



ISSUE 27

October-December 2009

AQUATIC INVASIVE SPECIES NEWS IN A NUTSHELL

Joan Cabreza, Editor

This newsletter, like its EPA precursor, focuses primarily on regional and aquatic issues, but it also contains terrestrial, national and international news of interest. Contents do not necessarily reflect views of the PSMFC. We welcome any questions, comments, and news items; direct them to the nutshell editor Joan Cabreza <joancabreza@msn.com>. To access all past Nutshell issues 1-26, go to [http://www.aquaticnuisance.org/newsletters]. To subscribe or unsubscribe from this newsletter please email <joancabreza@msn.com>.

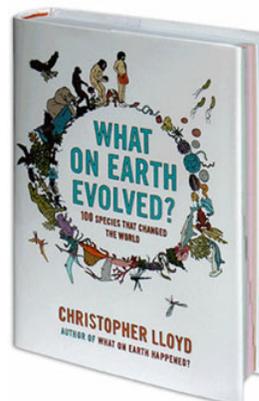
This Quarter's Unusual News

Earlier Nutshell articles have detailed the impacts on our forests made by invasive earthworms. Now additional info backs up the impact of these often unnoticed creatures:

The Earthworm: The Most Influential Species of all Evolution? A new book by Christopher Lloyd, *What on Earth Evolved? 100 Species that Changed the World*, (Bloomsbury, November 2009, \$45) reviews evolution and ranks the top one hundred most influential species of all time. *Homo sapiens* are not at the top of the list. In fact, the most influential species (defined as the species that has most changed life on Earth) is..... the earthworm!



USDA photo



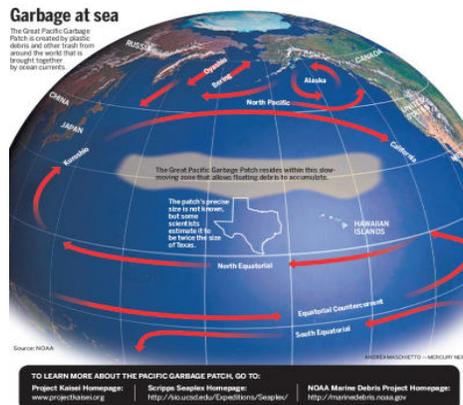
The book includes capsule biographies of a hundred of the most influential species. Here is Lloyd's list of the top ten most influential species of all evolution: See the full list of the most influential species on the book's website [www.whatonearthevolved.com].

1. Earthworm (allowed humans to cultivate the planet, settle, and build civilizations)
2. Algae (without microscopic algae, larger forms of sea life could not have evolved)
3. Cyanobacteria (established original presence of O² in the atmosphere and ocean)
4. Rhizobia ("fix" atmospheric nitrogen into soluble nitrates that fertilize the soil)
5. Lactobacillus (provide beneficial services inside the human colon)
6. Homo sapiens (heavy impact the past 12,000 years, but clearly still in its early phases)
7. Stony corals (construct massive underwater mountains supporting huge life diversity).
8. Yeast (Some of best prospects for fuelling future sustainable industrialization and transportation are based on ethanol, a by-product of yeast.
9. Influenza virus (One of humanity's biggest ever killers and still the largest threat)
10. Penicillium (has transformed modern medicine, substantially increasing population)

(Excerpted from

[<http://blogs.nationalgeographic.com/blogs/news/chiefeditor/2009/11/evolution-most-influential-species.html>] November 4, 2009)

Another Pathway: The 'Great Pacific Garbage Patch'. Scientists who returned to the CA Bay Area in August after a three week expedition to the "Great Pacific Garbage Patch", brought piles of plastic debris pulled out of the ocean — soda bottles, cracked patio chairs, styrofoam chunks, old toys, discarded fishing floats and tangled nets. But most alarming was the nearly inconceivable amount of tiny, confetti-like pieces of broken plastic. The research was the most extensive look yet at the “garbage patch,” a collection of mostly plastic debris located 1,000 miles north of Hawaii. The bobbing debris field, where currents swirl everything from discarded fishing line to plastic bottles into one soupy mess, was discovered in the mid-1990s and is estimated to be twice the size of Texas (!). Not much is known about when it began forming, or even its exact boundaries, and it cannot be seen from the air because most of the plastic has broken down into billions of tiny, confetti-like pieces that float just below the surface. Scientists believe the trash washes down storm drains and rivers from places such as the Bay Area or Japan, eventually drifting into several large ocean vortices where currents swirl together.



(Photo: Nhat V. Meyer)

They took hundreds of water samples between the Farallon Islands near San Francisco and the notorious garbage patch 1,000 miles west of California, and every one had tiny bits of plastic floating in it. And the closer they sailed to the garbage patch, the more plastic pieces per gallon they found.

The garbage patch is emerging as a major international environmental concern. Crews discovered tiny jellyfish eating bits of the plastic debris, and the jellyfish are eaten in turn by fish like salmon or tuna, which are then eaten by people. Because the plastic pieces contain toxic chemicals, and are believed to be able to absorb chemicals such as DDT and PCBs, toxicologists have taken hundreds of the objects, along with more than 300 fish, to an environmental chemistry lab in Berkeley to determine if any chemicals are moving up the food chain. Birds, sea turtles and other marine life also die when they eat or become entangled in floating plastic. Invasive species such as crabs, barnacles and other marine life can attach themselves to it and float across the globe. In the central Pacific, there are up to six pounds of marine litter for every pound of plankton, and roughly 46,000 pieces of plastic litter are floating on every square mile of the oceans there, according to a 2006 report from the United Nations Environment Programme. The expedition's goal was to study the patch's size, how the plastic affects wildlife and whether it may be possible to one day clean up some of it. Research papers from the expedition will not be published for several months. But time is of the essence. "The floating pieces of plastic - large and small - are like a spreading cancer on the ocean," a researcher said. "It's impossible for me to think of what the ocean might be like in another 30 years if we don't change." (Excerpted from a Paul Rogers article in the San Jose Valley Mercury News, September 1, 2009.) [http://www.mercurynews.com/breakingnews/ci_12985637]

Lights at the End of the Tunnel?

Control for Giant Salvinia? A team of researchers at Louisiana Tech University has found that a naturally occurring microorganism acts as a natural herbicide against giant salvinia (*Salvinia molesta*). Giant salvinia is a noxious and invasive aquatic weed that can block all sunlight penetration into bodies of water, altering entire ecosystems. Under ideal conditions, it doubles in size every three days. Dr. H. Lynn Walker, of Louisiana Tech, says "Research results indicate that the microbe can be grown under laboratory conditions and then sprayed onto the foliage of giant salvinia, and ...even one application can drastically reduce the scourge in as few as ten days." Pilot-scale studies are planned at Lake Bistineau to assess the feasibility for development of the microbe as a bioherbicide. The studies will focus on maximizing herbicidal activity, determining the long-term effectiveness of treatments, production costs, and integration of the microbe with other control measures. While the initial results of the research are encouraging, project leaders say the study is still in the early stages of development. (Excerpted from [http://www.redorbit.com/news/science/1789451/microorganism_could_combat_giant_salvinia_throughout_louisiana/index.html?source=r_science], November 20.)

Zebra Mussel Solution? Zequanox™ (Update). Marrone Bio Innovations (MBI) announced it will join forces with SePRO Corporation to develop MBI's microbial-based

product, Zequanox™ for use in controlling zebra and quagga mussels. Zequanox™ is “highly effective in selectively controlling both of these invasive mussel species in flowing and static water,” and has been successfully tested at North American power facilities. SePRO, a leader in the North American Aquatic Invasive Pest Control market, will work with MBI to validate the product's efficacy, optimize product formulation, and perfect application techniques for open waters. Zequanox will be the first naturally sourced and environmentally safe method for invasive mussel control in open water. Extensive research has shown that while it is quite effective at controlling invasive zebra and quagga mussels, it is also safe for people, the environment and important native aquatic species. Final regulatory approval of Zequanox is anticipated in 2010 in both the US and Canada. (Excerpted from the PRNewswire, December 17, 2009.)
[http://sanfrancisco.bizjournals.com/prnewswire/press_releases/California/2009/12/17/AQ28040]

WA Brazilian Elodea Eradication. More than 10 years after it was discovered in the Chehalis River, WA Officials hope they've finally eradicated Brazilian elodea (*Egeria densa*). At its peak, the plant infested 35 acres of the river. Divers removed the remaining 8 acres of the plant this season. The Thurston County Noxious Weed Control Board completed the annual removal of Brazilian elodea at the end of September, and could find no remaining trace of the plant. This was the only location in Thurston County infested with Brazilian elodea. The Weed Board will continue to monitor the river, and the plant will be deemed eradicated if there's no evidence of its return in the next three years. Native to South America, *Egeria* was once a popular aquarium plant, but the state has since banned its sale. Officials suspect someone dumped the contents of an aquarium into Plummer Lake in Lewis County, and it eventually flowed into the Chehalis River, where the plant took root in a slow-moving stretch of the river. It was discovered in 1998, during a survey in search of other problem weeds, and Thurston County began removing individual plants a year later. Individual hand removal was deemed impractical after several years, because the infestation grew too large, and beginning in 2004, divers were used to help remove the plant. Removal work has cost \$200,000, and an estimated 300,000 pounds of the plant have been removed. (From a *Christian Hill* article in the *Olympian*, October 16.)
[<http://www.thenewstribune.com/partners/theolympian/story/918011.html>]

Western Zebra Mussel Invasion (Updates)

In the far Western US, zebra and/or quagga mussels are now currently known to infest waterbodies in NV, CO, CA, AZ, and UT. For a complete infestation map of the US go to <http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/>



Watercraft Interception Protocols and Decontamination Research Study (Update).

