ISSUE 25 ***May-July 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 1-24, go to* [http://www.aquaticnuisance.org/newsletters]. To subscribe or unsubscribe from this newsletter please email <joancabreza@msn.com>.

Quotes To Ponder: (re) Wildlife Trade

"Over half a million shipments of wildlife containing >1.48 billion live animals have been imported by the United States since 2000…"

-and-

"Despite mandated labeling of imported animals to species (50 Code of Federal Regulations 14), the majority of shipment records did not contain the appropriate level of taxonomic information, and almost one-third of imported shipments were identified [only] with commonly used labels such as 'marine fish,' 'live invertebrate,' or 'non-CITES' (i.e., not subject to the Convention on International Trade in Endangered Species of Wild Fauna and Flora)."

- From: *Reducing the risks of wildlife trade*, by Katherine F. Smith et al. (Policy Forum, Science Vol. 324, May 1 2009, [www.sciencemag.org])

This Quarter's Unusual News

(Invasives continue to make the news in more ways than just environmental impact.)

Nutria vs. Wal-Mart. A Wal-Mart shopper in Abbeville, LA, was in the grocery aisle on October 11, with a basket full of food when suddenly a large nutria (Myocastor coypus) came from behind the Coke rack and ran straight towards her. She pulled the shopping cart towards her for protection, and as she did, the cart rolled over her left foot causing her to stumble and suffer an injury.

Wal-Mart employees that came to assist her told her that, "she had an encounter with Norman", a name the employees had given the nutria. In true American fashion, she is now suing Wal-Mart for negligence, pain and suffering, mental anguish etc., etc., because Wal-Mart did not: warn her of the nutria prior to her entering the store; take steps to protect her from the nutria; warn her that she is shopping at her own risk because there is a wild animal loose in the store; and did not attempt to capture the nutria. *(Excerpted from a Chris Rosa article, April 30, in <Abbevillenow.com>; thanks to Aquatic Hitchhikers)*

Florida Python Tragedy. On July 1, a 2-year-old girl from Oxford, FL was found asphyxiated by an eight foot Burmese python. The snake escaped its terrarium in the middle of the night and was found the next morning lying on her lifeless body. The snake is being "rehabilitated" [whatever that means] at a wildlife center. It will be needed as evidence, and then will be donated to a wildlife center *(Excerpted from: Python tragedy puts face on a trend, by Ed Killer, in the TC Palm. [http://www.tcpalm.com/news/2009/jul/05/python-tragedy-puts-face-on-a-trend/])*

On July 14, Sen. Bill Nelson requested Interior Secretary Ken Salazar to approve supervised hunts of thousands of pythons believed to be living in the Everglades by U.S. Park Service staff, other authorities and volunteers to kill the pythons en masse. Burmese pythons were first found in the FL wild in the 1980s, and are now well established. Nelson has estimated 100,000 pythons are living in the Everglades, the result at least in part to owners releasing their pets into the wild when they grow too big to keep. U.S. Rep. Tom Rooney has introduced legislation to allow python hunts in the Everglades. *(Excerpted from: Hunts sought to kill pythons in Fla. Everglades, by Matt Sedensky, AP July 14)*

Lights At The End Of The Tunnel?

Fighting Fire Ants With Phorids. Fire ants (*Solenopsis spp.)* are widely hated, because they bite people's feet, kill infant birds, short out electrical units, and out-compete native ant species. They first emigrated from Argentina to Mobile, Alabama, in the early 1930s, probably on an agricultural-produce boat. They began moving  through Texas around 1950. But a decades-long battle against invasive fire ants in the southern U.S. might be

turning a corner, thanks to a small Phorid fly. Plentiful in fire ants' South American home ranges, phorid fly females inject their eggs into the fire ants. The egg develops into a maggot, which appears to control the ant's behavior by "directing" the ant to a moist, leafy place (phorid larvae are vulnerable to drying out). The larva then eats the ant's brains, causes the ant's head to fall off, and finally "hatches" from the ant's hollowed-out head about 40 days later. "Not only is it decapitating it, but it turns the ant into a zombie," said Sanford Porter, a research entomologist with the USDA Agricultural Research Service. Though one phorid species didn't take hold, two others have expanded to cover almost half the U.S. fire ant range and will probably make it the rest of the way in the next several years. The TX Agricultural Extension released the foraging-ant-attacking species, *Pseudacteon obtusus,* last year in southern TX, though the species failed to spread. This year researchers will release *P. obtusus* in two new locations—one near previously released species in southern TX so that, hopefully, the different species' ranges will one day overlap, resulting in a multipronged attack on the ants. The second set is headed to eastern TX, where no other phorid flies have yet been released. Eastern TX is moister than southern TX, hopefully making the east more conducive to phorid survival. Besides the phorid flies, several labs are also working to develop fire ant-fighting fungi and viruses—perhaps to be delivered via phorid fly eggs. *(Excerpted from May 15, 2009 National Geographic News, http://news.nationalgeographic.com/news/2009/05/090515-zombie-ants-flies.html)*

Rat Island, Alaska (Update). Last year, in an intensive rat eradication effort, rats were poisoned in hope that many bird species would re-establish on the island in AK's Aleutian Chain. The USFWS now says that two weeks of intensive field monitoring showed no sign of invasive rats on the island. Monitoring also showed that several bird species, including peregrine falcons and black oystercatchers, are now nesting on the island. Scientists did find numerous carcasses of glaucous-winged gulls and bald eagles that appear to have died in recent months, but the cause of the deaths of the birds is not known. Tests are being conducted. For further information go to http://www.seabirdrestoration.org/. (*Thanks to Stephen Phillips*).

NY Declares Success With Ludwigia Representatives of government and environmental groups announced the "successful eradication" of water primrose (*Ludwigia peploides)*, an invasive South American plant that was choking off fish habitats in the Peconic River, NY. The movement to remove the plant from the river was launched in 2006. The plants began appearing in the river in 2003 and one theory traces its origin to its use as an ornamental in landscaped ponds. Officials credited not only inter-agency cooperation and grant money, but also 350 volunteers and 1,500 man-hours in the triumphant, three-year-long effort to clear Long Island's longest river. Although the spread  of *Ludwigia* is currently contained, maintenance harvesting events still are necessary throughout the river to prevent its return, DEC officials emphasized. Five signs with pictures that outline the ongoing battle against the aquatic plant are placed at access points to the river, explaining how swimmers, kayakers and anglers can identify and remove the weed. "We've really knocked the weed back so that it's just a

sprig here and a sprig there, but if those sprigs are left, it will come back," said DEC fisheries manager Charles Guthries, explaining the idea behind the signs. They hope the signs will recruit users of the river to help pull the weed whenever they see it. Two "weed pulls" were also scheduled for July 11 and August 8. *(Excerpted from Victory is declared in fight against invasive water plant, by Michael White, Riverhead News-Review July 2, 2009 [http://www2.timesreview.com/NR/stories/R070209_Invade_mw])*

Asian Carp Decreasing? Asian carp dramatically expanded in the Missouri River after the 1993 floods. Duane Chapman, a research fisheries biologist at the USGS Columbia Environmental Research Center, said this year's silver carp (*Hypophthalmichthys molitrix)* population is starving, since the Missouri River is unable to sustain such a large number, and they may face a die-off (i.e., a drop in numbers) sometime this year. Asian bighead carp have been decreasing in number since 2005. Chapman said the starvation of Asian carp has appeared in the Center's research and observations; the silver carp are much thinner this year, and lab studies indicate that spawning may be affected because the fish gametes can't produce good eggs. Chapman predicts the Asian carp will have trouble reproducing in the river, hopefully leading to fewer baby silver carp next year and a smaller population. Chapman hopes the carp decline enough to help preserve the native species that they compete with for food, which research has shown is already scarce. Even though researchers predict that a die-off is likely, it may not be obvious, as the Missouri River water flows rapidly, and many dead fish may just float on down the river. In the end, Asian carp can't remain in this poor condition for much longer, and any decrease in numbers should be good for the river. *(Excerpt from a Missourian article by Amber Wade, June 7. Asian Carp facing starvation, reproductive problems. [http://www.columbiamissourian.com/stories/2009/06/07/asian-carp-facing-starvation-and-reproductive-problems/])*

Zebra Mussel Invasion Update

In addition to infestations in many areas of the East and Midwest, in the Western U.S., zebra and/or quagga mussels are currently known to infest waterbodies in Nevada, Colorado, California, Arizona and Utah.

