect our precious aquatic resources," said David Kumlien, executive director of the *Whirling Disease Foundation*. This action will also help make the public more aware of the threat of ANS and hopefully will motivate them to change their behavior and practices related to other aquatic recreational activities that may also contribute to the spread of ANS."

Preventing the proliferation of ANS is central to TU's mission to conserve and protect North America's trout and salmon fisheries, TU said. The impact of ANS to native species is substantial, second only to loss of habitat, and is responsible for causing losses in biodiversity, changes in ecosystems, and impacts on economic enterprises such as agriculture, fisheries, and international trade. "It's like a war on our streams, rivers and lakes, with a new enemy rearing its ugly head each week. First, whirling disease, then mud snails, then some invasive aquatic plant," said Jack Williams, TU's senior scientist. "We have to be more aggressive in our battle against the spread of invasive species."

Source: *Trout Unlimited Press Release*, 9/12/08

Coast Guard Launches Towboat Inspection Program

The U.S. Coast Guard has launched a yearlong inspection program meant to crack down on the largely unregulated barge and towing industry after an oil spill last summer on the Mississippi River near New Orleans drew criticism about an improperly licensed mariner. The *Operation Big Tow* initiative is the precursor to a formal program the Coast Guard is developing to regularly examine towboats, which are now included in a class of vessels that are uninspected. The initiative will require periodic inspections of towboats that travel through five Coast Guard districts that span from New Mexico to the East coast and the Great Lakes.

The operation will include checks to ensure proper crew licensing and monitoring of towboats to make sure they follow safety standards like maintaining appropriate fire fighting and communication equipment. Violations could lead to the Coast Guard's banning a vessel from waterways, issuing fines or suspending licenses. The program aims to quiet critics of the Coast Guard while the agency formulates rules that would permanently subject towboats to safety inspections. Congress ordered the Coast Guard to regulate towboats four years ago, but the agency has not yet installed an inspection program.

The call for reform escalated last summer after an oil spill prompted an exhaustive Coast Guard probe that ended in early November. The July 23 accident occurred when an improperly licensed towboat operator abruptly steered a fuel barge into the path of an oncoming ship, which plowed through the barge and spilled 280,000 gallons of fuel oil into the Mississippi River, closing it for days. The master-licensed captain who was supposed to be in charge of the towboat, had abandoned the vessel several days earlier to patch up problems with his girl friend, according to testimony during the Coast Guard probe.

Beyond safety issues, towboats and barges should also be inspected for leakage. Some biologists have described leaky barges as a constant point source for distribution of aquatic invasive species. Many barges have leaky seams or holes in their hulls allowing for free exchange of river water as they traverse the intercontinental waterway system. A barge's residual water supply can become laced with large numbers of eggs, larvae and even adult aquatic organisms, many of them invasive. As such these barges act as a pathway and point source for the spread of invasive species and need to be regulated.

Sources: Jen DeGregorio, *New Orleans Times-Picayune*, 11/12/08; and *Greenwire*, 11/14/08

Western Energy Development Water Quality Concerns

The Montana Department of Environmental Quality (DEQ) has started enforcement action against a coalbed methane producer for repeatedly failing toxicity tests on water discharged into the Tongue River. *Fidelity Exploration and Production Co*. violated the toxicity provision in its discharge permit 132 times in a 2.5 year period, from April 2006 through August 2008. The company also failed to submit an adequate compliance plan, said John Arrigo, administrator of DEQ's Enforcement Division.

Fidelity produces methane from coal beds in the Decker area of the Powder River Basin. Groundwater pumped to the surface through the drilling for natural gas is discharged untreated into the Tongue River at 15 sites covered by the permit. *Fidelity* is a subsidiary of *MDU Resources Group Inc.* and is based in Denver.

Although tests are finding toxicity in the discharge water, that doesn't mean the Tongue River is being harmed, Arrigo said. "We don't have any dead fish — if we saw dead fish or saw effects on the receiving water, we would act more aggressively, but we don't see that," he said. But DEQ is seeing dead fleas — *Ceriodaphnia dubia* fleas to be exact. The fleas are used in laboratory tests as an indicator of toxicity.

Fidelity is required to test for toxics by taking samples of its discharge water and putting in organisms to see if they survive. In addition to the fleas, similar tests also are conducted on fathead minnows. *Fidelity's* tests using minnows have all passed, but the tests using the fleas are failing, Arrigo said. But while the toxicity failures have been consistent, pinpointing the cause has been difficult and expensive, and both DEQ and *Fidelity* officials said they are working to find a solution. "It's complicated," Arrigo said. One test costs about $500 and *Fidelity* has done hundreds of them. Despite a variety of tests on different discharges at different times, the results are inconsistent, he said.

Joe Icenogle, a spokesperson for *Fidelity*, said the violations represent "a permit concern" and do not threaten or degrade the Tongue's water quality. "One of the things *Fidelity*, DEQ and everybody shares down there is the health of the Tongue River," he said. The company has hired water specialists, fisheries biologists and other consultants. There is a possibility that total dissolved solids may be the problem, Icenogle said, while researchers have pretty much eliminated methane in the water as the cause. There is a permit limit for total dissolved solids, and *Fidelity* is not exceeding it, Arrigo said.

In the meantime, *Fidelity* is experimenting with running its discharge water through a holding tank before it enters the Tongue. The results have been variable, Icenogle said. *Fidelity* has also submitted a compliance plan, but DEQ said it did not adequately describe how toxicity would be controlled. Failure to submit an adequate plan is a permit violation.

Now DEQ is proposing the agency and *Fidelity* enter into a negotiated administrative order to resolve the violations. Penalties would be assessed but waived if *Fidelity* submits an adequate compliance plan and implements it in a timely manner, Arrigo said. The penalties would be used as leverage to require *Fidelity* to submit a more definite control plan on a tighter schedule, Arrigo said. "We want them to submit a better compliance plan. We're not

interested in fining them a lot of money. We want them to do more faster. If they blow us off and say no, we have a variety of enforcement options," he said.