As state and regional organizations attempt to enhance efforts to prevent the continued spread of zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*) in the West, uncertainty remains about protocols used to eliminate live larval and adult mussels from contaminated watercraft. In September 2009, the Western Regional Panel on Aquatic Nuisance Species (WRP) adopted the “Recommended Uniform Minimum Protocols and Standards for Watercraft Interception Programs for Dreissenid Mussels in the Western United States.” This report, by the PSMFC, can be found at: [<http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Recommended-Protocols-and-Standards-for-Watercraft-Interception-Programs-for-Dreissenid-Mussels-in-the-Western-United-States-September-8.pdf>].

The protocols and standards recommended in this document are directed at preventing trailered watercraft and equipment from inadvertently transferring quagga/zebra mussels from infested to uninfested waters. They largely rely on use of hot water and pressure washing equipment to kill and remove all visible mussels (live and dead) and veligers from all areas of the watercraft, engine, trailer, and equipment. The document also highlights the need for research to determine the effectiveness of current decontamination strategies.

A 2009 paper by John Morse (*Biofouling*, 25:7, 605-610) provides new information about efficacy of heated pressure washing, and suggests additional research needs, particularly within the context of actual field conditions. Field reports indicate that in some cases, several days after a thorough decontamination, settled mussels are found during re-inspection. This is likely due to the difficulty of reaching places like the gimbal area on the inboard or outboard motor. Questions also exist regarding effective methods to eliminate veligers from standing water in ballast tanks on certain wakeboard and ski boats.

To help answer these questions, the PSMFC, with funding from the USFWS, requested proposals in September, 2009 for additional scientific investigation of watercraft decontamination practices (e.g., pressurized hot water wash) to help set minimal thresholds for associated decontamination and inspection parameters. The successful proposal was submitted by the University of Nevada Las Vegas (Dr. David Wong, lead investigator). The UNLV team will investigate the use of pressurized hot water wash applied to watercraft as a decontamination practice, to determine minimal temperature and duration thresholds for 100% quagga mussel mortality. This research project will begin in early 2010.

Quagga Mussel Risk Assessment. If you have not already seen it, check out the link below for “Quagga Mussel Risk Assessment - An experiment test of quagga mussel survival and reproductive status using Lake Tahoe water with a prediction of invasion into Western water bodies (Chandra et al. 2009). [http://www.mwraadvisoryboard.com/Research_Articles/Tahoe_Quagga_Final_Report.pdf] (*Thanks to Stephen Phillips*)

Quagga Zebra Mussel Action Plan (QZAP). The Aquatic Nuisance Species Task Force (ANSTF) requested that the Western Regional Panel (WRP) draft a plan to coordinate management of invasive mussels in the West. The resulting QZAP was approved conditionally by the ANSTF on November 5, 2009 and will be finalized in early 2010. Among the highest priority action items is funding for state and interstate ANS management plan implementation (estimated annual funding need is \$31,140,000). In its FY 2010 appropriations, USFWS received \$2 million in new funding for quagga and zebra mussel activities, including implementation of QZAP. USFWS is in the process of developing and distributing requests for proposals associated with these funds (*Thanks to Erin Williams, Paul Heimowitz and Eileen Ryce*).

Western Regional Panel (WRP) Mussel Project. The WRP has provided \$25,000 to the University of California-Davis and the University of Nevada-Reno, to fund a *Risk assessment of recreational boating traffic and aquatic nuisance species (dreissenid mussel) invasion to lakes, rivers and reservoirs of the Western United States*. The WRP is not planning to do any requests for proposals next year. (*Thanks to Erin Williams*)

Enforcement: Lake Powell's First "Catch". A Nevada man has become the first person to be found guilty of violating regulations adopted to prevent the spread of invasive mussels at Lake Powell. A federal magistrate ordered Jonny Ward to pay a \$2,500 fine for failing to have his boat inspected for quagga mussels before launching it on the lake. Regulations mandate inspections for "at-risk" boats entering Lake Powell. Ward visited Glen Canyon on Aug. 17, 2009 and was told by National Park Service staff that an inspection for quagga and zebra mussels was mandatory, but Ward ignored the information and launched his boat from Lone Rock Beach. He was issued a citation, took the case to court, and was convicted of violating the regulation on October 19, 2009.

To date, zebra mussels have been detected in Electric Lake in Emery County, and quagga mussels have been detected in Red Fleet Reservoir in Uintah County. Test results for five other Utah bodies of water are pending. Neither mussel species has yet been detected in Lake Powell. (*Excerpted from a November 3 Deseret News article, 'Nevadan guilty of spreading mussels'*)

Montana Inspection Program (Update). New legislation has provided increased funding and increased rulemaking authority, and this fall it became mandatory for all watercraft to stop at inspection stations. From May to October, inspection stations operate on some major highways as well as boat ramps. The state now has 6 portable boat washers, but containment and treatment of contaminated recovery water is a challenge. The biggest problem found during inspections is standing water in the watercraft; they are treating it with bleach and hot water. Inspections have not found any mussels, but several boats had potentially contaminated standing water in bilges and live wells. Because they don't have 24 hour coverage at this point, this is still more of an educational tool. (*Thanks to Eileen Ryce*)

Idaho Inspection Program (Update). In 2009, ID adopted a boat sticker program that was projected to bring in \$1,500,000 in program funds. As of October, only \$770,000 was received, but they expect to receive \$900,000 up-front next year. Between July 4

and September 14, the program operated 17 inspection stations (10 by private contractor) at highway border crossings, and conducted about 14,000 inspections. The data is still being analyzed, but two boats were found with confirmed mussels (one zebra and one quagga). There is now an online data base at: [<http://gis.idaho.gov/quaggamap/>]. A report to the legislature in mid-November includes their plan for 2010. Contact Amy Ferriter, <aferriter@idahoag.us> for more information.

Oregon Boat Inspection Program (Update). OR has 180,000 registered boaters. It has passed new legislation modeled after Idaho's, including the requirement for boat permits. Their permits are paper (not stickers), and resemble hunting tags, so they can be transferred to any boat an individual owns. All fees go to the Oregon State Marine Board, which will provide funding to ODFW to manage the program. There are no mandatory inspection stops in OR, but the state hopes to have five roving inspection teams in place by January. They are also staffing up and coordinating with their public relations staff to develop a public message. New boat ramp signs patterned after those in ID and WA provide a similar message throughout the region. *(Thanks to Rick Boatner and Glenn Dolphin)*

Washington Boat Inspection Program (Update). WA has 280,000 registered boaters. In 2008 the WA Aquatic Invasive Species (AIS) program conducted 11,000 boater surveys/inspections. In 2009, the program turned to early detection monitoring combined with mandatory check stations. WA has an active enforcement with three layers focused on mussel interception: (1) All Washington State Patrol Commercial Vehicle inspectors stationed at the five Ports of Entry are trained in mussel identification and vessel inspection, (2) WA Fish and Wildlife Officers are trained in mussel identification and vessel inspection and have integrated these activities into general patrolling and boater safety inspections (1367 inspections in 2009), and (3) Random mandatory AIS check stations. During 2009, WA operated 16 of the random mandatory check stations at boat ramps and major highways/roadways and hope to operate 30-35 during 2010.

During 2009, four mussel contaminated boats were intercepted; one boat coming from Lake Mead on I-5 in Ridgefield, one Boat coming from Lake Mead on I-90 in Spokane, one boat coming from New York at the Port of Everett headed to Lake Washington, and one boat coming from Lake Michigan on I-90 in Cle Elum. The boat intercepted at Cle Elum resulted in extensive enforcement action being taken due to the actions by the commercial hauler. At this time, charges of Transportation of a Deleterious Species (gross misdemeanor) and Making False Statements to a Law Enforcement Officer (gross misdemeanor) have been filed in Kittitas County District Court against the commercial hauler. *(Thanks to Eric Anderson)*

Wyoming Boat Inspection Legislation. Draft rules meant to prevent the entrance of aquatic invasive species, such as zebra and quagga mussels, are in WY state legislature. The draft legislation will make it a crime to willingly and knowingly transport the species to WY through a boat bilge system, ballast tank, or other container. The proposed legislation, based on a similar prevention plan in CO, would make it a misdemeanor to knowingly bring the mussel species to WY, and will be punishable by a fine up to \$10,000 and up to one year in prison, plus civil penalties to recoup costs of enforcement.