Pilot Pseudomonas Project. An eco-friendly bacterium that kills invasive mussels will be tested for the first time in Canada at the Decew Falls hydro plant. Ontario Power Generation will monitor the specialized microbe's ability to kill zebra and quagga mussels. Normally, the power producer uses up to 20,000 liters of chlorine annually to control the mussels at its Niagara

generators. Chlorine kills mussels, but can also poison fish, plants and other aquatic life. But if the bacteria work, they could stop using chlorine completely. The bacteria are introduced into the water as a food source, and filtered out by the mussels, which then die. "It has worked incredibly well in smaller-scale tests so far", said Daniel Molloy, a scientist with the NY State Museum who discovered the potential of *Pseudomonas fluorescens.* "We tested the bacteria in many small-scale trials and it kills zebra and quagga mussels, but even more importantly, no other aquatic organism died. This is extraordinary." Molloy has teamed up with a CA company, Marrone Bio Innovations, to market the bacteria as a product. This is not only the first Canadian trial for the bacterium, but the first worldwide trial on this scale. They plan to have a full-scale test of the bacteria running by August. Ontario's Ministry of the Environment has approved the one-year pilot project, which could ultimately make the product legally available to other industries. *(Excerpted from Microbes may be answer to invasive mussels, by Mathew Van Dongen, The Standard, [http://www.stcatharinesstandard.ca/ArticleDisplay.aspx?e=1627276])*

First Zebra Mussels Invade Massachusetts. In late June, zebra mussels were discovered in Laurel Lake, MA. A beach worker discovered the thumbnail-sized zebra mussel on a beer can that washed up on shore. They don't know how the mussel got into the lake, but speculate it may have hitchhiked on a boat that had been in an infested waterway. The state Department of Conservation and Recreation has confirmed this as the first documented zebra mussel infestation in the state. Public Works has placed barriers at the boat ramp, and officials are now racing to assess whether the mussels have already reached other waters in the Berkshires. Officials from two more Berkshire County communities have taken steps to prevent the spread of zebra mussels, closing the boat ramp at the Stockbridge Bowl. And the Town of Hinsdale has closed the boat ramp at Plunkett Reservoir and is requesting that the state prohibit all boats from using Ashmere Lake. Boaters can stop their spread by disinfecting and drying boats before entering another waterway. *(From various sources)*

Zebra Mussels Invade Maryland. Eight shells indicate the arrival of zebra mussels in MD waters. They were apparently transported on a trailered recreational fishing boat launched into the Susquehanna River. Whether that handful can get into the Chesapeake may be a multibillion-dollar question. On Lake Erie, which is among 100 lakes infested by zebra mussels, the Monroe Power Plant spent more than $500,000 to clear the pipes and $50 million more for repairs and pipe replacement. Mussels have caused an estimated $5 billion in damage to the Great Lakes as a whole. (*From Ashley Halsey III article, AP release May 23.)*

A New Vector Identified. On May 26, the CA Yermo Border Protection Station issued a quarantine notice to an individual who was transporting items inside his boat and truck that were covered in quagga mussels. The boat originated at Lake Mead, NV, and was destined for Alta Loma, CA. There were no mussels found on the outside of the boat, but inside the boat and truck there were 4 anchors, a pole spear, a small prop, bottles and cans, and a boat propeller, all heavily infested with mussels. The individual collected the mussel-covered items he found in Lake Mead because he thought they looked interesting, and he wanted to place them in his garden. The items are now under quarantine at DFG's Ontario Regional Office in Ontario, CA. (*Thanks to Dominique Norton*)

New Monitoring Technology Helps Stop Aquatic Invasions. Although the Gull Chain (MN) of Lakes has remained free of zebra mussels and Eurasian water-milfoil, these species are

established in many Great Lakes states, and once established, treatment options are very expensive and of limited effectiveness. So the Gull Chain of Lakes Association in MN has installed three new devices, called Internet Landing Installed Device Sensors (I-LIDS), at major Gull Lake boat accesses to increase the level of protection against introduction of invasive species. The devices use cameras to monitor and record each boat launch during all daylight hours all season long. Developed by Environmental Sentry Protection [www.environmentalsentry.com] in Plymouth, MN, the I-LIDS enclose video cameras, motion detectors and solar panels in stainless steel enclosures. When approaching vehicles are detected, the camera turns on to record short videos of boat license numbers, and show whether or not plants can be spotted on the trailer or boat motor. This video is then transmitted wirelessly to a nearby high speed data access point, and then to a central monitoring area at Environmental Sentry Protection headquarters. The devices have been shown to be very effective on other lakes in creating an environment where boat owners become more aware of the possibility of invasive species transmission and more responsible about cleaning their boats and trailers before launching. New signs explaining the functioning of the video devices will also be installed. Data on Lake Minnetonka showed that introduction of I-LIDS reduced the number of boats launching weeds from 7.4% to 0.3%. *(From May 26 Northland Press [http://www.northlandpress.com/BDgullchaincameras52609.html)*

Efficacy Of Watercraft Decontamination. A newly published paper provides timely information relevant to the efficacy of watercraft decontamination protocols, and also raises additional research questions that need to be addressed. Excerpted Abstract: The Dreissenid mussel (*Dreissena polymorpha, Dreissena rostriformis bugensis*) expansion into the Western US has renewed interest in using hot-water spray against mussels fouling boat hulls, trailers, and other equipment. But the efficacy of hot-water sprays has not been experimentally assessed. Emersed, adult *D. polymorpha* were exposed to low-pressure, hot-water sprays at 40, 50, 60, 70, and 80°C for 1, 5, or 10 seconds. Sprays at ≥60°C for 10 seconds or 80°C at ≥5 seconds were 100% lethal. In contrast, 1-10 second exposures did not induce 100% mortality at ≤50°C. The results indicate that mitigation of *D. polymorpha* fouling, especially in areas protected from the hydraulic impacts of high-pressure sprays, requires spray temperatures of > 80°C applied for >5 seconds or no less than 60°C applied for >10 seconds. Thus, presently recommended spray temperatures of ≥60°C may not be 100% effective unless applied for >10 seconds. (Read the article: Morse, John T. 2009. *Assessing the effects of application time and temperature on the efficacy of hot-water sprays to mitigate fouling by Dreissena polymorpha (zebra mussels Pallas),* Biofouling 25:7, 605- 610). *(Thanks to Paul Heimowitz*)

Idaho Boat Inspection Stations Now Open. Fifteen boat-inspection and decontamination stations are now up and running at locations along ID borders in an effort to prevent the introduction of invasive aquatic species, including quagga and zebra mussels. This implements the Invasive Species Fund Program passed by the 2009 ID Legislature (HB 213). To see the bill go to: http://www.idahoag.us/Categories/PlantsInsects/Images/Invasive_Species/HB_213.pdf. Inspection stations are located in areas of expected high boat traffic. In the coming weeks additional inspection stations will be set up at various locations throughout the state.

In addition, all out-of-state boats and in-state boats 10 feet or longer are required to have an Invasive Species sticker on the watercraft before launching in ID. The stickers can be purchased

online through the ID Department of Parks and Recreation (IPR) or at ID State Parks. The boat stickers cost $20 for out-of-state crafts, $10 for in-state motorized boats, and $5 for in-state non-motorized crafts less than 10 feet long. For more information about invasive species and inspection stations, contact Pamm Juker or Lloyd Knight at ISDA, 208-332-8500 or visit [www.agri.idaho.gov]. For more information about invasive species boat stickers, contact Renee Iverson at the IPR, 208-334-4199. *(From a press release, July 2, thanks to Amy Ferriter)*

Western Interagency Monitoring Plan (Update). A working DRAFT of the Interagency *Dreissena* Monitoring Plan for Western Waters is now available at [http://www.musselmonitoring.com]. The plan is available for review, and has river-basin-specific monitoring information available as separate downloads, broken out by states. Monitoring information, important updates and alert notices will be regularly added to the website as the plan is implemented.

Watercraft Decontamination Protocols and Standards (Update). The need for better coordination and consistency of protocols and standards related to preventing overland transport of Dreissenid mussels on trailered watercraft is widely recognized, and one of the highest priority action items in the Western Regional Panel's (WRP) *Quagga/Zebra Mussel Action Plan* is the development of consistent equipment inspection and decontamination protocols. To address this need, earlier this year, PSMFC (Bill Zook), in cooperation with the WRP, initiated a project to identify and survey practices of western agencies and organizations involved in watercraft inspection programs. Seventy two programs in 20 western states were identified as employing some form of watercraft intervention on about 300 waterbodies. The survey results were used to produce a draft *Recommended Protocols and Standards for Watercraft Interception Programs for Dreissenid Mussels in the Western United States.*

Implementing a regionally consistent program is difficult when numerous local programs are already in planning or implementation stages. But the region must identify and implement the best prevention measures available as quickly as possible, and having regionally consistent decontamination standards and protocols will help accomplish this by insuring that all programs are using the best technology available. This will also give participants confidence in the effectiveness of their own programs, and a level of trust in each other's programs, reducing duplication of effort; and will increase the public's ability to understand, comply with, and support intervention programs. Contact Bill Zook <bjzook2@msn.com> to obtain a draft of the plan. *(Thanks to Bill Zook)*

New Montana Law. A new MT law (SB 343) declaring zebra mussels an invasive species, and providing funds ($334,000 per year, general funds) to coordinate education programs and other efforts to prevent the spread of the zebra mussel in MT lakes, became effective July 1. To see a copy of the bill, go to http://data.opi.mt.gov/bills/2009/billpdf/SB0343.pdf.