Meanwhile, Wyoming is also experiencing some water quality problems related to energy developments in their state. Trace amounts of hydrocarbons have been found for the first time in a livestock water well bordering a natural gas drilling area in southwest Wyoming. Officials say the concentrations of hydrocarbons found in the well in August were miniscule and posed no threat to human or animal health. But they are still concerned. The well is on the outside edge of the Pinedale Anticline, where gas drilling has been occurring, Chuck Otto, director of the Bureau of Land Management's (BLM) office in Pinedale said.

The BLM is close to issuing a final decision on a plan allowing oil and gas companies to drill some 4,400 more natural gas wells on the 200,000-acre Anticline. But local residents opposed to the intense drilling have expressed concern about water and air pollution from the activity. Linda Baker, community organizer for the *Upper Green River Coalition*, noted that the discovery of pollution in the livestock water well follows the discovery of benzene in more than 80 industrial water supply wells in the area last year. Benzene is a hydrocarbon that can be harmful to human health.

Baker said she regards the water pollution in the area as "a very dangerous situation that the BLM has not even begun to address as they consider approving 4,400 more wells." The state hasn't determined the source of the hydrocarbons found in the livestock water well, but the nearby oil and gas drilling is a likely suspect, according to Mark Thiesse, hydrogeologist with the state Department of Environmental Quality. However, Thiesse said subsequent tests have found barely measurable traces of the pollutant, making it difficult to identify a source definitively.

"We're certainly keeping an eye on it," Thiesse said. "And we're trying to figure out where these low levels are coming from, and we keep sampling a variety of wells just to try to get a feel for how widespread the problem is and is there really a health risk to humans or to critters or the environment out there. And so far we're not really finding any significant risk."

Some 250 water wells within a half mile of the Anticline drilling must be tested routinely for any change in water quality, he said. Most of the wells are on the drilling site and are used by the industry in their drilling operations. It's not unusual to find traces of hydrocarbons in such industrial wells.

Sources: Clair Johnson *Billings Gazette*, 11/11/08; Bob Moen, *AP/Casper Star Tribune*, 9/10/08; and *Greenwire*, 9/11 and 11/11/08

OK/AR Poultry Wars Continue

A federal judge has denied Oklahoma's request for a preliminary injunction to stop 13 Arkansas poultry companies from disposing bird waste in the Illinois River watershed.

Attorney General Drew Edmondson, who requested the injunction last year, said the recent ruling had no impact on the state's environmental case against the companies, which figures to begin in 2009.

The injunction could have halted a practice thousands of farmers have employed for decades in the 1 million-acre watershed, which occupies parts of Arkansas and Oklahoma: Taking the ammonia-reeking chicken waste — clumped bird droppings, bedding and feathers — and spreading it on their land as cheap fertilizer. It also could have led to similar environmental lawsuits nationwide against the industry, which produced more than 48 billion pounds of chicken in 2006. Edmondson sued the companies in 2005, accusing them of treating Oklahoma's rivers like open sewers. While gathering evidence for the pollution case, Edmondson said the state "discovered the excessive land application of poultry waste could be a danger to public health," and argued in court for the injunction earlier this year.

But U.S. District Judge Gregory K. Frizzell ruled that Oklahoma "has not yet met its burden of proving that bacteria in the waters'' are "caused by the application of poultry litter rather than by other sources, including cattle manure and human septic systems.''

He also said that "the record reflects levels of fecal bacteria at similar levels in rivers and streams throughout the state of Oklahoma, including waterways in whose watersheds the record does not evidence similar application of poultry waste." The judge also labeled as "not sufficiently reliable" the testimony of two of the state's expert witnesses because their work had not been peer reviewed or published.

Edmondson defended the injunction request, saying, "we believed the health implications were sufficiently serious to bring to the court's attention as early as possible.'' "As the court acknowledged in its ruling, we faced a heightened burden of proof in this hearing," he said in a statement. "Since the testimony of two of our experts was discounted, we could not meet that burden."

Scott McDaniel, an attorney for one of the defendants, *Peterson Farms Inc.*, said that the attorney general did not produce any farm-specific evidence of contamination, and instead relied on untested science to make a case. "We've gone through several years of just battling back and forth in the press, and this was the first opportunity for everybody to put their evidence on the table," McDaniel said. "We're pleased to have won this round."

The Oklahoma/Arkansas region supplies roughly 2% of the nation's poultry, and is one of several areas nationally where the industry is most concentrated. More than 1,800 poultry houses are in the Illinois River watershed, most of them in Arkansas.

Source: *AP/New York Times*, 9/30/08

Mud Meter

A western North Carolina watershed group recently installed a roadside billboard that shows real-time (like a time and temperature sign at a bank) the turbidity levels in a stream passing under the road. Known as the "Mud Meter," the unique project has received media attention and has served as a great way to get nonpoint source conversations started.

Dr. Roger Clapp, Executive Director of the *Watershed Association of the Tuckasegee River* (WATR), spearheaded the Mud Meter project in an effort to bring attention to the sediment entering Scotts Creek, a tributary of the Tuckasegee River. The Tuckasegee River flows northward from the Blue Ridge Plateau near the South Carolina border and drains the reservation of the Eastern Band of Cherokee Indians, a large portion of Smoky Mountains National Park and private lands.

Erosion, sediment and turbidity are the biggest water quality problems in this once heavily forested, mountainous terrain. Sources of excessive erosion are abandoned logging roads, neglected farm fields, destructive all-terrain vehicle use, poor pasture management practices, and construction, notably for a recent wave of second-homes.

Dr. Clapp saw the Mud Meter project as an entertaining and innovative way to attract interest and educate people about the potential

negative impacts of sediment in waterways. "We believe that this mountain community deserves clean, cool streams to preserve the region's heritage and to support the prized trout fishing and the tourist economy," he said. The group hopes that the mud meter will help community members learn more about sediment in streams and begin taking steps to better protect their water resources.

Dr. Clapp partnered with Dr. Brian Howell from nearby Western Carolina University to develop and launch the Mud Meter. The meter itself consists of a probe which reads turbidity from 0 to 400 Nephelometric Turbidity Units (NTUs), a vented pressure transducer for water depth, a specific conductivity sensor and a temperature sensor. The unit requires 110 volts — provided by a connection to a nearby street light — to drive the two display units and the meter. The meter takes data readings every 15 minutes. Student-written programs enable the sensors to interface with the data center, and transmit the data to the billboard. Stored data can be downloaded with a wireless receiver.