The bill would also allow vehicle inspections and disinfections, and monitoring of waters for the invasive species with permission from the water controller. The state is also in the process of developing a master plan that should be complete by January, which will describe how the state should prevent, monitor, contain, and if necessary, eradicate, invasive species. (Excerpted from *New laws may take aim at mussels that stow away on boats*, by J.D. Stetson, in the Gilettenewsrecord.com October 22, 2009.) [<http://gf.state.wy.us/fish/AIS/index.asp>]

Zebra Mussels Continue Spread in KS. Zebra mussels have been found in Milford Lake, a 16,200 acre lake near Junction City. Milford is the eighth Kansas lake to become infested. They were first discovered in November when a boater found several attached to his boat as he pulled it from the water for the season. A follow-up check found additional mussels in the lake. Zebra mussels have also been documented in the Kansas River, probably washing downstream from an infestation at Perry Lake, and the Lawrence water plant has also found them within their system. (Excerpted from a *Michael Pearce article*, Nov. 18, 2009.) [<http://blogs.kansas.com/outdoors/2009/11/18/zebra-mussels-found-in-milford-lake/>]

Canadian Mussel Response (Update). The British Columbia Ministry of Environment just established an Aquatic Invasive Species Coordinator position in 2008, so their program is still in its early stages. Much of their work is externally funded, which makes it difficult to establish a long-term program. The provincial government is interested in participating in international agreements, and has signed on to the Columbia River Basin (CRB) Rapid Response Plan for Zebra and Quagga Mussels. Other Provincial initiatives include: a compliance focus on prevention of illegal sport fish introduction in BC (yellow perch, large and smallmouth bass); *Spartina* eradication by local stakeholder groups; consideration of including *Spartina* eradication in the Pacific Coastal Collaborative; and ongoing eradication of yellow perch and smallmouth bass infesting lakes in interior BC. BC's participation in the CRB rapid response plan includes identifying funding sources for basic monitoring and outreach, development of an effective monitoring plan in collaboration with the power companies, targeting a few high use reservoirs with a lot of cross border traffic for sampling, and starting a basic outreach initiative based on existing work of the 100th Meridian Initiative. (Thanks to *Matthias Herborg*)

Watercraft Tracking Systems: Quagga Inspection Services (QIS) has developed a tracking system to deal with boat operators who fail inspections on one lake and then try to go somewhere else (or leave and return later). They have developed a quagga inspection system database (QID) to allow real time vessel tracking through the use of any web enabled phone, PDA or laptop with an internet or cellular connection. They also use a banding system so boats can leave and return without having an additional inspection. QIS also provides inspection services and training using protocols provided by the PSMFC and approved by the Department of Fish and Game. For more information on QIS, or to learn more about the user manual for the QID, contact Marshal Pike, at (530) 949-9451, or <mp@calparksco.com>. (Thanks to *Marshal Pike*.)

Double-Blind Veliger Monitoring Study. The deadline for signing up as a participant in a Round Robin *Double Blind Study for Detection of Dreissinid Larvae from Western Waters* is January 10, 2010. This is the second phase of a study than began last January. The original study provided water samples to various laboratories to compare veliger identification methods (flowCAM, microscopy, and PCR/genetic). Performance was generally good, but led to questions about what would happen when using “real” water samples; this second phase was initiated to check that. The Bureau of Reclamation will lead the study. Contact Kevin Kelly (866-476-4550), or go to [http://www.100thmeridian.org/Open_Invitation_Dreissinid_Larvae_Detection_Round_Robin_112009%20FINAL.pdf] for more information. (*Thanks to Dave Britton*)

Glen Canyon NRA Cuts Back Lake Hours. Winter visitors to Lake Powell will have to deal with more hour restrictions than in years past, but National Park Service officials say this is necessary to maintain the park’s current level of alertness for zebra and quagga mussels. The park has a set amount of funding earmarked for the prevention of invasive species like zebra and quagga mussels, and the interdisciplinary team for this effort felt the shorter hours were more prudent so that NPS would not run out of money during the tourist season, when the infestation risk is greater. Glen Canyon has also added a FlowCAM to its zebra and quagga mussel monitoring lab. The state-of-the-art instrument will reduce the time required to analyze plankton samples from eight hours to approximately 20 minutes per sample, greatly increasing the park’s capacity to monitor for zebra and quagga mussel veligers in Lake Powell. (*Excerpted from Stop Aquatic Hitchhikers, October 22, and December 17, 2009*) [<http://www.protectyourwaters.net/news/display.php?id=11784>]

Online Interactive Dreissenid Monitoring Database. The current objective of the monitoring database and Dreissenid Interactive Map being developed by Portland Center for Lakes and Reservoirs is to identify gaps in regional zebra/quagga monitoring and increase regional coordination. Because they have switched to a new database, the data is not yet current, and there are still a few glitches to fix, as well as finalizing the map. Data will be verified before it is added to the database, and there is a “date last checked” feature to help identify how current information is, what has been entered, and by whom. The database was originally developed with USFWS funding, and although it focuses on the West, the database is set up for the whole US. For further information contact Steve Wells <sww@pdx.edu>.

Diver Monitoring. Divers can play an important role in zebra mussel response and monitoring. Now, rapid response dive teams are being trained for mussel inspections, and written procedures are being prepared on how to conduct SCUBA surveys to identify, quantify, and sample quagga and zebra mussels. Procedures will cover what are divers should look for, how and where to look for mussels, how to define a search area, search methods, seeding the search area, sample collecting, and “good dive practices.” Target dates are February 28 (preliminary draft), April 30 (revised draft) and June 30 (final procedures). Although there are some liability issues with using divers, at least now a product will be available to help any volunteer groups that want to assist. For more information on this project, contact Noah Adams <noah_adams@usgs.gov>.

Other West Coast Activity

WA Hotline and Reporting Website. The Washington State Invasive Species Council announced the launch of a hotline and website for people to report sightings of invasive species. The creation of the hotline, [1-877-9-INFEST](tel:1-877-9-INFEST), is one of a series of actions being taken by the Invasive Species Council and its partners to combat invasive species. The council has revamped its website at [www.invasivespecies.wa.gov], created posters in state parks and created other materials to help educate the public about what they can do to help stop invasions. (From an RCO Press Release, September 28, 2009. Thanks to Kevin Aitkin and Wendy Brown)

West Coast Non-Native *Spartina* Eradication by 2018? *Spartina foliosa*, found in salt marshes from Baja California, Mexico to Bodega Bay in California, is the only species of cordgrass native to the West Coast. But several other non-native and less “benign” species were brought here, both intentionally, for erosion control and forage production, and unintentionally, in ship’s ballast water and/or in oyster packing material. A 2004 drift card release study at the Center for Lakes and Reservoirs at Portland State University helped better understand Oregon’s vulnerability to non-native cordgrass from neighboring states, and demonstrated that OR is likely the continual recipient of non-native cordgrass seeds from both CA and WA, demonstrating the need for interstate coordination. Three state governors are now committed, through the West Coast Governor’s Agreement on Ocean Health, to eradicate non-native cordgrasses from the West Coast by 2018. (Excerpted from an OISC press release, November 3, 2009.)

So far, WA has had very good eradication success. After switching herbicide usage to Imazapyr, a couple of years back, *Spartina* acreage in WA has been reduced from thousands to only a few hundred acres. Nearly complete eradication appears possible, but the state will need to be continually vigilant. For the [latest 2009 report](#) to the WA Legislature on *Spartina*, contact Tanner Ketel, at <tketel@agr.wa.gov>. [Results](#) of the PSU drift card study are available at [<http://www.clr.pdx.edu/projects/ans/spartina.php>].