Editorial Comment: **Isn't It About Time We Get Serious About Mussels?** Lakes and recreation areas do not seem to be taking the zebra/quagga mussel situation as seriously as they should. Recently, a mussel-fouled boat left Lake Mead, NV (Lake Mead National Recreation Area) without proper decontamination and it managed to get all the way to Spokane, WA, before it was luckily stopped by authorities and decontaminated (See Nutshell #24, page 3,

"Hello" incident). There have been numerous other incidents over the past two years of contaminated boats leaving the Lower Colorado River reservoirs (Lakes Havasu, Mead and Mohave) and being intercepted in the Columbia River Basin, Utah, Montana and California. In fact, from January 2007 to June 2009, California's state border agricultural inspection stations quarantined 395 watercraft with quagga/zebra mussels (it is assumed that many of these were from the lower Colorado River reservoirs).

Responding to the "Hello" incident, on June 9, ID Governor "Butch" Otter wrote to Ken Salazar, Secretary of the Interior, and in that letter said:

> Of immediate concern are the vessels leaving mussel-infested water bodies such as Lake Mead. The vessel "Hello" recently was the subject of a multi-state search after a concerned citizen reported the fouled boat traveling toward Idaho on Interstate 15 in Utah. The vessel originated at Lake Mead, where it was allowed to leave the National Recreational Area without proper decontamination. Thankfully, and with the assistance of the State of Washington, this vessel was found and decontaminated in Spokane.
>
> Mr. Secretary, please seriously consider instituting within all U.S. Department of Interior agencies, including the National Park Service and the U.S. Fish and Wildlife Service, a mandatory decontamination requirement for ALL vessels leaving mussel-infested waters, such as Lake Mead. Additionally, I ask that Interior use its Lacey Act authority to enforce restrictions on interstate transport of zebra mussels.

On July 17, Secretary Salazar responded to Governor Otter, saying:

> The response to the western mussel invasion is led largely by the U.S. Fish and Wildlife Service (Service) as part of the overall response to aquatic invasive species under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (Act). The Act established the Aquatic Nuisance Species (ANS) Task Force (Task Force), a public-private forum to address these issues, and assigned the Service as co-chair. The law authorizes the Service to provide financial support for State ANS management plans. The State of Idaho is a recipient of these funds.
>
> The Task Force recently asked its Western Regional Panel (Panel) to develop a quagga/zebra mussel action plan (Plan) recognizing that our best hope for protecting uninfested waters is to prevent mussel from being introduced into new areas and to contain the existing populations. At the spring 2009 Task Force meeting in Bozeman, Montana, the Panel unveiled the first draft of the Plan. The draft calls for mandatory inspection and decontamination stations at infested bodies of water, as well as other actions aimed at addressing the rising threat of the quagga and zebra mussels.
>
> The primary objective of the Plan is to highlight the actions that are necessary over the next five years to minimize the impacts that these invasive shellfish have on native species, water delivery infrastructure (e.g., municipal, agricultural, and hydro-electric), and other vulnerable resources.

> The Task Force and the members of the Panel have agreed to use the Plan as the guiding document to direct the western response to these invasive mussels. The next step for members of the Task Force, including the National Park Service, is to work with the Panel to identify the priority actions that can be immediately implemented, and to identify the associated budget required to implement the remainder of the Plan. Limited resources restrict the feasibility of decontaminating every individual watercraft leaving mussel-infested waterways managed by the Department. [emphasis added].

Other groups have also raised concerns about contaminated watercraft moving northward. In July, the Pacific Northwest Economic Region, a regional U.S.-Canadian forum dedicated to encouraging global economic competitiveness and preserving the Northwest's natural environment (for further information go to http://www.pnwer.org/Home/tabid/36/Default.aspx) agreed to send a letter to Secretary Salazar saying that it is "absolutely critical" that federal authorities move to contain and decontaminate boats as they leave Lake Mead in Nevada and other infested water bodies. (source: http://www.spokesman.com/stories/2009/jul/15/regions-lawmakers-want-more-fed-help-mussels/)

However, paying for 100 percent decontamination will be a challenge as boater use at Lake Mead alone includes a 12-month season that attracts more than 9 million visitors each year for swimming, boating, skiing, fishing and other outdoor pursuits. On the other hand, the spread of quagga mussels to uninfested areas including the Pacific Northwest could wreak havoc on irrigators, power producers, and municipal water suppliers; and there is particular concern about zebra/quagga mussel impacts to the numerous salmon and steelhead stocks listed under the Endangered Species Act. For example, salmon and steelhead traversing the Columbia/Snake River system to Idaho must pass through eight hydro projects both as adults and juveniles. Surface fouling created by attached dreissenid mussel on structures such as fish ladders, as well as clogging inflows, drainages, and screened areas, could create hazardous passage conditions for fish. It is therefore vital that decontamination of all watercraft leaving infested waterbodies in the southwest on federal lands (and non-federal lands as well) be a priority for the Department of Interior (and other resource management agencies) and sufficient funding be found to undertake such an effort….and this will be no easy task.

Other West Coast Activity

California Divers Battle *Undaria*. In San Francisco's South Beach, divers are removing a new invasive seaweed that is taking over harbors and estuaries all along the Pacific coast. *Undaria pinnatifida*, known and popularly consumed in Japan as wakame, is believed to have arrived on the hulls of commercial ships. It has plagued harbors in Southern CA since 2000 and, more recently, arrived in the San Francisco Bay. It is considered a serious threat to native species because it crowds them out, deprives them of oxygen, and ruins the marine habitat for native fish, shellfish, sea otters and other organisms. No one expects it to be completely eradicated, but they hope to keep it from spreading. Although in Asia, the kelp is used in miso soup, it is dangerous to eat here because it takes in toxins from the polluted harbors along the CA coast. The Smithsonian Environmental Research Center in Tiburon is keeping meticulous records of

every alien cluster that the divers harvest, and trying to alert boat owners - particularly those sailing into the bay from southern harbors - to watch for the seaweed fouling their hulls and get rid of it (but not in the water!). *(Excerpted from 'Divers battle fast-growing alien kelp', San Francisco Chronicle article by David Perlman, July 10. Thanks to Randy Marshall)*

Fish Farm In Federal Waters. The Hubbs-SeaWorld Research Institute wants to build a fish farm in the ocean off San Diego. This would apparently be the one of the first of its kind in federal waters off the West Coast. Don Kent, President of Hubbs, says the facility would raise

(Grid of ocean net pens in Mexico)

striped bass in up to 24 net pens secured to the ocean floor. They are also considering yellowtail, halibut and white sea bass. Kent says the farm would operate with more stringent environmental and health standards than farms in other countries. But because the proposed farm would be in federal waters, it would not be subject to CA's more rigorous environmental regulations. San Francisco-based Food and Water Watch says the concentrated waste stream will equal the sewage from 30,000 people, and that the farm will have significant cumulative impacts that will not benefit the coastal communities or the environment. They are also concerned about escapes and predation, because striped bass are voracious predators that have harmed several native endangered and threatened species, including the Delta smelt. But Hubbs says routine sea floor monitoring would catch any problems, that some of the waste can actually be beneficial, and that they have operated a net pen facility at Santa Catalina Island for the past seven years without system failure or an escape. The controversial fish farm faces a long approval process before state and federal agencies, and it will take another two years beyond that before the first crop of fish would be harvested. *(Excerpted from a Ed Joyce article, KPBS News. June 1.) [http://www.kpbs.org/news/2009/may/28/fish-farm-planned-san-diego/])*

Alaska Marine Monitoring. The Alaska Sea Life Center recently received a National Park Service Coastal Marine Resources grant to launch a marine non-indigenous species monitoring program in Resurrection Bay. The program also supports a complementary education curriculum. The European green crab and several varieties of tunicates are species of specific concern to the Resurrection Bay project. Twenty-four crab traps will be placed in the Seward harbor area, and throughout the school year student groups will regularly monitor green crab collection sites and record data that will then be uploaded to Internet-based databases. This opportunity will expose students to scientific fieldwork while monitoring for threatening species. The Resurrection Bay Conservation Alliance will alternately deploy traps and collect samples with Sea Life staff and local school classes. Tunicate sampling will be conducted with a network of participants across AK, overseen by the Smithsonian Environmental Research Center. Weighted 5-inch square tunicate sampling plates are suspended to floating docks, where tunicates and other small invertebrates can settle and be observed. Direct questions about the marine invasive species program to Howard Ferren, at <howard_ferren@alaskasealife.org>.