Funding was provided by a U.S. Environmental Protection Agency Clean Water Act section 319 grant, WATR member dues, and Jackson Paper (a unique upstream paper plant that operates a zero discharge facility). The City of Sylva provided the location for the meter's placement and the electricity to run the meter. In rough numbers, costs included about $4,000 for the sensors, $500 for the display panels and the sign, $700 for electronic parts for the data logger customized to drive the electronic display and $500 for a licensed electrician. Dr. Howell, his students and WATR volunteers and staff have provided countless hours of labor.

WATR plans to post data from the Mud Meter on their Web site (http://watrnc.org) and submit it to North Carolina's Division of Water Quality. The data offers a series of daily snapshots showing how the watershed is performing and what conditions accompany sediment fluctuations. Eventually, the group hopes to post the Mud Meter's water data in near real-time on the Web.

Clapp and Howell would like to build a network of turbidity, complementary sensors and rain-fall recorders which they collectively call a "watershed observatory." This unique network would depend on a series of solar-powered, low-power transmitters that would relay information strategically through the surrounding mountains. Eventually, the group hopes to improve the overall design of the Mud Meter to include a more adaptive

Mud Meter

monitoring system that can vary the intensity of monitoring as climatic conditions change.

Clapp thinks he can keep the Mud Meter in its current configuration for two years. After that, he says, the sign will become almost background noise, and passersby will not notice it much. At that point, WATR will have the data necessary to modify the billboard to show the loading rate, or tons of soil moving beneath the bridge per day. "We can keep the sign in that mode for two more years; by that time we should be making some headway on erosion reduction. A cleaner creek should be the news then," said Clapp. "We hope that the buzz around the Mud Meter will help us identify friends within the community that can assist in the development of a watershed plan," he said.

For more information, contact Dr. Roger Clapp, Executive Director, *Watershed Association of the Tuckasegee River*, P.O. Box 2593, Bryson City, NC 28713. Phone: 828-488-8418; E-mail: info@watrnc. org

Source: *NonPoint Source News Notes #85*, November 2008

Tunnels Beneath River Collect PCBs

In a precedent setting project, workers have drilled and blasted two enormous tunnels under the Hudson River near the former Hudson Falls General Electric (GE) plant for environmental cleanup work. The tunnels, each 1,800 feet long and 10 feet in diameter will be used to collect PCBs (polychlorinated biphenyls) before the toxic chemicals can seep up through the bedrock and into the river.

It's all part of a state-mandated cleanup of PCB contamination from GE's Hudson Falls and Fort Edward plants. A separate federally mandated cleanup is also under way. GE spokesman Mark Behan called the tunnel project "a unique application of an existing technology." That existing technology is the drilling and blasting methods, used in the mining industry. The unique part is that the tunnels, which are 80 feet below the river bottom, will be used to collect the PCBs that are slowly migrating from the old capacitor plant in Hudson Falls through the bedrock and under the river.

"It's a very unique project," said Kevin Farrar of the state Department of Environmental Conservation. Farrar described the tunnel drain collection system as the "world's largest groundwater recovery tunnel." Once the project is finished next spring or early summer, the PCBs collected will be pumped up out of the tunnels into an expanded water filtration and treatment plant in the old Hudson Falls GE plant. This collection and pumping process, once started, will continue into the foreseeable future, Farrar said.

The state is concerned that the PCBs are slowly entering the river through seep holes in the river bottom. Earlier work at the old capacitor plant site has reduced the amount of PCBs seeping into the Hudson from five pounds per day to less than three ounces per day, according to state and DEC officials. The state DEC ordered the cleanup in 2004.

Drilling and blasting of a vertical shaft near the former GE plant in Hudson Falls started in the fall of 2007. This vertical shaft is 200 feet deep and 24 feet in diameter. A demolition company from New Jersey, called *Merco Obayashi*, used water-based explosives, not dynamite, to excavate the shaft and tunnels. Workers then started drilling and blasting the two tunnels under the river, working all spring and summer and finishing up in late September. The next phase of the project — lining the tunnels with concrete — was scheduled for completion at the end of October.

Behan said the collection equipment on the ceiling of the horizontal tunnels will be installed, and then vertical wells will be drilled up into the bedrock under the river. "They will be like fingers going up into the bedrock," Behan said. These collection wells will capture the PCB oil before it seeps up and into the river.

A state-of-the-art water treatment plant was built inside the empty Hudson Falls GE plant in recent years. Behan said the capacity of this plant, which has been used to treat other PCB-tainted water near the plant, has been expanded from 125 gallons per minute to 450 gallons per minute for the tunnel drain collection system.

State officials estimate the project will cost $30-40 million. Once completed, the system will cost GE approximately $1.3 million each year to operate and maintain, said Lori O'Connell, a DEC spokeswoman. Behan said the tunnel drain collection system should be complete by the spring, but months of testing will then be needed with an expected completion date of October 2009, according to DEC.

The U.S. Environmental Protection Agency ordered GE in 2002 to pay for the approximately $700 million cost of dredging about 2 million cubic yards of PCB-contaminated river sediment from the upper Hudson between Fort Edward and Troy. This project is scheduled to start in May, 2009. GE contractors are currently putting the finishing touches on a 110-acre river sludge processing and transportation complex just below Lock No. 7 on the Champlain Barge Canal in Fort Edward.

PCBs are described by the EPA as a probable carcinogen that also cause other health problems in humans and wildlife. GE plants in Hudson Falls and Fort Edward discharged an estimated 1.3 million pounds of PCBs into the Hudson for 30 years ending in 1977, when the government banned the practice.