OR Snail Study. Alix Laferriere of the South Slough National Estuarine Research Reserve has completed a study on *Assiminea parasitologica* (AP), the new invasive Japanese snail first detected in Coos Bay, OR, in 2007. By 2008, it was also found in the Umpqua/Smith and Newport estuaries. This small snail, thought to have been introduced via ballast water, is important partly because it is the first intermediate host to the lung fluke, *Paragonimus ohirai* (Mitten crabs are the primary hosts). Study objectives were to: (1) Determine the spatial distribution and abundance of all species of the snail guild (other species include *Littorina subrotundata* (native), *Angustassiminea californica* (native) and *Myosotella myosotis* (introduced in Coos Bay in 1967)); (2) Correlate the species-specific distributions and densities with environmental parameters; (3) Investigate the life history strategy of AP and (4) Survey the Umpqua, Siuslaw, Smith and other estuaries for the presence of AP. She used a two-tiered rapid assessment method and detailed assessment method. Conclusions: AP is spreading within and across estuaries, probably via contaminated fishing and sampling gear, and boots; it is present in

large numbers in Coos Bay (1,000s per square meter); abundance varies by region in the estuary; mechanisms affecting its distribution are unclear; it has a wide salinity tolerance, reproduces in a summer cycle, and spread to two other estuaries in the last year (Alsea and Bandon); and it has the potential to displace native snails. No parasites have been found on the snails. *(Thanks to Alix Laferriere.)*

Water Bags as a Vector (Update). Crane weight test bags are a possible pathway for ANS spread that raises special inspection and decontamination issues. Water weight bags that are filled and emptied at each crane test site are becoming the testing standard. When raw water is used to fill weight bags, veliger transfer is possible, and inspection and decontamination of the bags is difficult. Options for decontamination include chemical (has wastewater and quantity issues); heat (no hot surface exposure, and hot water wash inside bags is difficult); desiccation (the most common current method); hang, drain and dry (time consuming), and freezing (a possible workable alternative). More research on control options are needed. Paul Heimowitz (USFWS) is collaborating with BOR and the crane certification industry to improve water bag weight decontamination and research. BOR has already directed industry contacts to the 100th Meridian Initiative quarantine estimator [<http://www.100thmeridian.org/Emersion.asp>]. The next steps include a presentation to the ANSTF (done in November 2009), establishment of a partnership to evaluate freezing and other controls, and possible formation of a WRP work group. *(Thanks to Paul Heimowitz)*

ID Hydrilla Eradication (Update). Idaho's second year of eradication efforts involved the use of divers, three diquat treatments, and two organized volunteer days. Hand removal was conducted on seven miles of river. The *Hydrilla* biomass has been reduced by an estimated 70% in the last two years, but the state estimates it will take another 5 to 10 years to complete eradication. *(Thanks to Amy Ferriter.)*

WA ISC 2009 Annual Report. The Council's 2009 annual report is finished and has been delivered to the Legislature. Work this year includes: receiving a federal grant to do a baseline assessment of invasive species in the Puget Sound; creating a tool to evaluate the worst of the worst invasive species threatening WA; creating an education campaign to solicit the public's help in stopping the spread of invasive species; launching a web site and hotline where people can report invasive species; and initiating and organizing the response to a New Zealand mudsnail infestation in Capital Lake. To learn more about the Council and its projects, visit the Council website at: [www.invasivespecies.wa.gov]. *(Thanks to Wendy Brown)*

WA Aquatic Nuisance Species Committee Report to the Legislature. The biannual report is completed and should be available on the WDFW website soon. For more information, contact Allen Pleus, <allen.pleus@dfw.wa.gov>.

OR Plant Quarantine List Changes. At a December 17 hearing, the OR Department of Agriculture proposed to amend the noxious weed quarantine law (603-052-1200) and update the list of prohibited plants. Nine new weeds would be added to the list: common reed (*Phragmites australis*), flowering rush (*Butomus umbellatus*), Japanese dodder

(*Cuscuta japonica*), taurian (*Onopordum tauricum*), yellowtuft (*Alyssum murale* & *A. corsicum*), herb Robert (*Geranium robertianum*), shiny leaf geranium (*Geranium lucidum*), lesser celandine (*Ranunculus ficaria*), and spurge laurel (*Daphne laureola*). Restrictions would be modified for English Ivy (*Hedera helix/hibernica*) and butterflybush (*Buddleia davidii/varabilis*). These changes would bring the noxious weed quarantine in line with the State Noxious Weed List maintained by the State Weed Board. (Thanks to Tristan Berg)

WA Noxious Weed List Changes Noxious Weed rule changes adopted on September 3 and in effect on October 4, included addition of four new plants to the wetland and aquatic weed quarantine list: floating primrose willow (*Ludwigia peploides*), variable-leaf milfoil (*Myriophyllum heterophyllum*), ricefield bulrush (*Schoenoplectus mucronatus*), and water soldiers (*Stratiotes aloides*). They also added false brome (*Brachypodium sylvaticum*), shiny geranium (*Geranium lucidum*), and European hawkweed (*Hieracium sabaudum*) to the noxious weed seed and plant quarantine. (Thanks to Sasha Shaw, KC Weed News October 2009)

WA Tunicate Risk Analysis. In a survey taken at the 6th International Marine Bioinvasions Conference in August, 2009, tunicate experts from around the world helped the Washington State Department of Fish and Wildlife analyze the threat of seven nonnative tunicate species to the Puget Sound. The compiled results are being used to direct the WA biennial Tunicate Work Plan. Results of the risk analysis (10 respondents) identified the greatest risks were to aquaculture/wildstock fisheries yields, followed by impacts to biological ecosystem processes and physical infrastructure. Least likely risks were believed to be to physical/geomorphic processes; genetic integrity of native species; recreation, and human health. Species posing the greatest risks were ranked as *Didemnum vexillum*, followed by *Styela clava*, and then *Botrylloides violaceus* and *Ciona intestinalis*. In ranking management and species risk priorities (12 respondents), the greatest management priority actions for Puget Sound by species are: control actions for *S. clava*, and *D. vexillum*; followed by research/monitoring for *C. savignyi*, *B. violaceus* and *Botryllus Schosseri*; and prevention and eradication for *C. intestinalis*. Greatest species risks both worldwide and for Puget Sound were *D. vexillum*, *S. clava* and *C. intestinalis/C. savignyi*. More information on the WA program can be found at [<http://wdfw.wa.gov/fish/ans/tunicates.htm>]

New PNW NAS Alerts. The first WA sighting of *Procambarus acutus acutus* (white river crawfish) was made at Echo Lake, in the Lake Washington drainage (17110012). For more information on this specimen, go to: [<http://nas.er.usgs.gov/queries/specimenviewer.asp?SpecimenID=264585>]. For more information on this species, go to: [<http://nas.er.usgs.gov/queries/SpResults.asp?SpeciesID=216>].

To receive automatic alerts on new sightings of your own particular species or geographic areas of interest, contact the US Geological Survey - Nonindigenous Aquatic Species Database, at <NAS_Alerts@usgs.gov>

WA Aquatic Plant Program. Ecology began accepting Aquatic Weeds and Saltwater Algae grant applications beginning October 1, 2009. The following documents related to Aquatic Weeds, Algae, and Saltwater Algae programs are on the Washington Department of Ecology website:

- Saltwater Algae funding announcement [<http://www.ecy.wa.gov/biblio/0910072.html>]
- Saltwater Algae guidelines [<http://www.ecy.wa.gov/biblio/0910073.html>]
- Saltwater Algae application [<http://www.ecy.wa.gov/biblio/ecy070359.html>]
- Aquatic Weeds funding announcement [<http://www.ecy.wa.gov/biblio/0910070.html>]
- Aquatic Weeds application [<http://www.ecy.wa.gov/biblio/ecy07028.html>]

There is also a brief explanation on the Freshwater Algae program page about this year's (nonexistent) grant cycle (<http://www.ecy.wa.gov/programs/wq/plants/algae/index.html>) (*Thanks to Kathy Hamel*).

Seven Ballast Water Treatment Methods Meet CA Standards. The California State Lands Commission Marine Invasive Species Program has recently completed a brief update of the availability and ability of ballast water treatment technologies to meet CA ballast water discharge performance standards. This update is not a mandated report, and does not provide Commission-approved recommendations or constitute an endorsement or approval of any treatment system or system manufacturer by the Commission. It is solely intended as a resource for stakeholders interested in ballast water treatment systems for use in CA waters. The report's conclusions state that "based on the available data, at least seven ballast water treatment systems have demonstrated the capability to comply with CA performance standards for the discharge of ballast water: AlfaLaval, Ecochlor, Hamann Evonik Degussa (Germany), Hyde Marine (United Kingdom), OceanSaver (Norway), OptiMarin, and Techcross. All seven systems are commercially available at this time. The seven systems all have at least one testing replicate, at either full-scale land-based or shipboard scale, that demonstrates compliance with the standards. Vessel owners/operators should closely scrutinize the available data, however, to ensure that systems will meet CA standards on a regular basis, given the varying vessel configurations and piping/water flow requirements. The field of ballast water treatment technology appears to be evolving rapidly. Within ten months of the release of the most recent report (Dobroski et al. 2009), the number of systems that presented data demonstrating the potential to meet CA performance standards more than tripled, rising from two to seven. A great increase in the available data on system performance is expected in the near future, particularly as systems are installed on operational vessels beginning January 1, 2010, for the initial implementation of CA performance standards. The next legislatively mandated technology assessment will be released July 1, 2010. (*Thanks to Nicole Dobroski. For more information, contact her at (916) 574-0742.*)

Another Salmon Escape. B.C.'s largest farm recently lost an estimated 40,000 adult fish through several holes in its net pens at its Port Elizabeth plant. The fish, almost five kilograms each on average, were healthy and close to their harvest weight, and represented more than a third of the population of the two pens. But it's just a small fraction of the 40,000 tons produced each year by the company. Marine Harvest has 18 million fish in its farms at any one time, about half of all farmed salmon in B.C. The escape strengthens the call for fish farms to switch to containment pens to prevent such

losses. The invasion of non-native salmon into the ecosystem can disturb the Pacific salmon's egg-laying sites and compete with them for food. The company believes the fish do not interbreed with natives. [*Ed comment: This issue has long been debated by many*]. The company supports a call for provincial and federal governments to fund research into a containment system for farmed fish. In the meantime....the fish are free for the taking! (*Excerpted from a Susan Lazaruk article in the Ottawa Citizen, October 24, 2009.*
Thanks to Kevin Aitkin)

Elsewhere Around the U.S.