(Excerpted from Sea Life Center Monitoring Marine Invaders, by Todd Rennie, June 17, in the Seward Phoenix Log. [http://www.thesewardphoenixlog.com/news/show/6360].)

West Coast Governors Tackle *Spartina*. The West Coast Governors' Agreement on Ocean Health called for a plan to eradicate *Spartina spp.* from the West Coast by 2018. The draft Plan is available for review and can be downloaded at the website for the West Coast Governors' Agreement. [http://www.westcoastoceans.gov/teams/#spartina.] The comment period ended July 10. *(Thanks to Mark Sytsma)*

Washington Non-native Invasive Aquatic Animal and Non-Native Marine Algae Management General Permit (Update). The Department of Ecology currently has four general permits for invasive species (noxious weeds, aquatic plants and algae, mosquito larvae, and irrigation ditch treatment of aquatic plants) and three individual permits for fish management (rotenone), invasive moth (gypsy moth), and oyster growers (burrowing shrimp). Now the department is proposing to develop a general permit for the control of non-native invasive aquatic animals and non-native invasive marine algae. The aquatic invasive species permit will allow the application of pesticides/chemicals to marine and freshwaters for management of invasive species. Ecology started developing the permit in 2006, and currently the permit and fact sheet are about 90% completed. Because this proposal is likely to have a significant adverse impact on the environment, Ecology is also preparing an environmental impact statement (EIS). Ecology accepted public comment on the scope of the EIS, from May 14-June 5, 2009, and is now working on the draft document. They would like the permit and EIS out and operational by April, 2010. For questions, or to add your name to the mailing list, or to offer assistance as an early reviewer, contact Kathy Hamel at <kham461@ecy.wa.gov>; or go to http://www.ecy.wa.gov/programs/wq/pesticides/invasive_species.html

Oregon Invasive Species Legislation (Update) OR had great success this legislative session! Nearly all of the invasive species bills were passed. New laws include:

***House Bill 2220** – Operators of a manually propelled boat or motorboat more than 10 feet in length must obtain an aquatic invasive species prevention permit. The surcharges are $5 every two years for power boats that already are subject to registration fees, $5 per year for manually powered boats 10 feet or longer, and $20 for a motor boat brought into the state by a nonresident. Those who operate nonmotorized boat-oriented businesses, from kayak and canoe rentals to whitewater outfitters, will pay flat fees: $30 per year for six to 10 boats, $55 for 11 to 20 boats, and $100 per year for 21 or more boats. This bill also establishes an Aquatic Invasive Species Prevention Fund administered by the Oregon Marine Board to prevent and control aquatic invasive species. The Marine Board and the Oregon Department of Fish and Wildlife will use the money for education programs and for training, equipping and dispatching mobile inspection teams. *Signed by the Governor -- The surcharges go into effect January 1, 2010.*
***House Bill 2020 -** Establishes an invasive species rapid response fund of $350,000 using ATV funds from Oregon Parks and Recreation Department. *Signed by the Governor – effective July 1, 2009.*
*** House Bill 2212** – Consolidates OR plant quarantine laws, and enhanced definition of integrated pest management. *Signed by the Governor – effective January 1, 2010.*

*** House Bill 2213** - Adds two seats to the Invasive Species Council; an ex officio seat for the ODEQ and another at-large seat. *Signed by the Governor – effective May 21, 2009*
*** House Bill 2221** - Makes it a crime to knowingly allow feral swine to roam on private land or to sell or purchase hunts for feral swine. *Signed by the Governor*
*** House Bill 2424** - Expands the role of the Adopt-A-Highway program to include weeds. *Signed by the Governor*
*** House Bill 2583** - Prohibits a person from launching a boat into waters of the state if there are any visible aquatic species on the hull, trailer or other related equipment, or any invasive species inside the boat. *Signed by the Governor*
*** House Bill 2625** - Amends existing statute to provide explicit DEQ authority for vessel boarding, inspections, and collection of ballast water samples for compliance verification purposes. *Signed by the Governor – effective January 1, 2010*
*** House Bill 2714** - Continues the Shipping Transport of Aquatic Invasive Species Task Force. *Signed by the Governor – effective May 26, 2009*
*** Senate Bill 105** - Increases maximum civil penalties for non-compliance with ballast reporting and discharge requirements from $5,000 to $25,000. *Signed by the Governor*
*** Senate Bill 571** - Increases penalty for releasing or attempting to release live fish into body of water without a permit to maximum of five years and imprisonment, $125,000 fine, or both, and allows the Commission to institute suit for recovery of damages for control or eradication of live fish released into a water body without a permit. *Signed by the Governor*

Washington Ballast Water Rule (Update) The WA Fish & Wildlife Commission passed the state ballast water rules (WAC 220-150) unanimously on June 5. The implementation date for the ballast water rules was July 26. For further information go to:
http://wdfw.wa.gov/fish/ballast/ballast.htm *(Thanks to Allen Pleus)*

An Emmy For Oregon! Oregon Public Broadcasting's *The Silent Invasion: An Oregon Field Guide Special* has received three EMMY® Awards and a duPont Award, one of the most prestigious national honors in the field of broadcast journalism. For more information go to http://www.opb.org/programs/invasives.

Washington Tunicate Response (Update). The WA Department of Fish and Wildlife (WDFW) Aquatic Invasive Species Unit has been conducting ongoing surveys to determine the geographic extent of occurrence of three species of non-native tunicates (*Styela clava*, *Ciona savignyi*, and *Didemnum vexillum*,) in Puget Sound. Thus far, *S. clava* appears to remain confined to four marinas at two geographic locations - Pleasant Harbor in northern Hood Canal, and Drayton Harbor near Blaine at the US/Canada border in northern Puget Sound. High density populations of *C. savignyi* have been found at scattered natural substrate locations throughout Hood Canal and at two marinas in central Puget Sound. Quantitative assessments of *S. clava* and *C. savignyi* have been conducted at four marinas in order to monitor for density changes over time. *Didemnum vexillum* has been found to be widespread throughout greater Puget Sound. A heavily infested public park dock facility located in central Puget Sound was used as an eradication methods evaluation and test site. Three methods (acetic acid, hand removal, and suffocation) proved to be highly effective. Distribution control efforts have focused on vessel hull removals of individual tunicates at heavily infested marinas. Details of these and other work efforts will be posted soon on the WDFW aquatic invasive species web site

[http://wdfw.wa.gov/fish/ans/index.htm] in August 2009 in the biannual report to the Puget Sound Partnership. (*Thanks to Larry Leclair, WDFW*)

National and International Activity

Economic Recovery Projects For Invasive Species. On May 14, US Agriculture Secretary Tom Vilsack announced projects funded by the American Recovery and Reinvestment Act (ARRA) for 19 invasive species projects, funded at over $38 million, in 14 states. These projects will provide for public health and safety by restoring forestlands and rangelands damaged by invasive species, because invasives weaken affected ecosystems and reduce resource benefits from forests and rangelands. The recipients include AK ($1.14 M), AL ($6.281 M), CA ($7.511M), GA ($1.795M), HI ($4.486M), MA ($538,000), MI ($2.962M), MS ($2.767M), NC ($120,000), OH ($4.419M), OR ($2.513 M), RI ($673,000), SC ($879,000), and WA ($2.243M)

Bighead Carp (Update). Sen. Carl Levin is moving to put the invasive Asian bighead carp (*Hypothalmichthys nobilis)* on a list of species prohibited from importation into the U.S. *The Asian Carp Prevention and Control Act* (S 1421), introduced in July, would make it unlawful to import, export, transport, buy or sell the fish. The USFWS has already listed other species of Asian carp as injurious under the Lacey Act. This is too late, however, for some waters: it has already spread from catfish farms in LA in the 1970s, up the Mississippi River, and is only being kept out of the Great Lakes by an electric dispersal barrier. Bighead carp, known for their voracious appetite, can grow to 6 feet, and weigh as much as 110 pounds. By adding the species to the list of prohibited wildlife under the Lacey Act, Levin and his cosponsors hope to prevent any intentional introduction of the bighead carp to yet-untouched U.S. waters. *[http://www.freep.com/article/20090709/NEWS07/90709062/Sen.+Levin+to+prohibit+invasive+carp+from+U.S.+import]*

Great Ships Initiative (GSI) (Update). The GSI is a innovative collaboration whose objective is to end the problem of ship-mediated invasive species in the Great Lakes-St. Lawrence Seaway System. It includes independent research and demonstration of environmental technology, financial incentives and consistent basin-wide harbor monitoring. The near-term objective of the GSI is to significantly accelerate research, development and implementation of effective ballast treatment systems for ships that visit the Great Lakes. GSI has established research capabilities at three scales—bench, land-based, and shipboard. Each scale is dedicated to addressing specific evaluation objectives, with protocols as consistent with IMO and federal requirements as practicable. Developers of ballast water treatment systems apply for GSI research services online, and awards are offered based on an objective review process. (*Excerpted from Great Ship's Initiative, [http://www.nemw.org/GSI/index.htm])*