Sources: Lee Coleman, *Schenectady Daily Gazette*, 10/5/08; and *Greenwire*, 10/7/08

Ecosystem Values

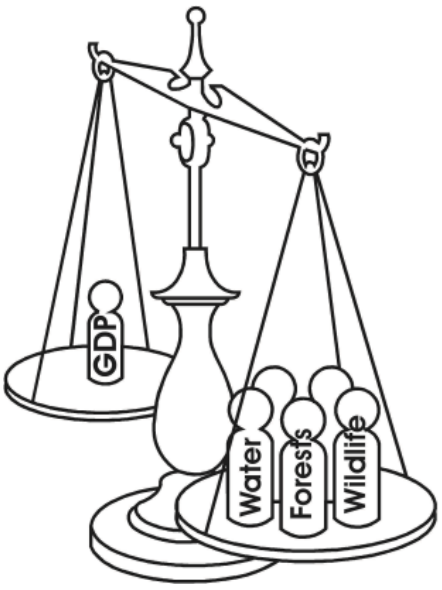
The worst financial crisis since the 1930s may be a chance to put price tags on nature in a radical economic rethink to protect everything from coral reefs to rainforests, some environmental experts say. Farmers know the value of land from the amount of crops they can produce, but large parts of the natural world — such as wetlands that purify water, oceans that produce fish or trees that soak up greenhouse gases — are usually viewed as "free."

"Most of our valuable assets are not on the books," said Robert Costanza, professor of ecological economics at the University of Vermont. "We need to reinvent economics. The financial crisis is an opportunity," he says. Advocates of "eco-nomics" say that valuing "natural capital" could help protect nature from rising human populations, pollution, and climate change that do not figure in conventional measures of wealth such as gross domestic product (GDP) or gross national product (GNP).

Achim Steiner, head of the U.N. Environment Program, told *Reuters* at the *International Union for Conservation of Nature* congress in Barcelona in early October that, "We are reaching a point...at which the very system that supports us is threatened." Costanza helped get the international debate underway a decade ago with a widely quoted estimate that the value of natural services was $33 trillion a year — almost twice world gross domestic product at the time. While some economists dismissed this as an overestimate, others pointed out that no one would be alive without nature, so its value to humans is infinite.

"There is little that can usefully be done with a serious underestimate of infinity," economist Michael Toman said at the time. But with the seizure of world money-markets bringing — for some, at least — an opportunity to rethink modern capitalism's basic tenet that greed and self-interest can counterbalance each other, more environmental experts hope to revisit nature's role in producing food, water, fuels, fibers or building materials.

"The financial crisis is just another nail in the coffin" of a system that seeks economic growth while ignoring wider human wellbeing, said Johan Rockstrom, executive director of the *Stockholm Environment Institute*. Under standard economics, nations can boost their GDP — briefly — by chopping down all their forests and selling the timber, or by dynamiting coral reefs to catch all the fish. A rethink would stress the value of keeping nature intact. Rockstrom said bank bailouts totaling hundreds of billions of dollars might "change the mindset of the public...if we are willing to save investment banks, why not spend a similar amount on saving the planet?" he said.



Other attempts at mixing prices and nature include the following:

- The European Union set up a carbon trading market in 2005 to get industries such as steel makers or oil refineries to cut emissions of greenhouse gases, blamed for global warming.
- Ecuador has asked rich countries to pay it $350 million a year in exchange for not extracting 1 billion barrels of oil in the Amazon rainforest.
- The Himalayan kingdom of Bhutan has shifted from traditional gross national product to a goal of "gross national happiness," which includes respect for nature.
- And in the U.N. talks on a new climate treaty, more than 190 nations are considering a plan to pay tropical nations billions of dollars a year to leave forests alone to slow deforestation and combat global warming. Norway has led donor efforts in this endeavor by pledging $500 million a year to tropical nations for abandoning the chainsaw and letting trees stand.

Steiner said long-standing objections that it is too hard to value ecosystems have dwindled as economists' ability to assess risks has improved. A report sponsored by the European Commission and Germany in May estimated that humanity was causing 50 billion euros ($67.35 billion) in damage to the planet's land areas every year. And a 2006 report by former World Bank chief economist Nicholas Stern said that unchecked global warming could cost 5- 20% of world GDP, damaging the economy on the scale of the world wars or the Great Depression.

A 2005 *Millennium Ecosystem Report* also said that natural systems were worth more intact than if converted. It said a Canadian wetland was worth $6,000 a year per hectare, and just $2,000 if converted to farmland. A hectare of mangrove in Thailand was worth $1,000 a year — producing fish or protecting against coastal erosion — against $200 if uprooted and converted to a shrimp farm.

According to a European Union commissioned study, the global economy is losing more from the disappearance of forests than through the current banking crisis. The study puts the annual loss at $2-5 trillion and says it may be costing about 7% of the globe's gross domestic product. "[The economic loss is] not only greater [than the credit losses], but it's also continuous; it's been happening every year, year after year," said study leader Pavan Sukhdev.

Deforestation stops ecosystems from providing services it used to provide essentially for

free, forcing the human economy to provide them instead, through actions such as building reservoirs, building facilities to sequester carbon dioxide or farming foods that were once naturally available, according to Sukhdev.

Earlier this year, Costanza and a colleague, in a letter to the journal *Science*, said one way to value nature would be to set up a government-backed system to trade all greenhouse gas emissions and channel the revenues, estimated at $0.9-$3.6 trillion a year, into an "*Earth Atmospheric Trust*." If half the cash were shared out, each person on the planet would get $71-$285 a year, a big step toward ending poverty. The rest could go to renewable energy and clean technology."

Sources: Richard Black, *BBC News*, 10/10/08; Alister Doyle, *Reuters*, 10/21/08; and *Greenwire*, 10/10 and 10/21/08

Nature's Right to Exist

Following a Pennsylvania mining town's example, Ecuador has O.K.'d a constitution giving rights to nature. In so doing Ecuador has become the first nation to approve a constitution that, among other reforms, recognizes certain inalienable rights for nature. Under five provisions in the new constitution's *Rights of Nature* chapter, an ecosystem has the "right to exist, persist, maintain and regenerate its vital cycles, structure, functions and its processes in evolution," and "every person, people, community or nationality, will be able to demand the recognitions of [these] rights."