Another Result of Hurricane Katrina? Giant tiger prawns (*Penaeus monodon*) first appeared in Louisiana waterways two years ago, and mature adults have been spotted near Lafitte, Grand Isle, Venice and in Vermilion Bay. They are used in aquaculture,



and first escaped from a facility in Bluffton, S.C., in 1988 but officials believe an additional release may have taken place from a facility in AL during Hurricanes Katrina and Rita. Officials warn native shrimp species could be infected with a variety of diseases if tiger prawns establish a population in LA waters. Local fishers and processors say that the tiger prawn threat shows why they've been opposed to aquaculture operations in the Gulf of Mexico. LA is already trying to contain another invader that arrived because of aquaculture -- tilapia that escaped in TX, FL and CA. (*Excerpted from an editorial in the Times-Picayune, October 26.*)

National Ballast Water Discharge Standards (Update). The October 15, 2009 Federal Register announced the extension of public comment and periods on the notice of proposed rulemaking and the Draft Programmatic Environmental Impact Statement for the U.S. Coast Guard rulemaking entitled "Standards for Living Organisms in Ships' Ballast Water" (DocketNo.USCG-2001-10486) to December 4, 2009. For questions on this proposed rulemaking, call or e-mail Mr. John Morris at 202-372-1433, or <John.C.Morris@uscg.mil>

Alabama vs. the Apple Snail. The first strike in the war against the giant Amazonian snails (*Pomacea canaliculosa*) that invaded Mobile, AL, Langan Park appeared successful. The plan involved killing all of the cattails and other emergent vegetation



in and around the pond to help reduce places the snails can lay their eggs, scraping all of the pink egg masses from the pond's banks, and in October, poisoning with copper sulfate. A week after officials spread copper sulfate in the pond and portions of Three Mile Creek, hundreds of empty snail shells were floating in the pond and lying on the bottom in the shallows. Alleviating previous fears, the copper sulfate seemed to attack only its intended victims, and ducks, other birds, turtles and fish did not appear to be affected. Prior to the poisoning, the snail's distinctive pink egg masses were present on every hard surface at the water's edge, from the dams to the cattails and cypress knees. After the treatment, only six or seven egg masses were seen, down from thousands upon thousands. Unlike similar native species, the snails have no natural predators here. But there is concern that the minor flooding associated with summer rains could be enough to wash young snails -- which often attach themselves to pieces of wood floating in the water -- all the way to the Mobile River. Because the pond and Three Mile Creek connect to the Mobile-Tensaw Delta, officials have placed a high priority on eradicating them before they spread further. (*Excerpted from Ben Raines, August 2 and October 14, articles in the Press-Register.*)

[http://blog.al.com/live/2009/10/kill_the_snails_epilogue_mobil.html]

December Epilogue: Andy Ford, a state biologist, says the snails adapted to attempts to wipe them out this year. When copper sulfate was placed in the water, many snails rose to the surface to avoid the poison, which sank to the bottom. Biologists also say that cold weather has not put the invading snails into a dormant state. But officials say that while they did not eradicate the snails, they did make a big impact in their numbers, and up to eight applications of copper sulfate are planned for next year. [http://www2.nbc13.com/vtm/news/local/article/snails_hang_on_in_mobile_despite_poison/117317/]. (Excerpt from Associated Press, December 21).

Ed comment: Apple snails are a big problem in Asia as well. See an informative ppt presentation, by Ravindra Joshi of the Philippine Rice Research Institute, at [<http://www.icaais.org/pdf/07abstracts/Joshi.pdf>].

Hull Fouling Solution? Fouling by marine life is a problem for ship owners, as vessels must be brought into dry dock every couple of years to remove organisms that cause drag as they accumulate on the ships' hull. It has been made worse by last year's banning of any antifouling paints based on tributyl tin, which is toxic to marine life. A new idea is

being tested by Rahul Ganguli of Teledyne Scientific, in Thousand Oaks, CA. Designing ships to exude slime from their hulls could cut their fuel consumption by up to 20 percent. The slime would form a gelatinous skin that continually sloughs off, taking barnacles and other marine life forms with it. Ganguli's solution is inspired by the skin of the long-finned pilot whale, *Globicephala melas*, that is criss-crossed with a network of nanoscale canals too small for any barnacle larvae to gain hold (*Marine Biology*, DOI: 10.1007/s00227-001-0710-8). The canals are filled with an enzyme gel that destroys proteins on the surface of bacteria and algae. Ganguli is now working on a way to make a ship's hull perform a similar self-cleaning trick. His idea is to cover the outer layer of a ship in a metal mesh, covering a regular pattern of holes that exude a sticky, bio-safe chemical that becomes more viscous on contact with seawater. As the secretion oozes out of the pores, it fills the gaps in the mesh and pools on top to form a viscous skin coating the entire hull. This skin steadily wears away, taking with it any life that has gained a foothold, and is replaced by new slime from below. Ganguli has tested the idea with two chemicals used on oil rigs. When the chemicals were squirted through holes under a mesh on a piece of a ship's hull, a smooth, slimy skin 700 micrometres thick formed on top. Tests of the system in tanks of seawater showed that after 11 days there was a 100-fold reduction in the number of *Pseudomonas carrageenovora* colonies that grew on a mock hull plate compared with the plain steel plate used as a control. (*P. carrageenovora* is one of the bacterial species known to form colonies on which larger fouling organisms, such as plants or barnacles, can grow.)

[<http://www.newscientist.com/article/mg20327275.800-slimyskinned-ships-to-slip-smoothly-through-the-seas.html>] (Excerpted from a September 26 article, in *New Scientist*, by Paul Marks (Thanks to Kevin Aitkin))

Great Lakes vs. the Asian Carp (Ongoing Saga)

Chicago Ship Canal Poisoned to Prevent Carp Invasion. In late September, water samples showed DNA evidence that Asian carp may have moved past the electric barrier in the Chicago Sanitary and Ship Canal, the last defense mechanism against the carp.



The carp are voracious predators that can grow to about 4 feet in length and weigh up to 100 pounds. They could destroy the Great Lakes' food chain from the bottom up, and wipe out sport and commercial fishing, which contribute more than \$7 billion to the economies in the bordering states. On December 2, the USEPA, USFWS, USCG and IDNR began using rotenone, which disrupts the fish's ability to metabolize oxygen, to kill carp in a several-mile stretch of the canal. A section of the waterway was poisoned to kill the carp so that the electronic barrier, which emits low-level voltage designed to keep the carp from getting past it, can undergo routine maintenance. The barrier itself is controversial, since it has taken several more years than planned to get it working, and it

has been operating below its maximum voltage. To be effective, it is imperative that the barrier be maintained at its maximum voltage once it is turned back on. The cost of poisoning the small section of the waterway was more than \$1.5 million, and poisoning is a drastic step because it will also kill other fish, but given the potential for complete devastation of the Great Lakes system, the cost and risks were deemed worth it. After about eight hours, crews used large cranes with nets to scoop up an estimated 200,000 pounds of dead fish that were disposed of in a landfill. (P.S. How many carps in the catch? One. The lone 22-pounder was among thousands of other fish poisoned.)

Various groups are now calling for the Army Corps of Engineers to close three locks on the waterways leading to Lake Michigan. A Sheboygan Press editorial says it well: "This would also be a good time to commit to finding a way to disconnect the Great Lakes from the Mississippi River basin by closing off the artificial connection of the Chicago Ship Canal. The risks to the Great Lakes are too great to not take these steps. To come back years later and say, 'we should have done more' would be a hollow response to calls for bold action today." (*Excerpted from a December 9 Jim Lynch article in the Detroit News, a December 2 editorial article in the Sheboyganpress.com, and from Carp Fear, on emagazine.com, December 8, By Jessica Rae Patton*)

The Latest: Closing the waterways to the Great Lakes? MN, OH, NY, MI, IN and the Province of Ontario have now begun a legal battle to close the IL carp-infested waterways from the Great Lakes. The lawsuit, filed by MI before the U.S. Supreme Court in December, raises the potential that the Chicago and O'Brien locks in downtown Chicago and south suburban Burnham might be ordered closed. This would have major repercussions in the Chicago area; hundreds of millions of dollars in freight and recreation in northeast IL would be rerouted or reorganized if the locks closed. But MI says it is suing to protect a more vital economic interest: a fishing industry on the lakes worth a reported \$7 billion annually. American Waterways Operators says closing the locks would disrupt shipments of jet fuel, coal, road salt and other products, but backers of the MI lawsuit, including the Alliance for the Great Lakes, downplay the impact, arguing much of the inland navigation would remain unchanged except for transfers at or near the locks. Still, new infrastructure would have to be built to transfer cargo. Barge traffic on the Chicago Sanitary and Ship Canal and its industrial tributary, the Cal-Sag Channel, is supposedly worth more than \$200 million a year. "We're hoping that we're not getting a knee-jerk reaction," said a Chicago barge operator. "It would affect us. It will be very complicated." (*Ed comment: That's an understatement!*) (*Excerpted from a Chicago tribune article by James Janega, December 29, 2009*)
[<http://www.chicagotribune.com/news/chi-canal-channel-future2dec29,0,3457531.story>]