NPDES General Ballast Water Permits (Update). On June 8, 11 days ahead of schedule, EPA announced deployment of the Vessel eNOI System, to allow those seeking coverage under the Vessel General Permit (VGP) to submit their Notices of Intent (NOIs) to apply for coverage under the permit. EPA strongly advises permittees to use the electronic-based eNOI system

instead of submitting paper forms. The eNOI system saves time since processing the electronic NOIs is faster than processing paper notifications. Vessel owner/operators must submit notices of intent to retain coverage under the VGP by September 19, 2009 if their vessels are either over 300 gross tons or if they have the capacity to carry more than 8 cubic meters of ballast water. Vessel owner/operators may access the vessels eNOI system by going to [www.epa.gov/npdes/vessels/enoi]. The system also has batch import capabilities using an excel based spreadsheet application. For those vessel owner/operators who have numerous vessels, this application may save time entering vessels into the electronic system. For general information about the NPDES Vessel General Permit, go to [www.epa.gov/npdes/vessels] or contact EPA staff at [commercialvesselpermit@epa.gov] for specific questions regarding the Permit. (*From NPDES News - June 15, 2009, thanks to Randy Marshall)*

USCG Ballast Water Discharge Standard Rulemaking (Update). On 15 May 2009, the Secretary of Homeland Security approved the Ballast Water Discharge Standard Notice of Proposed Rulemaking (NPRM) package for submission to the Office of Management and Budget (OMB). In accordance with Executive Order 12866, OMB has 90 days to review the NPRM, reconcile interagency questions and concerns, and either release the package for publication in the Federal Register or disapprove its publication. Although the contents of the NPRM are not available to the public until OMB approves the document for publication in the Federal Register, other federal agencies are able to review the NPRM and provide their comments to OMB and the Coast Guard during this time. See the announcement on this at: [http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=200904&RIN=1625-AA32]. (*source: [http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp], thanks to Stephen Phillips*)

Shippers Lose Another Ballast Ruling. The shipping industry has lost another round in its fight to keep states from passing their own ballast rules to protect the U.S. Great Lakes, the world's largest freshwater system, from invasive species. A NY Supreme Court justice has thrown out a shipping industry challenge to tough new ballast treatment requirements intended to keep freighters from dumping unwanted organisms into the Great Lakes. This is good news for supporters of WI's proposed ballast rules, which are similar to those adopted by NY. WI draft rules, released in February, would force the shipping industry to install ballast treatment systems by 2012 - the same year NY regulations would take effect. MI was the first to pass its own ballast discharge laws, which the shipping industry unsuccessfully challenged in court. But because most ballast discharges by ocean-going vessels happen at the ports of Duluth and Superior, the states that hold the most sway are WI and MN. WI officials have said they would prefer that Congress pass a national law to protect all the lakes from the relatively few overseas ships that visit the region, but absent federal action, WI regulators say they have no choice but to pursue their own rules, which are similar to what has been proposed in NY. MN is pursuing weaker rules that wouldn't become effective until 2016.

Ballast water rules don't just protect the ecosystem; they help defend multibillion-dollar tourism, fishing and recreational boating industries in NY and throughout the Great Lakes. This ruling sends a strong message to other Great Lakes states and (the U.S. Environmental Protection Agency, after 30 years of inaction), to finally slam the door on invasive species by requiring the shipping industry to install effective protections." said Thom Cmar, an attorney for the Natural Resources Defense Council. *(Excerpted from a Dan Egan article in the Journal Sentinel, June 1. [http://www.jsonline.com/news/wisconsin/46676162.html])*

Plastic Debris: A New Pathway. "One of the most ubiquitous and long-lasting recent changes to the surface of our planet is the accumulation and fragmentation of plastics," wrote David Barnes, a lead author and researcher for the British Antarctic Survey. The report was published this month in a theme issue of Philosophical Transactions of The Royal Society B. Plastics production and disposal contribute to an array of already well known environmental problems, but the report also identifies it as an invasive species pathway. Floating plastic waste, which can survive for thousands of years in water, serves as a floating transportation device that allows alien species to hitchhike to new parts of the world. Plastic items are commonly colonized by barnacles, tubeworms and algae, and along the shoreline of Adelaide Island, west of the Antarctic Peninsula, ten species of invertebrates were found attached to plastic strapping that was littering the ice. *(Excerpted from: The environmental toll of plastics, in Environmental Health News, July 2, by Jessica Knoblauch. Ocean Conserve News archive. [http://www.oceanconserve.org/shared/reader/welcome.aspx?linkid=131729]*

Blue Catfish: Another Catfish Predator. Tim Wilson's record-setting 102 pound 4 ounce catch in the James River, south of Richmond, VA, landed him in the middle of a growing

controversy over the non-native blue catfish (*Ictalurus furcatus).* Introduced in the James River in the mid-1970s, to beef up the river's sport fishery, in a little more than 30 years, the blue catfish has morphed from scavenging newcomer to top predator. Adaptive and aggressive, the blue catfish can also hunt in brackish marshes. It is now so prolific and widespread that some estimates suggest it comprises as much as two-thirds of the fish population of the James River, by weight. At about 8 years, when it reaches around four pounds, the blue catfish switches from bottom-dwelling vacuum cleaner to top predator, and begins eating fish. It also impacts crab fisheries, eating even full-size 5-inch crabs. By 10 years old, they are gaining about 10 pounds a year. The Mississippi River now holds the world-record 124-pounder, landed in 2005.

Curbing the growth of the blue catfish is difficult because fishermen are allowed to catch only one catfish measuring more than 32 inches a day. Further, there is almost no commercial market for larger fish because the Department of Health has a "do not eat" tag on any blue catfish more than 32 inches, long because of mercury and PCB concerns. The VA General Assembly expects to see watermen bring legislation to rein in the blue catfish population, but there are still questions about blue catfish impacts on other species. As a freshwater game fish, the blue catfish falls under the Department of Game and Inland Fisheries. Watermen are asking the VA Marine Resource Commission to step in and regulate the fish. *(Excerpted from Blue catfish is now James River's biggest predator, By Kimball Payne, Daily Press, July 11, 2009. [http://hamptonroads.com/2009/07/blue-catfish-now-james-rivers-biggest-predator])*

Ed Comment: According to some sources, the catfish is becoming rare (see article at [http://www.aquaticcommunity.com/catfish/blue.php]) but don't tell that to the people in VA: in the 1990s, scientists' sampling could pull in about 1,500 fish an hour; now similar samples bring in as many as 6,000 fish. Maybe states having other catfish species on their "unwanted lists" should consider adding this one as well.

Sea Lamprey Contraceptive? In addition to providing fundamental insights into the early evolution of the estrogen receptor, research by a team at the University of California, San Diego School of Medicine may lead to a contraceptive for female lampreys *(Petromyzon marinus),* a jawless fish in the US Great Lakes region that aggressively consumes trout, salmon, sturgeon and other game fish. As part of a program to understand the evolution of steroid hormone signaling, the UC San Diego researchers characterized the estrogen-binding site on the estrogen receptor in the sea lamprey. They also constructed a 3-D model of the structure of the lamprey estrogen receptor. The model uncovered a unique interaction between 15-alpha-hydroxy-estradiol and an amino acid called methionine, found only in lamprey estrogen receptors. The unique aspect of this interaction suggests that there are compounds that can bind specifically to the lamprey estrogen receptor, but not to estrogen receptors in other animals. Some of these compounds could interfere with estrogen action and act as contraceptives in female lamprey, providing a method to control their numbers. The researchers' findings were scheduled for publication PloS ONE on June 25.