Pat Siemen, director of the Miami, FL-based *Center for Earth Jurisprudence*, hailed the constitution's passage as "a major step forward in recognizing the intrinsic rights of the natural world to exist and not be subject to solely economic purposes for humans." The inspiration for Ecuador's environmental provisions came from an unlikely place, Pennsylvania, where the *Community Environmental Legal Defense Fund* (CELDF) is working on litigation and legislation with U.S. cities and towns.

Last November, the San Francisco-based *Pachamama Alliance*, a nongovernmental organization that works with indigenous groups in Ecuador's Amazon region, asked the Chambersburg, PA, group to help the Latin American country's constitutional assembly draft a legally enforceable *Rights of Nature* section. "The folks in Ecuador wanted us to build off our work in the U.S.," said Mari Margil, CELDF's associate director. "We have been doing work over the past several years in local communities in the U.S., and we've come to recognize that the way we treat nature now as property under the law is not a way to protect nature."

In 2006, CELDF helped Tamaqua, a coal-mining town in eastern Pennsylvania, draft a sewage-sludge ordinance that recognized natural ecosystems as legal persons for the purposes of enforcing civil rights. The ordinance in Tamaqua, which has a population of about 7,000, also stripped corporations that engage in the land application of sludge of their rights to be treated as "persons." Under the ordinance, which passed in September 2006, Tamaqua officials or individual residents have the ability to file a lawsuit on behalf of an ecosystem to recover compensatory and punitive damages for any harm done by the land application of sewage sludge. Damages recovered in this way must be paid to the town and used to restore those ecosystems and natural communities.

In March 2008, two New Hampshire towns passed local laws recognizing the rights of nature and specifically restricting the rights of corporations. Nottingham, NH passed an ordinance banning corporations from mining and selling the town water, and Barnstead, NH added the *Rights of Nature* to a similar ordinance that had been in place since 2006.

"Right now we have to fight to get standing to try to get damages for, say, the pollution of a river," Margil explained. "We have to show that we have been harmed — and it's very difficult to show that you, yourself have been harmed. What we have done in the U.S., and now on a much larger scale in Ecuador, is very different," she said. "The ecosystem — rather the river or otherwise — will automatically have standing under the law. And the way it's written here and in Ecuador, individuals and communities also have standing to represent ecosystems that are harmed."

But expect the *Rights of Nature* approach to face a test in Ecuador, said Robert Percival, director of the University of Maryland School of Law's environmental law program. "The constitution outlines broad principles, and what impact they will have depends on how they are treated by the president, the Legislature and the courts," Percival said in an interview. "Certainly, a number of courts have taken very vague environmental provisions and used them as justification for intervention in environmental matters. This constitution goes even further by offering much more extensive and explicit provisions, but it will still require action by the president, lawmakers and the courts to implement. The real impact of this constitution will probably depend upon political stability in the country over a period of time," he said.

But interest in enacting similar frameworks for protecting nature shows little sign of dissipating soon. Since CELDF began working with Ecuador, Margil said other countries, including Nepal, which is writing its first constitution, have expressed an interest in passing similar provisions.

And in Switzerland, scientists and geneticists must now consider whether their research tramples on a plant's dignity after that nation mandated geneticists consider the "moral consideration of plants for their own sake." The rule, which came out in April, is based on a constitutional amendment that aims to protect the dignity of all creatures — including plants — against any unwanted consequences of genetic manipulations. The amendment and subsequent law did not say anything specific about plants until earlier this year, when the government asked the ethics panel to come up with rules for plants as well.

The 22-page treatise published by the panel says that vegetation has an inherent value and that it is immoral to arbitrarily harm plants by, for instance, "decapitation of wildflowers at the roadside without rational reason." But the rule also limits scientists' research in lab and field tests. "Unfortunately, we have to take it seriously," said Beat Keller, a molecular biologist at the University of Zurich. "It's one more constraint on doing genetic research".

Source: Gautam Naik, *Wall Street Journal*, 10/10/08; Jennifer Koons, *Greenwire*, 9/30/08; and *Greenwire*, 10/10/08

Interactive Watershed Mapping Available for Kids

IMRivers (www.IMRivers.com), a new Web site developed for nonprofit *River Network*, allows network partner groups to develop interactive watershed maps and make them available to the public. Now, *IMRivers* is offering *IMRivers Junior* (www.imriversjr.com), which offers the same mapping application capabilities as *IMRivers*. *IMRivers Junior* is available free of charge to any organization working with K-12th grade students to educate them about the importance of ecological conservation.

Government organizations, nonprofit organizations and classrooms can access and man-

age their own *IMRivers Junior* account as a novel and innovative teaching tool. The maps can display multiple layers of information including data, photos, videos and text. The information can be about land use, pollution sources, clean up and restoration activities, water quality, flows, natural history, recreational access and other topics.

Source: *NonPoint Source News Notes #85*, November 2008

Climate Change Update

Using Henry David Thoreau's notes, Boston University scientists reported this year in the journal *Ecology* that common plant species in the Concocrd, MA area are flowering seven days earlier than they did during the mid-19th century. Thoreau died in 1862, just as the industrialized world began to pump greenhouse gases (GHGs) into the atmosphere, but started recording his data in 1851. Working with Harvard scientists, the researchers also determined that 27% of the species documented by Thoreau have disappeared from Concord and 36% were found in such small numbers that they probably will not survive for long. That study appears in the current issue of the *Proceedings of the National Academy of Sciences*. "It's targeting certain branches in the tree of life," said Charles Davis, an evolutionary biologist at Harvard who worked on the study. "They happen to be our most charismatic species — orchids, mints, gentians, lilies, iris." In addition to Thoreau's records, the scientists based their findings on their own surveys, contributions from members of area plant, insect and bird clubs and amateur naturalists. They say their research demonstrates the importance of simply watching the landscape and recording what occurs in it.