GLRI Funding for Immediate Carp Control Measures. President Obama has made restoring the Great Lakes a national priority, and in February 2009, he proposed \$475 million for a Great Lakes Restoration Initiative (GLRI), which signed into law last October. The funding for immediate carp control measures would come from the initiative. The U.S. Army Corps of Engineers has identified more than \$13 million in funding needs for measures to deter Asian carp from moving closer to Lake Michigan. The majority of funding will be used to close conduits and shore up low-lying lands

between the Chicago Sanitary Ship Canal and adjacent waterways. Agencies remain concerned that during times of heavy rainfall, water, and therefore carp, can wash from adjacent waterways into the canal. Initiative funding will support work by the Corps to reduce the risk of invasion from these collateral access points. Some of the funding will also support more genetic testing to pinpoint where carp may be in the Chicago Area Waterway System. The agencies will continue to identify other mechanisms for keeping Asian carp out of the Great Lakes.

The announcement follows on the heels of a November 23 announcement that a portion of initiative funding will be available for grants to interested stakeholders. EPA, through the Great Lakes National Program Office, is seeking applications from a diverse group of participants and partnerships to support the goals of the GLRI, and invasive species controls are a priority under the initiative. \$120 million will be awarded for up to approximately 400 projects, and project periods are generally expected to range from one to three years. The RFP is online at [<http://epa.gov/greatlakes/fund/2010rfp01>], and deadline for submissions is noon, January 29, 2010. (*Excerpted from a December 14 press release; Thanks to Gus Rassam*)

Invasive Vines Assault East Coast Beaches. A fast-growing vine imported from Korea to stop massive erosion of sand dunes, is destroying dunes in the Carolinas and threatens to creep into beaches up and down the East Coast. Another deliberate introduction, the beach vitex (*Vitex rotundifolia*), a woody plant with waxy leaves and a pretty purple flower, was planted widely along the Carolina coast after Hurricane Hugo ravaged



beaches and dunes in 1989. Beach vitex was promoted because it thrives on nutrient-poor, sandy soils and grows rapidly. But there were unforeseen consequences. With an average growth rate of 60 feet a year, the vine can completely cover dune systems, and the vines and runners create a tight network that prevents sea turtle nesting. And, unlike the native sea oats and other grasses, beach vitex doesn't help dunes grow into a high barrier against storm surges. NC has now declared it a "noxious weed," banning it from being sold or planted, and crews across coastal North and South Carolina are now cutting the plants with machetes and dabbing them with herbicide. But eradication may be tougher than first thought. The Beach Vitex Task Force thought it was on the road to victory, but then isolated strands of the vine were found in GA, FL, and AL, and a biologist reported beach vitex in the Maryland side of Assateague Island National Seashore. The Task Force had not believed it could be that far north. Based on an evaluation of the plant's native range, along the Pacific Rim, it is now thought beach vitex

might take root as far north as RI, and now the task force will have to send advisories as far as southern New England. Some believe the plant's seeds are transported by ocean currents, and others believe migratory birds are behind the propagation. (*Excerpted from a USA Today article, by Oren Dorell, October 15.*)

[http://www.usatoday.com/news/nation/environment/2009-10-15-beachvine_N.htm]

New Insight on an Old Lampricide. Canadian researchers have new insight on a pesticide that has kept lampreys in check for 60 years, and that could help fishery managers kill more lampreys with less money and less poison in Great Lakes streams. Lampreys crippled Great Lakes white fish and lake trout fisheries in the 1930s and 1940s, but the Great Lakes Fishery Commission now spends millions of dollars a year keeping the numbers down. The program's main weapon is TFM, a pesticide used since 1958, that is applied to 250 streams around the Great Lakes. Although TFM is relatively harmless to fish other than lamprey, it sometimes kills other aquatic organisms like insects and amphibians. The Barre-Montpelier Times Argus, a Vermont newspaper, reported that a TFM treatment in October killed hundreds of salamanders. Insect populations always recover after the pesticide breaks down. TFM is credited with reducing the lamprey population by 90 percent. It's clear that it works. What is less clear is exactly how it works. Scientists have suspected that the pesticide keeps lamprey from producing ATP. But the only proof that the lampricide cuts off the supply of this



A stream gets a dose of TFM. Photo: NY DEC

critical cellular molecule came from experiments done on rats. A recently published study by Wilkie et al., published in the journal *Aquatic Toxicology*, shows that lamprey larvae exposed to TFM can't produce ATP as easily as TFM-free lampreys. A clearer picture of exactly how TFM kills lamprey may lead to Great Lakes managers killing more larvae with less chemical, resulting in both economic and environmental benefits. In 2008, the Fishery Commission spent \$3.7 million on TFM. Less pesticide in the water is a good thing. (*Excerpted from "New insight on old pesticide spells trouble for the Great Lakes' invasive sea lamprey", By Jeff Gillies, in Great Lakes Echo, Oct. 22.*)

WI Ballast Water Standards. Beginning February 10, the Wisconsin Department of Natural Resources will require all ships coming into state ports to get a state-issued permit showing they are not carrying invasive species in their ballast water. DNR Secretary Matt Frank said Thursday that the federal government's rules protecting the Great Lakes have been "grossly insufficient. We can't afford to wait any longer for the federal government to turn off the tap." The DNR said its standards will be 100 times

more restrictive than the level set by the International Maritime Organization. Standards include handling of ballast tank sediment and seawater. The permit will require large commercial ships to take basic steps immediately to reduce the risk of spreading the invasive species. Current laws permit ballast water discharges outside the ports. "Under the DNR regulations, new oceangoing ships will have until 2012 to meet specific ballast water treatment standards. Existing ships will have until 2014 to retrofit to meet the standards." (*Excerpted from 'Oceangoing vessels face tougher rules', by Tony Walter, in the Green Bay Press Gazette, November 20.*) Also see [<http://www.maritime-executive.com/article/2009-11-23-wisconsin-dnr-announces-start-state-ballast-water-regulation-great-lakes-ships/>]

Greek Shipping Company First to Be Prosecuted for Violating NANPCA.

Polembros Shipping LTD, a ship management company headquartered in Greece, pleaded guilty in New Orleans federal court for violating anti-pollution laws, ship safety laws, and making false statements during a U.S. Coast Guard investigation of the M/V Theotokos. Charles Posas, the vessel's chief officer, pleaded guilty to one count of false statement and one count of violating the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) (for failing to maintain accurate ballast water records). This case is historic in that it is the first prosecution under NANPCA" The company's fleet of 20 ships has been barred from trading in US waters for three years, and agreed to a \$2.7m fine. The guilty plea carries with it a requirement, pending court review, that will prevent the company from participating in economic activity that takes place in territorial ports and waterways of the United States. (*From protect your waters.net, October 01, 2009*) For the whole article,, go to [<http://www.justice.gov/opa/pr/2009/July/09-enrd-685.html>]

Kudzu-Eating Pest? A kudzu-eating pest, never before seen in the Western Hemisphere, has arrived in northeast Georgia, but it may be a mixed blessing.



It's now been spotted in 9 counties. Native to India and China, it likely arrived on a plant, and it doesn't appear to have any natural enemies here. Commonly called the lablab bug or globular stink bug, it's pea-sized and brownish with a wide posterior and waddles when it walks and releases a stinky chemical when threatened. "At one home in Hoschton, we found the bugs all over the side of a lady's house," said Dan Suiter, a UGA entomologist. "There is a kudzu patch behind her home that provides food, and they were attracted to the light color of the siding." The bug hibernates on the south and west walls of homes, where they sit for the entire winter before coming out on a real warm day. The bug's long-term impact on kudzu is unclear. While it eats kudzu, it also eats soybeans and other legume crops, and stinks and gets on homes. Extension agents and pest control

companies have been notified about the bug, and homeowners who find it should call 1-800-ASK-UGA1.