Lamprey mouth. (Wikimedia Commons/Pubic Domain Image)

Lampreys have no jaw; they feed on fish by attaching themselves to the fish and sucking their body fluids. Their aggressive consumption of game fish has eliminated many natural predators of the alewife, another invasive species on the Great Lakes. This has allowed the alewife population to explode, with adverse effects on many native fish species. *(From Evolution of a Contraceptive for Invasive Sea Lamprey, Science Daily, June 25, 2009)*

Lamprey Traps. Sea lampreys (*Petromyzon marinus*) will have a harder time entering Lake Superior, thanks to a new trap placed on one of its favorite migration routes. The Sea Lamprey Control Centre recently unveiled the concrete and metal trap at the outflow of Great Lakes Power's Clergue generating station. This trap at the Clergue site joins three traps operating on the US side of the river, at the hydro plant in Sault, MI, and at two control dams. Part of the new trap's purpose is simply to remove lampreys from the system. But trapped males are also sterilized and released back into the system, where they compete for fertile females and basically create nests that don't produce offspring. The lampreys are also trapped for mark-and-recapture, to determine the magnitude of their spawning run. The project cost $580,000, roughly the cost of yearly control on the river. But the trap should be in use for as long as 30 years and makes a huge

impact; so far it has been responsible for half of all lampreys trapped on the Canadian side of the St. Mary's River, and roughly 33 percent of all lampreys trapped on the river. Several species of lamprey are native to the Great Lakes, but the sea lamprey, whose natural habitat is the Atlantic Ocean, made its way gradually into the Great Lakes beginning in the 1800s, and by the 1960s had devastated the lake trout fishery on Lake Superior. (*Excerpted from "Building a better lamprey trap", by Michael Purvis, Sault Star, July 1.)*

Hybrid Salamander Raises New Questions. The native California tiger salamander (*Ambystoma californiense*) and the non-native barred tiger salamander, (*Ambystoma tigrinum mavortium*), brought in from TX in huge numbers for 60 years by CA bait dealers, have produced an alarming hybrid offspring. The new hybrid is a "superpredator" that grows larger than either of its parent species, and its bigger mouth enables it to suck up a wide variety of amphibian prey. In a study published in the *Proceedings of the National Academy of Sciences*, the researchers found that in its larval stage, the hybrid salamander devoured tadpoles and larvae of many amphibian species, including the larvae of the native endangered tiger salamander. If the hybrid continues to spread through the area, it could affect other "third-party" species in the [Salinas] valley, like the California red-legged frog and the Santa Cruz long-toed salamander. But the question of how to deal with the hybrid poses an ethical quandary for conservationists. Since the hybrids are part endangered species, *should they be protected because they are part native, or should they be treated as a normal invasive species*? The survival of California's native salamander is now also of concern, as the hybrid's more aggressive predation speeds up the process of converting more populations into hybrids. *(Excerpted from "Invasive Salamander Carries on Endangered Genes While Killing off Natives", National Geographic News, Image: Brian MacElvaine)*

Hawaii Round-Up Dive Tournament Reduces Invasives. The Roi Round-up was the fourth one of its kind for Maui, and represents a continuing effort by spearfishermen, divers, and their supporters to raise awareness about reef conservation and invasive species. The Roi Round-up Dive Tournament, hosted by the Hard Rock Cafe in Lahaina, focused on roi, or blue-spotted grouper (*Cephalopholis argus*), taape, or blue-lined snapper, (*Lutjanus kasmira*) and toau, or black-tailed snapper (*Lutjanus fulvus*), all known to prey on native fish in both shallow and deep waters. The species were introduced to HA waters in the 1950s to enhance both commercial and recreational fishing, but the populations have grown so much that the fish are affecting the native species. These species are not desirable for eating, and in fact, roi is a high-risk fish for ciguatera poisoning. Eighteen competing teams were spread across 15 miles of ocean, and they tallied a total of 133 catches; 127 roi, six toau, and no taape. Organizers estimate that an invasive species eats about 146 fish, and thus they estimate the 133 catches saved 18,942 other fish. The next Roi Round-up Dive Tournament will be held in November. The invasive species caught will not be wasted: the larger roi will be sent to the University of Hawaii for ciguatera studies, and the smaller fish will be taken to Maui Ocean Center for shark food. *(Excerpted from A fish in the bucket is worth 146 in the sea, by Claudine San Nicolas, Maui News, July 13. [http://www.mauinews.com/page/content.detail/id/520945.html])*

Climate Change May Increase Spread of *Spartina patens*. New research shows global warming may particularly affect pannes, a key constituent of New England salt marshes. Pannes are waterlogged, low-oxygen zones in salt marshes that are "plant diversity hotspots," according to Keryn Gedan, a salt marsh expert at Brown University. In New England, pannes range from CT, where they make up less than 10 percent of a salt marsh's area, to ME, where they can comprise some 40 percent of the salt marsh ecosystem. Plots of forb pannes were subjected to air as much as 3.3 ◦C (~6 ◦F) warmer than the surrounding area. Plants in the test plots responded initially by increased growth, but then began a rapid die-off. As they died, they were replaced by a salt marsh grass, *Spartina patens*. In tests from 2004 to 2006, at two sites, the forbs decreased from 50 percent to less than 10 percent of the plot. At the third site, forb pannes cover decreased from 50 percent of the plot to 44 percent in just the summer of 2007. The researchers believe the forbs disappeared due to changes in the plant-water balance in the zone. The warmer air causes the forbs to take in more water, thus making the area less waterlogged and more hospitable to an invasion by *Spartina patens*, which prefers less water-soaked conditions. Researchers believe the experiments demonstrate that New England salt marsh pannes are extremely sensitive to temperature increases and will be driven to local and regional extinction with the temperature increases expected over the next century. Funding came from the EPA Science to Achieve Results (STAR) Program, the NOAA National Estuarine Research Reserve System, and RI Sea Grant *(Excerpted from: Climate Change May Spell Demise Of Key Salt Marsh Constituent, ScienceDaily (July 15, 2009, adapted from materials provided by Brown U., via EurekAlert!, a service of AAAS. [http://www.sciencedaily.com/releases/2009/07/090713085016.htm])*

Water Soldier: A New Canadian Invader. A new aquatic invader, the water soldier (*Stratiotes aloides*) has been sighted for the first time in Canada, along the Trent-Severn Waterway.

Photo: Francine Macdonald/Ontario Federation of Anglers and Hunters.

Native to Britain, it thrives at depths of up to two meters, on the edge of lakes and rivers, growing underwater and surfacing in summer. It has already established in the U.S. and Australia. It is very sharp, and requires gloves to pull it out of the water. Like spider plants, water soldiers also have offsets, or little plants that detach and take root at new locations, so moving water offers the perfect mechanism for spread. The Trent-Severn infestation was reported by a Hastings area resident last fall; he spotted a few plants in 2007 and tried to weed them out. But in May, 2008, a team went to the site to observe and count the plants, and found its numbers had swelled into the hundreds, and there is now a satellite group of similar size about two km downriver. It has become an impediment to boaters, and could be a huge problem for

swimmers. Unfortunately, water soldiers and many other invasive species can still be purchased at Ontario nurseries. Anyone who spots water soldiers in the Canadian wild should call the invasive species hotline at 1-800-563-7711. (*Ed. Comment*: U.S. residents might be wise to keep on the lookout for this plant as well!) *(Excerpted from a May 26, Emily Mathieu article in The Star [http://www.thestar.com/news/gta/article/640300].)*

Khapra Beetles. A Detroit border control agent looking for wood-boring pests in a container of tile from China spotted a suspicious speck of dust on the container floor: a khapra beetle (*Trogoderma granarium*). The container was first flagged for inspection in International Falls, MN. The beetles, 1/32 of an inch long, are considered one of the world's 100-worst invasive

species, and one of the most dangerous pests of grain and seeds. There have been two outbreaks of the beetle in the United States, a major one in the early 1950s and a smaller one in 1980. Both were successfully eradicated. If uncaught, the beetles can multiply quickly in stored items such as crackers, wheat, flour and baby cereal. Humans who swallow beetle body parts or hairs, or come into skin contact with the hairs of the beetle, can develop skin irritations and gastric problems. *(Excerpted from "Tiny but nasty beetle stopped at Detroit border" by Tina Lam, in the June 17, Detroit Free Press.)*

Hemlock Adelgid Facilitates Invasive Plants. Hemlock forests are characterized by uniformly low light levels and little plant cover; in many hemlock forests, only 2 percent of sunlight reaches the ground. And because hemlock trees may account for more than 70 percent of the trees in a hemlock forest, when the hemlocks go, the bulk of the canopy goes. New research by ecologists at UC Berkeley shows the understory environment has been significantly altered by the decline of the hemlock canopy caused by an exotic pest, the hemlock woolly adelgid (*Adelges tsugae*). Native to Asia and introduced to the Eastern US in the 1950s, it sucks fluid from the base of hemlock needles, causing the needles to drop and the branches to die, increasing the amount of light filtering through the canopy. This facilitates the successful invasion of non-native plants, which is further accelerated by a high concentration of the plants' seeds and white-tailed deer in the affected area. The researchers focused on three abundant and aggressive exotic plants: Garlic mustard (*Allaria petiolata*), Japanese barberry (*Berberis thunbergii*) and Japanese stiltgrass (*Microstegium vimineum*). They found that canopy disturbance and seed availability were the most important factors for all three invasive plants to succeed, and when those factors combine forces, they magnify each other's effects. Contrary to the theory that diverse ecosystems are less susceptible to invasion, the study found that species richness was the least important predictor of invasion for all three exotic plants studied. They also found that the white-tailed deer's preferential dining on native plants gave a significant advantage to garlic mustard and Japanese barberry, which each thrived when its competition was eaten. The implications of the hemlock woolly adelgid's impact on canopy disturbance go beyond the introduction of new plant species; loss of the canopy not only affects the native birds and plants in the hemlock forests, but

also aquatic life that depends upon the cooler temperature of shaded streams. The study is published in the May/June issue of the journal Ecological Monographs. *(Excerpted from a Sarah Yang article, Insect in hemlock forests causes loss of canopy, gain of invasive plants* **,***UC Berkeley News, May 26, 2009).*