Also, for the past 112 years. the *Mohonk Mountain House*, about 90 miles north of New York City, has housed the National Weather Service's cooperative station since the first official weather reading was taken there in 1896. Since then, the weather has been monitored in exactly the same place in precisely the same way by only a few people, allowing it to avoid the problems that normally plague weather records (i.e., the station is moved, buildings are constructed nearby or observers record data inconsistently). For much of that time, the handful of weather observers have also made detailed records about recurring natural events, like the appearance of the first spring peeper or the first witch hazel bush to bud in the fall. These two sets of data combined are beginning to offer intriguing indicators about climate change — not about its causes, but about how it affects the lives of plants and wildlife. The record shows that on this ridge in the Shawangunk Mountains — about 20 miles south of the Catskills — the average annual temperature has risen 2.7 °F since 1896. In that time, seven of the top 10 warmest years have come since 1990. Both annual precipitation and annual snowfall have increased, and the growing season has extended 10 days. The data also show how species have dealt with climate change. Several plant species have shown strong trends toward earlier flowering, according to Benjamin Cook, a climate modeler and a post-doctoral fellow at the NASA Goddard Institute for Space Studies, who has studied the *Mohonk Mountain House* data.

In the Arctic, British scientists have found that the icecap is shrinking at record rates in the winter as well as in the summer months, suggesting that the period in which the ice renews itself has become much shorter. The researchers found that the widely documented summer shrinkage is continuing in the winter with the thickness of sea ice dwindling by a record 19% last winter. Katharine Giles, who led the study and is based at the *Centre for Polar Observation and Modelling* at University College London, found that the air temperatures in 2007 were cold enough that they could not have caused the winter melting. The findings suggest that another longer-term change, such as a rise in water temperature or a change in ocean circulation, has brought warmer water under the ice. If confirmed, that could mean that the Arctic will likely melt much faster than was previously thought. Some experts say the summer icecap could disappear within a decade.

Vanishing Arctic sea ice could cause microscopic marine plants known as phytoplankton, a critical food source for much of the marine ecosystem, to bloom explosively and die earlier in the season, a development that could be disastrous for migratory wildlife, Stanford University scientists say. Whales, seabirds and other ocean species migrate to the Arctic in the summer to build fat reserves from the rich marine ecosystem which the phytoplankton creates, but the earlier blooms could leave them hungry. "It's a complex system," said Stanford biological oceanographer Kevin R. Arrigo, "but as the changes in ice cover throw the timing of phytoplankton abundance off, then the birds and animals whose brains have long been programmed to migrate north at specific times of the year will have missed the boat if there's no nourishment for them when they get there." Global warming which is melting the sea ice earlier, is allowing more sunlight to hit the ocean and triggering the early blooms. Plankton reached a peak accumulation of more than 10 million tons last year compared with only 700,000 tons in 2006.

Meanwhile, virtually all of Alaska's glaciers are retreating, thinning or both, a new U.S. Geological Survey (USGS) book reports. About 5% of the northern state is covered by more than 100,000 glaciers, and 99% are retreating, writes USGS geologist Bruce Molina in "*Glaciers in Alaska*." The new book used satellite images, aerial photos and other maps to document the melting glaciers, which began as early as the mid-19th century.

Despite this, Republican vice presidential candidate and Alaskan Governor Sarah Palin and her staff used the research of at least six scientists known to be skeptical about the causes and dangers of global warming in their state's effort to stop polar bears from being federally protected as a threatened species. Palin and her team referred to the work of at least six scientists who have questioned the severity or existence of warming as a man-made phenomenon, including one paper partially funded by *Exxon Mobil Corp*. The Interior Department listed the polar bear as a threatened species in May, saying two-thirds of the world's polar bears would likely be extinct by 2050 because of rapid sea ice melting. But Palin, in her capacity as Alaska's governor, sued the federal government to have the ruling overturned, saying the listing would "deter activities such as ... oil and gas exploration and development." Palin's criticism said the listing did not rely on the best available science.

Meanwhile, in Europe, warming is occurring faster than the global average, which could turn much of the Mediterranean region into desert this century, while the north gets even wetter, according to a report released by the European Environment Agency, branches of the World Health Organization and the European Commission. Warming temperatures are also causing sea levels to rise, threatening coasts and pushing fish stocks north. But some Europeans such as Northern farmers are benefitting from climate change by having longer growing seasons for their crops. European governments should invest to adapt to the impacts of climate change, the study says, including efforts to protect people from insect-borne illnesses, shielding coasts from rising water levels and helping developing nations adapt to global warming.

In the United Kingdom a team of researchers warn that more than half of Europe's amphibians could be extinct by 2050. Cli-

mate change, habitat destruction and disease are the main factors threatening the species' long-term survival, they added. Scientists from the *Zoological Society of London* (ZSL) said creatures in Italy and Iberia are at most risk, but a recent global assessment found that a third of all amphibians were at risk of being wiped off the face of the planet. The findings were presented at an event hosted by naturalist Sir David Attenborough to highlight the plight of Europe's amphibians. "Amphibians are the lifeblood of many environments, playing key roles in the functions of ecosystems," Sir David said. "It is both extraordinary and terrifying that in just a few decades we could lose half of all these species." ZSL research fellow Trent Garner said one possible lifeline, came in the guise of an organization called *Amphibian Ark*. "It is an organization that's trying to mobilize the world's zoological gardens to develop captive-breeding programs of species that are at a high risk of the threats facing amphibians. "One of the nice things about amphibians is that they are small, so getting them into captive-breeding programs is not like getting rhinos or hippos in one."

Most Europeans are concerned about climate change, but think they do not know enough to fight it, according to the results of a major E.U. opinion poll released in September. A majority (62%) of the 30,000 respondents from throughout the European Union and candidate countries considered global warming and climate change as one of the most serious world problems. It ranked second to poverty and the lack of food and water but ahead of international terrorism, armed conflicts and the global economic slowdown. But a majority of the respondents thought that industry, national governments and the European Union were not doing enough to tackle the problem. Sixty-one percent said they had taken some sort of action toward cutting GHG emissions, but many (40%) said they did not feel well informed on the issues. The *Eurobarometer* survey was conducted on behalf of the European Commission.