Kudzu was introduced to the U.S. in 1876 as a Japanese ornamental plant. Soon Southern gardeners began planting the vine as protective ground cover and decorative foliage in gardens. In the 1930s and 1940s, the Civilian Conservation Corps planted it extensively to control soil erosion. But by 1953, the USDA termed it a weed, and it now tops the nation's invasive species list. (*Excerpted from a Larry Hartstein article in the Atlanta Journal-Constitution [http://www.ajc.com/news/kudzu-eating-pest-too-195254.html], November 12*)

White-Nose Syndrome Endangers Bat Species. Federal wildlife officials now consider the die-off of bats in Connecticut and other Northeastern states to be "the most precipitous decline of North American wildlife caused by infectious disease in recorded history." Since 2006, when hibernating bats in a cave west of Albany, NY, were found coated with a chalky fungus, the so-called "white-nose syndrome", now identified as *Geomyces destructans*, has jumped from NH to WV, sometimes decimating entire caves in a single winter. The white fungus covers the heads, legs and wings of hibernating bats, causing them to interrupt their sleep, wake up and attempt to scratch off the fungus. This depletes their fat reserves, and hungry because of this interruption, the emaciated bats then leave their caves too early, before insects hatch, only to die in large numbers in fields and on snowy lawns. Surveys have confirmed that many common species of bats are experiencing more than a 90 percent mortality rate. Finding a solution before the die-off reaches the huge bat habitats of TN and KY is considered vital. In CT, bats are dying off in such massive numbers that state and federal wildlife agencies might have to consider listing some species as endangered. In other states, where species such as the Indiana bat and the Virginia big-eared bat are already endangered, captive breeding programs may have to be started. Studies are underway to determine whether it is the same fungus often found in European caves, but until the fungus is fully identified and scientists devise a way to combat it, they are forced to rely on stopgap measures. This fall, Wisconsin bats not affected by the syndrome were introduced to NY and VT caves to learn more about the transmission of the fungus. In other caves, video cameras have been placed to record bat movements during hibernation. And, over the winter, state and federal teams working to save the bats will review all of their population counts to see whether emergency steps to list species as endangered are appropriate. (*Excerpted from an article by Rinker Buck in the Hartford Courant, December 21.*)

Elsewhere Around The World

Britain, Climate Change, and Invasive Species. A Copenhagen climate conference concluded invasive species 'will take over in a warmer Britain'. Lord Smith, Chairman of the Environment Agency, said one fifth of insects in rivers could die out, causing further loss of wildlife up the food chain, including migratory birds and mammals like the otter. Invasive species that thrive in a warmer environment would also push out native species. African clawed toads, South American water primrose, and Japanese knotweed have already taken hold in many parts of the UK. Iconic fish species such as Atlantic salmon

and trout, which need cold water to thrive, may struggle to survive. Lord Smith called on world leaders meeting in Copenhagen to reach a deal that limits temperature rise to 2C (3.6F) or less to save Britain's wildlife. "There is a danger that we think of climate change as something that is happening in other countries. But it's not just polar bears and rainforests that are at risk," he said. "What we see in our rivers, gardens, seas and skies here in the UK is already changing, and delays in reducing harmful green house gas emissions will lead to more severe impacts." Professor Steve Ormerod, of Cardiff University School of Biosciences, said there is already evidence of rising temperatures affecting wildlife. He said native fish and plants are in danger from invasive species, increased salinity from floods and droughts. "Rivers and streams, particularly in the cooler uplands of Britain, are extremely sensitive to climate change because rising temperature and altered rainfall affect them directly. Our own studies in Welsh streams show that temperatures have risen by almost two degrees over the last 25 years and these changes appear to have affected river insects, whose numbers have fallen by around 20 percent for every one degree rise." (*Excerpted from a Telegraph.co.uk article by Louise Gray, December 14.*)

New UK Invasives Website. Check out this new website, at [<http://138.253.199.114/IAAP%20Web/IAAPwebsite/index.asp>]. (*Thanks to Kevin Aitkin*)

International Congress on Biological Invasions The inaugural meeting of the International Congress on Biological Invasions (ICBI) was held in November in Fuzhou, China, with the aim to "strengthen international collaboration and work together towards managing biological invasions under global change." Invasive alien species are comprehensively addressed under Article 8h of the Convention on Biological Diversity (CBD), and the ICBI meeting was an important contribution to the CBD process. Key outcomes of the 2009 congress included a call to governments, international organizations and conventions to reaffirm their commitment to CBD Article 8h, and provide the necessary resources to address this global threat; establishment of an International Expert Committee to provide scientific, technical and policy guidance to the ICBI on the development of an ICBI website; e-newsletter and a forum for the exchange of scientific ideas and capacity building; and agreement that the ICBI be held on a regular basis (4-year intervals) in the future. Invasive species are estimated to cause \$1.4 trillion of losses a year globally, and the United Nations has also declared 2010 as the International Year of Biodiversity. (*Excerpted from [http://www.gmpromagazine.com/invasive_species_cause_over_a_trillion_in_annual_losses.aspx] 12/23/2009*).

Scotland Catches a Million American Crayfish. The signal crayfish was introduced to waters in England and Wales through fish farms about 20 years ago. In Scotland, they were first recorded in the catchment of the River Dee in Kirkcudbrightshire in 1995. Since then, specimens have been found in Scottish ponds, rivers and lochs as far north as Inverness-shire. A pilot project at Loch Ken in Dumfries and Galloway was part of the research into the impact the non-native species was having on marine life. From summer to its end in October, over 1 million crayfish were caught. The signal crayfish has been



blamed for eating young fish and destroying their habitat. A business case is now being prepared to seek further funding to undertake a three-year study in the loch, which will involve more trapping. However, the Scottish Environment Protection Agency feels it is unlikely that all the crayfish can be removed by trapping. The long-term focus will be on reducing their numbers to a manageable level. (*Excerpted from BBC News, December 24*) [http://news.bbc.co.uk/2/hi/uk_news/scotland/south_of_scotland/8426824.stm]

Australia Uses Dogs Against Ants. Labradors have a keen sense of smell that officials hope may help Far North Queensland win the war against electric ants. For eight months, Ofira, a dog from Brisbane, has been trained in the fine art of detecting the invasive ant species. So far she has been able to find as few as 10 ants in a vial hidden several meters away. Biosecurity Queensland officers are confident that with more training Ofira will be able to locate ant infestations outside of Cairns' restricted suburbs of Smithfield, Kewarra Beach, Caravonica and Trinity Beach. The electric ant, which poses significant environmental risks and has the potential to cause blindness in pets, was first found at 17 homes in Smithfield in 2006. Because dogs have proven to be extremely successful in the detection of fire ants in Brisbane, eradication coordinator Charlotte Greer has every confidence that this will have the same level of success. (*Excerpted from Cairns Post, November 30.*) [http://www.cairns.com.au/article/2009/11/30/79075_local-news.html]

Another Vector: Oil Rigs. Marine transport has long been a recognized vector for exotic species invasions, but relatively little attention has been given to the transport of semi-submersible rigs used for oil drilling. A case study from the remote island of Tristan de Cunha of the South Atlantic shows that when these rigs are being hauled, they can carry virtually intact reef communities with them from one place to another. On one rig, "scientists identified a total of 62 non-native taxa including corals, barnacles, sponges, crustaceans, and the first records of free-swimming marine finfish populations becoming established after unintentional movement." Ultimately the rig was salvaged and disposed at a cost of \$20 million. This problem could have been avoided at much less cost to the insurance company that had to foot the bill. The authors recommend that as a basic precaution to prevent (or minimize) the spread of invasive alien species associated with the movement of rigs, encrusting/biofouling organisms should be physically removed or otherwise killed (e.g. by prolonged immersion in freshwater or exposure to air) immediately prior to towing, and that this be made standard practice for all pre-towing contracts. (see Wanless, R. et al., 2009. *Semi-submersible rigs: a vector transporting entire marine communities around the world*, in *Biological Invasions* DOI: 10.1007/s10530-009-9666-2) (*Excerpted from Conservation Maven Research briefs December 10, 2009.*) [<http://www.conservationmaven.com/frontpage/2009/12/9/ocean-rigs-as-vectors-for-entire-communities-of-invasive-spe.html>)

Puerto Rico Residents Win Legal Victory in Monkey Farm Fight. A Superior Court judge has halted construction of a primate-breeding facility in the Puerto Rican town of Guayama. The decision is the latest development in a lawsuit filed against Bioculture, Ltd., by Puerto Rico residents who say the company has not submitted a full environmental impact statement or held public hearings. Judge Escudero's ruling, which cites irregularities in the permitting process, follows a report from the Puerto Rico Senate that found strong evidence that Bioculture supplied misleading and contradictory information to obtain permits for the project. The proposed facility could pose serious risks to public health and the environment. Monkeys are likely to escape from Bioculture's Guayama facility. Such escapes could result in the establishment of another invasive species in Puerto Rico, adding to the serious problems already caused by patas monkeys and rhesus monkeys who also invaded the island by escaping from research facilities. *Ed Comment: Kudos to Puerto Rico for being proactive on a possible invasive species!* For a copy of the judge's order in Spanish, or to schedule an interview with Dr. Durham, contact Jeanne McVey at 202-686-2210 ext. 316, or <jeannem@pcrm.org>.

Grants, New Materials and Resources

Graduate Fellowships in Population Dynamics and Marine Resource Economics.