Changing Climate Impacts Phragmites. Researchers at the University of Delaware have discovered a new reason why the giant reed *Phragmites australis* is one of the most invasive plants in the US: *Phragmites* delivers a double chemical mechanism to snuff out its victims, and the poison becomes even more toxic in the presence of the sun's ultraviolet rays. The study, published in the June issue of *Plant Signaling & Behavior*, is believed to be the first to report the effects of UV-B radiation on plant allelopathy, the production of toxins by a plant to ward off encroachment by neighboring plants. "Our research also addresses the growing questions of increased UV-B incidences because of global warming and its ultimate effect on plants. In this case, an invasive plant is accidentally utilizing the changed global conditions for its survival and invasion," author Bais noted. Two years ago, Bais also led a study which discovered that *Phragmites* actively secretes gallic acid to kill off plants and take over new areas. In this research, they found that the gallic acid released by *Phragmites* is degraded by ultraviolet light to produce another toxin, mesoxalic acid, effectively hitting susceptible plants and seedlings with a double-whammy. The mesoxalic acid triggers a similar "cellular death cascade" in victim plants as gallic acid does, destroying the structural protein in the roots within minutes of exposure. The study highlights the persistence of the photo-degraded phytotoxin, particularly potent in the exotic species of the plant, and its enhanced effects against the native species of *Phragmites,* which is becoming increasingly endangered in the US. (See: Thimmaraju Rudrappa, Yong Seok Choi, Delphis F. Levia, David R. Legates, Kelvin H. Lee and Harsh P. Bais. *Phragmites australis root secreted phytotoxin undergoes photo-degradation to execute severe phytotoxicity*. Plant Signaling & Behavior, 2009; 4 (6): 506- 513) (*Excerpted from Changing Climate Likely To Make "Super Weed" Even More Powerful, in Science Daily, June 4, 2009)*

Aquatic Snail Permits Now Required. The United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), implemented existing regulations on April 5, 2006 to: 1) require importers and interstate sellers of marine and freshwater aquatic snails to acquire a three-year permit, 2) prohibit the importation or interstate movement of all members of the Family Ampullariidae except the interstate sale of *Pomacea bridgesi* (*diffusa*), and 3) routinely inspect shipments of aquatic plants and aquarium supplies that may contain aquatic snails. To acquire the appropriate permit (USDA PPQ Permit 526) visit [http://www.aphis.usda.gov/plant_health/permits/organism/index.shtml]. For additional information, contact Dr. Carmen Soileau, at <lena.c.soileau@usda.aphis.gov> or 301-734-5302. *(Thanks to Paul Zajicek)*

Invasive Dingoes May Promote Diversity. A new study suggests that in some cases, invasive predators, once established, can play an important role in the food web and might actually be good for conservation. The world's longest fence stretches for 5,000 kilometers (> 3,000 miles) from one side of southern Australia to another; it was designed to keep sheep-eating dingoes out of a third of the country. But on the dingo-free side of the fence, overall biodiversity is actually lower than on the side with dingoes. "There's an idea that introduced predators are altogether bad and cause these catastrophic extinctions," said Mike Letnic, an ecologist at the University of

Sydney. "Our results clearly show that this introduced predator species has a positive ecological role that is contrary to its classification as a pest."

Dingoes were introduced to Australia 5,000 years ago and promptly replaced the Tasmanian wolf as top predator. From 1900 to the 1960s, the country built a six-foot tall wire fence through deserts and mountains, from the southern coast to the northeast of Brisbane, to keep the dogs away from sheep and other livestock. Since then, ecosystems on two sides of the fence have strikingly diverged. Study results, published in Proceedings of the Royal Society B, showed more kangaroos and foxes inside the fence, where dingoes weren't hunting them down. With more of these mid-level predators around, there were fewer small mammals, such as the dusky-hopping mouse and dasyurid marsupials, including the Tasmanian devil, the numbat and the quoll. Of 19 threatened native mammal species, the study identified 16 of them inside the fence that would be better off if dingoes were around. From a conservation perspective, these findings suggest that dingoes might not be all bad, after all. *(Excerpted from a Discovery article, by Emily Sohn, June 30 [http://www.msnbc.msn.com/id/31666352/ns/technology_and_science-science/#storyContinued]*

Causes Of U.S. Black Cherry Invasion In Europe. Black cherry trees, native to the U.S., are invasive in Europe. Demographic research by the scientists indicates that black cherry trees grow much more sparsely in native forests than in European forests. Experiments now show a soil-borne pathogen keeps these trees in check in the US, but is too weak to stop them from spreading in Europe. A study at the Agricultural Research Service' laboratory in Miles City, MT, collected soil randomly around black cherry trees in more than 20 forests throughout their range in the US and nearly 20 forests throughout their range in Germany, France, Belgium and The Netherlands. They isolated the pathogen *Pythium,* or "damping-off disease", from the soil samples. Researcher Kurt Reinhart and colleagues tested the virulence of each *Pythium* isolate and then used DNA sequencing to identify them. They found some nonaggressive *Pythium* types were common in both ranges, but aggressive types were found only among samples from the tree's native range. Results from the pathogenicity experiments suggest that Pythium helps regulate black cherry populations in the US, but not in European forests. Evidence of an invader encountering more aggressive enemies in its native versus non-native range provides new evidence for the popular hypothesis that invasive species thrive outside of their native lands in part because they have escaped their enemies. Reinhart summarized results from this study at the July Soil Ecology Society and Society of Nematologists Joint Meeting in Burlington, VT. *(Excerpted from: USDA article, Study Shows Why North America Tree is Invasive in Europe, by Don Comis, July 14, 2009 [http://www.ars.usda.gov/is/pr/2009/090714.htm])*

Ireland Biodiversity Mapping Helps Track Invasives. A new National Biodiversity Mapping System in Ireland has gathered all available information on their flora and fauna and made it available online. Including maps and aerial photographs of habitats throughout the country, this represents the first comprehensive information system on Ireland's biodiversity. It contains over 400,000 records of 3,721 species, and can help Ireland answer questions such as how many species they have, where they occur, and what changes are taking place. It can also help early identification of invasion locations, so that they can be tackled locally before becoming more widespread. The system is expected to have one million records available by the end of the year.

Go to the website at [www.biodiversityireland.ie], then click on biodiversity maps and follow the links. *(From Sean MacConnell article in the Irish Times, June 12 [irishtimes.com])*

Third World Efforts. *Ed. Comment: It's nice to see so many Third World countries now beginning to recognize the impacts of invasive species, and taking proactive steps! Just in the last couple of months:*

*** Thailand** Begins to Curb Foreign Species**.** The government will distribute a handbook in an attempt to stop the spread of foreign animal species which pose a threat to the nation's ecosystem. Nisakorn Kositratna, Secretary General of the Office of Natural Resources, said her office had classified foreign animals into four categories and will distribute the information to 24 relevant agencies. "We are preparing guidelines and pictures of the animals so officials can easily identify and learn how to deal with them." The handbook would be completed in two months. "The species listed under the four categories include apple snails, sucker fish and iguanas. The cabinet has approved the move to control the alien creatures" she said. *(From Aquatic Hitchhikers May 14, 2009)*

*** Philippines** Plans an 'Alien' Species Campaign. The Environment Department has called for a massive information campaign to prevent people from introducing invasive alien species into a new environment**.** In a press release, Environment Secretary Jose Atienza said that invasive alien species are considered "one of the greatest threats to biodiversity, to human health and to endemic species. Not only are invasive species threatening our agriculture, fisheries and forests, they are also causing major impacts to human health and tourism" and educators should provide information, including brochures, posters and lectures on invasive alien species in community centers, libraries, schools and plant nurseries. (From: Business World Online, May 22 [http://www.bworldonline.com/BW052209/content.php?id=077]

*** Swaziland** Launches a National Invasive Plant Strategy - The Minister of Tourism and Environmental Affairs Macford Sibandze yesterday launched the formulation of a National Strategy for the control and management of invasive alien plant species in the country. "To deal with this problem effectively, it is imperative that a national strategy is formulated, adopted and implemented urgently," he said. *(From: Swaziland Launches a National Strategy for the Control/Management of Invasive Plant Species, July 10.)*

New Materials and Resources

Invasive Species Experts Directory. Identifying a new species is often difficult, and taxonomists are increasingly difficult to find. Now the national ANS Task Force has developed a database designed to direct users to invasive species experts. It has been set up as a 2-tier system with the first tier accessible to the public. The public portion of the database will guide you to a state contact who acts as a filter for information and identifications. If they can't answer your question, these state contacts have the ability to log in to the second tier experts. Check it out at [http://www.anstaskforce.gov/experts/search.php]