In the U.S., a recent *National Wildlife Federation* (NWF) report predicts that in the Southeastern states global warming could lead to "more dry conditions, more heavy rainfall events, and an increasing threat of saltwater intrusion into freshwater systems as sea level rises." And all those water woes will come as the population continues to grow. The report notes that much of the Southeast's population growth has been fueled by assumptions about water abundance and that the region has failed to manage its growth with an eye toward long-term water security. "Now it's becoming apparent that we need a new water ethic," said F.G. Courtney, director of NWF's *Southeastern Natural Resource Center* in Atlanta. "We have got to get our house in order and plan for our future needs," he said. The report also notes that the South's biological diversity — it is home to 70% of the nation's vulnerable fish and mussel species — will be further stressed by water shortages. "Even where water is still available during severe drought, infrequent replenishment and declining volume decreases water quality while forcing remaining fish populations into shrinking habitats," the report states. Southeastern forests also will feel the effects of drought that will make them more susceptible to severe fires. "Such catastrophic fires ... can decimate even fire-adapted species such as longleaf pines," the report says. The report urges a multipronged regional strategy — reducing GHGs associated with global warming, improving water efficiency and conservation programs, adopting risk-based adaptive water management strategies, and preserving and maintaining natural forest and wetland habitats that both store and cleanse natural water supplies.

Scientists say it is nearly certain that global warming will cause a spike in waterborne diseases worldwide. Heavier rainfalls will trigger sewage overflows, contaminating drinking water and endangering swimmers, experts predict. Higher lake and ocean temperatures will allow bacteria, parasites and algal blooms to flourish. Warmer temperatures and heavier rains will also bring more mosquitoes, which can spread West Nile virus, malaria and dengue fever. And fresh produce and shellfish are more likely to become contaminated.

A higher frequency of intense rainfalls is one of the most agreed-upon effects of climate change. Heavier rainfalls in the U.S. have increased notably in the Midwest, the Northeast and Alaska, and the trend will accelerate, according to a 2007 report by the U.N. *Intergovernmental Panel on Climate Change*. The results will be particularly severe in 950 U.S. cities and towns — including New York; Washington, D.C.; Milwaukee and Philadelphia — where "combined sewer systems" carry stormwater and sewage in the same pipes. During heavy rains, raw sewage often spills out of those systems into lakes or waterways.

In China, officials have acknowledged that GHG emissions have caught up with the U.S, marking the first official acknowledgment by that country that it could be the world's top polluter. Xie Zhenhua, a deputy chief of the National Development and Reform Commission that steers climate change policy, made the comments while releasing a paper on climate change. But he did not give any specific numbers. Many experts believe China's carbon dioxide (CO_2) emissions have already exceeded those of the U.S., the world's biggest emitter for more than a century. But Chinese officials have hedged on the issue and haven't released any new government data on emissions for the past 14 years. "Climate change has already brought real threats to China's ecological system and economic and social development," Xie said. But the report that Xie released says China will nonetheless likely increase CO_2 emissions as it seeks to lift hundreds of millions of its citizens out of poverty.

Meanwhile, in a submission to the U.N. *Framework Convention on Climate Change*, the Chinese government said that slower-growing, wealthier nations should cut their annual GHGs by 2050 and leave developing economies free from curbing their air pollution. China, the world's most populous nation, said countries like the U.S., Britain and Japan should slash their CO_2 emissions 80-95% from 1990's level by 2050, and 25-40% by 2020. China is the fourth-largest economy, and wants larger nations to set targets because their industries and vehicles have caused most of the CO_2 buildup that is warming the planet.

At the same time, indigenous leaders from around the world are demanding that native groups be given a larger say in how to best manage tropical forests in the global fight against climate change. More than a billion poor people who rely on forest ecosystems are at risk from cultural and economic devastation if efforts to cut GHGs fail to respect their rights and needs, indigenous leaders from Amazonian nations, Democratic Republic of Congo and Indonesia said at the recent *World Conservation Congress* in Barcelona, Spain.

Many rich nations favor an international carbon trading scheme that would compensate developing countries for reducing activities that contribute to global warming, like clearing rain forests for mining or agriculture. And the global carbon market is on pace to grow more than 80% this year to $116 billion, according to the clean-technology research and analytics firm *New Energy Finance*. The robust growth is due largely to consistently high prices for carbon allowances and credits in European Union countries that are bound by the Kyoto Protocol cap on heat-trapping gases, which expires in 2012.

"Conservationists want to prevent us from us-

ing our forest lands for economic purposes, and businesses have government concessions to extract ore, water and biofuel from lands that have been ours for generations," said Tony James of Guyana, president of the *Amerindian Peoples Association*. Native groups say they now want to play a key role in crafting any financing scheme that could be included in a broader U.N. agreement about how to fight climate change. "We have been hearing more and more about the carbon trade, but indigenous people are not being included in the discussions," James said. "We want to know: Who will own the carbon, and what will be the impact on us?"

According to a new paper written by Holly Gibbs and others at the University of Wisconsin's *Center for Sustainability and the Global Environment* and published in the latest edition of *Environmental Research Letters*, clearing tropical rainforests to grow crops for biofuels like ethanol and biodiesel can increase GHG emissions for anywhere from decades to more than a millennium. The Gibbs, et. al. report confirms research published earlier this year noting that global biofuels production is expected to result in a net increase of CO_2 emissions thanks to the release of carbon stored in native ecosystems that are converted to grow the energy crops.

Even after accounting for higher crop yields and more carbon-intensive sources of petroleum fuels, the researchers found that clearing tropical forest lands for biofuels production will essentially never pay for itself in carbon savings. Under current conditions, such land-use changes result in a "carbon debt" for 30 to 1,500 years, depending on whether the biofuel feedstock is a carbon-clutching tree plantation like oil palm or a higher-turnover annual crop like corn or soybeans, the study found. Other ecosystems require less time to justify land-use change decisions, according to the researchers, with biofuels grown on former grasslands generally offsetting the switch within 100 years. On the other hand, growing biofuel feedstocks on degraded land can provide fast carbon payoffs, the analysis says. "The conversion of already degraded lands provides nearly immediate carbon payback because the biofuel crops can increase ecosystem carbon storage while simultaneously offsetting fossil carbon emissions."