The California Sea Grant College Program is now seeking applications for the 2010 National Marine Fisheries Service - Sea Grant Joint Graduate Fellowship Programs in Population Dynamics and Marine Resource Economics. The award for each fellowship, contingent upon the availability of federal funds, will be a grant or cooperative agreement of \$38,500 per year. The deadline is January 12, 2010. Formal announcements of the RFPs have been published in the Federal Register. Complete funding information and application are available at:

[www.csgc.ucsd.edu/EDUCATION/NMFS_PD/PopDynam_current.html]

Grants For Volunteer Projects. Washington Department of Fish and Wildlife (WDFW) is accepting grant applications from individuals and groups seeking financial support for volunteer projects that benefit fish and wildlife. The one-year grants will provide cost reimbursement for volunteer-driven projects occurring between July 1, 2010 and June 30, 2011. Projects should protect and enhance fish and wildlife and their habitats, improve access to the outdoors, collect and disseminate fish and wildlife science, and/or educate the public about resource conservation. Eligible applicants include individual citizens, non-profit organizations, state organizations such as public utility districts, schools and universities, and tribal governments. Total funding available is approximately \$180,000. Applications must be received by Feb. 28, 2010. Application materials are available on WDFW's website at [<http://wdfw.wa.gov/grants/alea/>]. A CD containing application materials is available by calling (360) 902-2700. (*Excerpted from a November 30 news release.*)

Journal Issue: Perspectives in the Management of Invasive Species. The Journal of Applied Ecology has just published a Virtual Issue of papers on "Key Perspectives in the Management of Biological Invasions", in honor of the International Congress on

Biological Invasions, being held in Fuzhou, China. The papers, which are all free to access online, are the most highly cited papers on this topic published by the Journal of Applied Ecology over the last five years. “A key strategic aim of the journal is to increase both the authorship and readership of the journal from China, and we hope the Congress will act as a catalyst for excellent applied research and look forward in publishing the best research from China in the pages of our journal.” This issue is online at [<http://www.journalofappliedecology.org/view/0/virtualissueoct09.html>] (*Thanks to Philip Hulme, posted on Aliens listserv.*)

[*Ed Comment*: The Aliens listserv often has interesting comments and discussion, but be warned- it can swamp your inbox! But if you want to join in, contact the list owners: <aliens-l-owner@indaba.iucn.org>]

New Equipment Inspection and Cleaning Manual. The Bureau of Reclamation has developed a new publication, *Equipment Inspection and Cleaning Manual to Prevent the Spread of Invasive Species*. It can be downloaded from their website at [http://www.usbr.gov/pps/EquipmentInspectionandCleaningManual_Sept09.pdf] (*Thanks to Linda Lyon.*)

Web Seminars on Inventory and Survey Methods for Invasive Plants. Six FREE interactive web seminars on inventory and survey methods for invasive plants are offered by the Center for Invasive Plant Management (CIPM) during January and February 2010. There is no fee for the seminars, but advanced registration is required. Participants will be provided with reading materials in advance of each seminar. To learn more and to register: [<http://www.weedcenter.org/outreach/project-webseminar.html>].

New Article: Dam Decommissioning and Exotic Species. Flow diversion and invasive species are two major threats to freshwater ecosystems that restoration efforts attempt to redress. Yet, few restoration projects monitor whether removal of these threats improves the target characteristics of the ecosystem. A new article by Jane C. Marks, George A. Haden, Matthew O'Neill and Cinnamon Pace, *Effects of Flow Restoration and Exotic Species Removal on Recovery of Native Fish: Lessons from a Dam Decommissioning*, is expected in Restoration Ecology. Authors used a dam decommissioning in Fossil Creek, Arizona, to compare responses of native fish to exotic fish removal and flow restoration, using a before-and-after-control-impact design with three impact treatments: flow restoration alone where exotics had not been present, flow restoration and exotic fish removal, and flow restoration where exotics remain, and a control reach that was unaffected by restoration actions. Removal of exotic fish dramatically increased native fish abundance. Flow restoration also increased native fish abundance, but the effect was smaller than that from removing exotics. Flow restoration had no effect where exotic fish remained, although it may have had other benefits to the ecosystem. The cost to restore flow (\$12 million) was considerably higher than that to eradicate exotics (\$1.1 million). In the 2-year period considered, the return on investment for extirpating exotics far exceeded that from flow restoration. Projects aimed to restore native fish by restoring flow should also consider the additional investment required to eradicate exotic fish. DOI: 10.1111/j.1526-100X.2009.00574.x (The article may still be ahead of print.) But

you can contact the author at <Jane.Marks@nau.edu> and see the paper at:
[http://pubget.com/paper/pgtmp_48b3905450888440f743512dc2911174?title=Effects+of+Flow+Restoration+and+Exotic+Species+Removal+on+Recovery+of+Native+Fish%3A+Lessons+from+a+Dam+Decommissioning]

Red Swamp Crayfish. WI DNR has two videos on local red swamp crayfish eradication, as well as fact sheets and other information. See them at:
[<http://dnr.wi.gov/invasives/>]

Revised Manual - Best Management Practices for Aquatic Weeds. The Aquatic Ecosystem Restoration Foundation (AERF) recently completed an update to their Best Management Practices for Invasive Aquatic Weeds. The new edition is titled "Biology and Control of Aquatic Plants - A Best Management Practices Handbook". You can download a free pdf copy at the AERF website: [<http://www.aquatics.org/bmp.htm>]
(Thanks to Linda Lyon)

Emerald Ash Borer (EAB) University. The US Forest Service, Purdue University, Michigan State and Ohio State, are sponsoring a free series of Webinars that let you learn about EAB from the convenience of your own computer. Some of them are already completed, but a number are still in the future. Topics include: Introduction to EAB (Nov. 5, 2009); EAB 101: The History of EAB and Basic Information (Nov. 12, 2009); Pesticides and Biocontrol to manage EAB (Dec. 3, 2009); EAB Research Updates (Parts 1 and 2) the latest from researchers Part 1 ([Jan. 7, 2010](#)), Part 2 ([Jan 14, 2010](#)); Utilization of Ash in the Wake of EAB (Feb. 4, 2009); Management of Woodlots to prepare for EAB ([Feb. 11, 2010](#)); Regulatory Issues about EAB ([March 4, 2010](#)); Helping Communities Prepare for and Live with EAB (March 8, 2010); What Happens After Ash is Gone? ([April 1, 2010](#)); 2010 EAB Awareness Week. Ways to Get the Word Out ([April 8, 2010](#)). Register at [www.emeraldashborer.info]. For more information contact Robin Osborne, (517) 432-1555 x 169, Amy Stone (419) 575-6783, or Jodie Ellis (765) 494-0822. (Thanks to Linda Lyon)

Major Upcoming (Invasive) Meetings

January 10-14, 2010. U.S. National Invasive Species Awareness Week. For more info on events, go to [<http://www.nisaw.org/>].

January 12-14, 2010. North American Environmental Field Conference and Exposition, Tampa, FL. For more info, go to [<http://www.envirofieldconference.com/>].

February 8-12, 2010. Island Invasives: Eradication and Management, University of Auckland, New Zealand. [<http://www.cbb.org.nz/conferences.asp>].

February 10, 2010. 100th Meridian Initiative: Columbia River Basin Team, Heathman Lodge, Vancouver, WA. Contact Stephen Phillips <stephen_phillips@psmfc.org>.

February 24-25, 2010. Forest Health Conference. Forest Health in Oregon: State of the State, Oregon State University. Contact David Shaw, (541)737-2845, or <dave.shaw@oregonstate.edu>.

March 28-31, 2010. Western Aquatic Plant Management Society. Annual meeting, Seattle, Washington. Registration free to students. A call for papers and registration information is available at [http://www.wapms.org/wapms_conference.htm].

April 27-29, 2010. International Invasive Ant Management Workshop, Darwin, Australia. Details of the workshop can be found at: [<http://www.terc.csiro.au/iiamw/>].

May 5-6, 2010. Aquatic Nuisance Species Task Force. Portland, Maine. [<http://www.anstaskforce.gov/default.php>].

August 29- September 2, 2010. 17th International Conference on Aquatic Invasive Species, San Diego, CA, [<http://www.icaais.org/>].

September 14-17, 2010. 6th European Conference on Biological Invasions NEOBiota, Copenhagen, Denmark. The conference homepage is [<http://cis.danbif.dk/neobiota2010>].

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Aquatic Invasive Species News In A Nutshell: Published by the Pacific States Marine Fisheries Commission, 205 SE Spokane Street, Suite 100, Portland, Oregon 97202 phone (503) 595-3100 fax (503) 595-3232. <http://www.psmfc.org/>. Executive Editor: Joan Cabreza (Consultant to the PSMFC), email <joancabreza@msn.com>. Managing Editor: Stephen Phillips, ANS Program Manager, Pacific States Marine Fisheries Commission, email <Stephen_phillips@psmfc.org>