British Prime Minister Gordon Brown proposed in a recent report to safeguard the world's rainforests by funnelling cash from carbon saving in rich countries into nations with forests in need of protection. The plan is part of a review into deforestation by Swedish businessman Johan Eliasch, who says an international deal to protect forests would cut the cost of combatting climate change by up to 50% in 2030. It would also allow more ambitious global carbon cuts at no additional cost, the report says. Rainforest destruction accounts for about a fifth of the world's carbon emissions.

On another front, the *Worldwatch Institute* released a report in late September saying global action on climate change could spur the creation of millions of "green jobs" — many of which will be "dirty, dangerous and difficult" and pay poorly. Employment in solar and wind power, recycling, biomass and other so-called green sectors is already a much bigger part of the global economy than many realize and will likely grow significantly even if the world fails to draft a new climate treaty as resource constraints force efficiencies, the study says. The projected value of these emerging activities — to nearly $3 trillion over the next decade — will open significant new employment opportunities and new capital for tackling global warming. The current value of environmental products and services is estimated at roughly $1.3 trillion, according to the report, "*Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*." Experts say that figure will likely double to $2.7 trillion by 2020 at projected annual growth rates. Energy efficiency technology accounts for roughly half that amount, with waste management, clean transportation, and water and sanitation making up the rest.

To his credit, Chicago Mayor Richard Daley in mid September announced a plan to cut his city's GHG emissions to 75% of 1990 levels by 2020 and to 20% of 1990 levels by 2050. The plan is part of the city's effort to be one of the greenest cities in the nation and calls for making buildings more energy efficient, improving transportation and reducing industrial pollution. Chicago emits 34.6 million metric tons of GHG each year, and if the city does not reduce emissions, summer heat indexes could climb as high as 105 °F by the end of the century, according to researchers from Texas Tech University and the University of Illinois who were commissioned by the city to study climate change. The plan lists ways Chicago will deal with any coming climate change, including implementing a heat warning system, reducing summer energy use, improving air quality, preparing for increases in rainfall and flooding, reducing erosion around Lake Michigan's shoreline and planting vegetation that can adapt to climate change. "There's certainly going to be cynicism about this, but this is the direction the city as a whole knows we need to go in," said Suzanne Malec-McKenna, Chicago's environmental commissioner. "We think it's very do able and it needs to be aggressive. It needs to spark people's imaginations".

Meanwhile, each of us as individuals often scoff at the notion that small efforts, like reusing grocery bags and buying a Prius, can save the environment, and instead argue that the best way to curb GHG emissions is to stop big industries from spewing millions of tons of the gases into the atmosphere every year. But consumers — particularly U.S. consumers — have more of an impact than some may think. U.S. consumers have direct or indirect control over 65% of the country's GHG emissions, according to data compiled by consultant *McKinsey & Co*. For the rest of the world, that number is just 43%. Industries — including oil, steel, chemicals and cement — account for 23% of U.S. GHG emissions, according to the *McKinsey* study. Passenger cars produce 17% of U.S. emissions and residential buildings and appliances create 17% of emissions. But experts say efficient technologies need to be affordable to make a difference. Consumers aren't likely to behave in a more environmentally friendly way unless it saves them money, said Rhian Kelley, head of climate change for the business group *Confederation of British Industry*.

Sources: Cornelia Dean, *New York Times*, 10/28/08; Jonathan Leake, *London Times*, 10/26/08; *E&ENews PM*, 2/7/08; Roger Harrabin, *BBC News*, 10/13/08; Alister Doyle, *Reuters*, 0/28/08; Mark Kinver, *BBC News*,9/25/08; David Perlman, *San Francisco Chronicle*, 11/21/08; Kari Lydersen, *Washington Post*, 10/10/08; Graham-Harrison/Buckley, *Reuters*, 10/29/08; Matthew Carr, *Bloomberg*, 10/1/08; *Agence France-Presse*, 9/11 and 10/8/08; Jeffrey Ball, *Wall Street Journal*, 10/2/08; Ed Pilkington, *London Guardian*, 10/1/08; *NBC5.com*, 9/18/08; Anthony DePalma, *New York Times*, 9/16/09; Daniel Cusick, *Greenwire*, 11/20/08; Jenny Mandel, *Greenwire*, 9/30/08; Michael Burnham, *Greenwire*, 10/10/08; Nathanial Gronewold, *Greenwire*, 9/24/08; and *Greenwire*, 9/11, 9/16, 9/19, 9/26, 9/28, 10/1, 10/2, 10/8; 10/14/, 10/20, 10/27, 10/28, 10/29 and 11/21/08

Meetings of Interest

Jan. 27-31: Fisheries and Harmful Algae: Can They Co-Exist? Radisson Fort Worth Fossil Creek Hotel, Ft. Worth, TX. Contact: TX Parks & Wildlife Dept.

Feb. 15-18: Aquaculture America 2009, Seattle, WA. http://www.was.org.

Mar. 16-21: 74th North American Wildlife and Natural Resources Conference, Refining the Relevance of Resource Management, Arlington, VA. http://www.wildlifemanagementinstitute.org.

Mar. 30 - Apr. 3: Improving the Ecological Status of Fish Communities in Inland Waters: International Symposium and EFI + Workshop, Hull, United Kingdom. http://www.hull.ac.uk/hifi/events/index.html.

Feb. 7: EcoLandscape 2009 Conference, Sacramento, CA. http://www.ecolandscape.org/eventsConference.html.

July 12-17: International Society for River Science, St. Petersburg, FL. www.stpt.usf.edu/coas/espg/riverconference/home.asp

July 20-24, 2009: 3rd National Conference on Ecosystem Restoration (NCER), Los Angeles, CA. http:// www.conference.ifas.ufl.edu/NCER2009/

Aug. 10-13: Visions of a Sustainable Mississippi River, Collinsville, IL. Contact: ngrrec@lc.edu

Aug. 3 - Sept. 3, 2009: 139th Annual Meeting of the American Fisheries Society, Nashville, TN, http://www.fisheries.org.

Congressional Action Pertinent to the Mississippi River Basin

A new Congress will convene in January so this section was deleted from this issue.

River Crossings

Mississippi Interstate Cooperative Resource Association
9053 Route 148
Marion, IL 62959