New Book: Alien Herpetofaunal Analysis. Alien reptiles, turtles, and amphibians have never been scientifically assessed as a group for their potential invasiveness. A hefty new 564 page book, *Alien reptiles and amphibians; a scientific compendium and analysis,* by Fred Kraus, examines how alien reptiles, turtles, and amphibians are transported by humans; surveys their ecological, evolutionary, economic, and health impacts; reviews the management responses taken against them; and summarizes the immediate research and management efforts needed to mitigate the threat posed by these organisms. It also provides a comprehensive database of herpetofaunal introductions worldwide and a bibliography of supporting literature. The database is also provided on CD-ROM to facilitate use of the data. Book and CD are available from Springer Verlag and online, for $169.00. To order, email < SCSC-books@springer.com> or go to [http://www.springer.com/life+sci/ecology/book/978-1-4020-8945-9] *(From Arpita Choudhury, via Lisa DeBruckyere)*

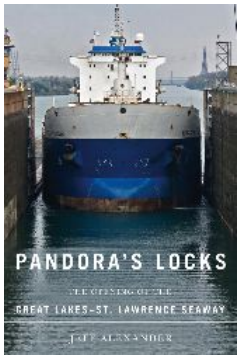
New Outreach Materials For Gardeners. The CA State Master Gardener Program has developed new materials about preventing the spread of aquatic invasive plants through water gardening activities. The materials include a resource sheet, an aquatic weeds poster and a tip sheet, and focus on preventing the spread of aquatic invasive plants through water gardening activities. The three documents are meant to be used in tandem rather than separately. The project was funded in part by the Western Regional Panel on Aquatic Nuisance Species. To find the materials, go to the CA State Master Gardener Program website [http://ucanr.org/invasive-water-garden] and click on the "Responsible Water Gardening" materials. (*Thanks to Kevin Anderson and Holly Crosson)*

International Conference Presentations Available. To access presentations and abstracts from the recent International Conference on Aquatic Invasive Species (ICAIS), held April 19-23, 2009 in Montreal, PowerPoint files in PDF format are posted on the ICAIS website. The final abstracts book is also available online in PDF format. Access the files at [http://www.icais.org/html/previous16th.html] and check the ICAIS website in the coming months for information about the next conference. (*From Lisa Carmody via Stephen Phillips)*

Apple Snail Website And Blog. The Snail Busters Blog was created to facilitate communication between aquatic resource managers who are fighting the spread of invasive South American apple snails, specifically *Pomacea insularum* and *P. canaliculata.* To view the website, go to [http://snailbusters.wordpress.com/] *(Thanks to Jess D, via Stephen Phillips)*

Gypsy Moth Article. If you're interested in reading an article on gypsy moths in the most recent issue of Western Forester, go to [http://www.forestry.org/pdf/debruyckere.pdf]. *(Thanks to Lisa DeBruyckere)*

The Impact of Connecting Waterbodies. Jeff Alexander's recently released book, *Pandora's Locks: the Opening of the Great Lakes-St. Lawrence Seaway,* explores the environmental impact of the $1 billion seaway that opened 50 years ago. By discharging ballast water into the Great Lakes, ocean vessels brought invasive species into the Great Lakes, which have caused more damage than the $3 billion Exxon Valdez oil spill, Alexander said. Through "Pandora's Locks," Alexander hopes to show how the seaway affects people living near the Great Lakes and across



the U.S. When the seaway opened in 1959, it was touted as an economic benefit to the region. But it has also resulted in higher water costs due to invasive species clogging water lines, beaches closed because of algae blooms, and smaller sized salmon, due to fierce competition for food sources, Alexander said. "When you catch a goby down at the pier, it's because of the seaway," he said. "Or you see zebra mussels on the beach, it's because of the seaway." The book recommends ocean vessels should have ballast water treatment systems and states should have their own laws to protect the waters. The book is available at the Michigan State University Press Web site: [http://msupress.msu.edu] *(Excerpted from a June 9, 2009, article by Peter Dainning, in the Grand Haven Tribune)*

Reader Feedback

USDA Apple Snail Permit: Reader Paul Zajicek, <Paul zajicep@doacs.state.fl.us> says: In reference to your article concerning apple snails, we produced a technical bulletin about the family to educate our producers and we included information about a national permit that effectively prohibits interstate trade in all members of the family Ampullaridae except for *Pomacea diffusa* (*bridgesi*). See [http://www.floridaaquaculture.com/publications/Apple%20Snails.pdf] and visit [http://www.aphis.usda.gov/plant_health/permits/organism/index.shtml] for permit information.

Offshore Aquaculture. For those of you interested in the emerging offshore Aquaculture issue, here are some resources, thanks to Kevin Aitkin, USFWS:
* National Offshore Aquaculture Act -[http://aquaculture.noaa.gov/pdf/06_whole07act.pdf]
* History – [http://aquaculture.noaa.gov/pdf/22_offshore_leg_history.pdf]
* Legal review – [http://www.aquanic.org/systems/cages/documents/offshore.pdf]
* Oregon Sea Grant info-
[http://blogs.oregonstate.edu/breakingwaves/2009/03/25/new-oregon-sea-grant-publication-explores-offshore-aquaculture/];
an Offshore Aquaculture publication –
[http://seagrant.oregonstate.edu/sgpubs/onlinepubs/w08001.pdf];
Sea Grant Symposium on aquaculture - [http://seagrant.gso.uri.edu/baird/2009/]
* NOAA info –
[http://www.gulfcouncil.org/beta/GMFMCweb/Aquaculture/08_%20Backgrounder%20on%20Open%20Ocean%20Pilot%20Projects-1.pdf] and [http://aquaculture.noaa.gov/];
NOAA Report – [http://aquaculture.noaa.gov/pdf/econ/econ_rpt_all.pdf];

NOAA Policy 1997- [http://swr.ucsd.edu/fmd/bill/aquapol.htm] ;
NOAA 2007-2017 plan - [http://aquaculture.noaa.gov/pdf/finalnoaa10yrrweb.pdf]

Reader Comment On Harvesting Invasive Species: I think harvesting/using invasive species as a tool to manage, control or eradicate them is acceptable. I don't think it is acceptable for responsible agencies to "naturalize" such species by changing their legal classification or setting up regulations, policies or programs to sustain, maintain or propagate such species. (Name withheld.)

Promoting Use of Invasive Species. Kurt Brownell, USACE, writes: I work in the Mississippi River bottomlands and help manage lands there, including invasive species control. One species that I have been quite successful at marketing is black locust (*Robinia pseudoacacia*). It is highly invasive here and I have sites with hundreds of acres of it. I initially started control on the most infested site by cutting it as part of a national public lands day volunteer event. That proved to be very labor intensive but as a result of the initial cutting I found that there was quite a market for this tree. People started coming out of the woodwork asking to buy it for firewood, fence posts, vineyard support posts, lumber, and the Corps even used it for some rock/log structures within the river to help stabilize a creek delta from being eroded by wave action. Black locust is extremely rot resistant so it has lots of uses. I now sell off chunks each year and basically get the land cleared for free so that I can then reforest it with native bottomland hardwood species. With budgets getting tighter each year, land/water managers need to utilize every tool they can to help manage this overwhelming problem of invasive species. Check out the attached links if you would like further information:
[http://www.rivervalleynewspapers.com/articles/2009/05/07/outdoors/1out.txt]
[http://www.rivervalleynewspapers.com/articles/2009/05/07/outdoors/lamb.txt]

Upcoming Major (Invasive) Meetings

August 24-27, 2009 - Portland, OR. Sixth International Conference on Marine Bioinvasions. [http://www.clr.pdx.edu/mbic/] Registration is now open.

September 8-10, 2009 - Seattle, WA. Western Regional Panel on Aquatic Nuisance Species Annual Meeting. [http://www.fws.gov/answest/]

September 11-12, 2009 – Lincoln City, OR. Oregon Lakes Association Annual Meeting. [www.oregonlakes.org] Send Abstracts before August 7 to both <events@oregonlakes.org > and <benj@pdx.edu>.

October 28-30, 2009 - Hartford, CT. North American Lake Management Society (NALMS) Annual Symposium. Send abstracts for presentations to <Amy.Smagula @des.nh.gov>. [http://www.nalms.org/nalmsnew/nalms.aspx?subcatid=42&Sid=3]

November 1-5, 2009 - Portland, OR. Coastal and Estuarine Research Foundation (CERF, formerly ERF). [http://www.erf.org/]. Abstract deadline was May 15.

November 4-5, 2009 – Silver Spring, MD. ANS Task Force Meeting. [http://www.anstaskforce.gov/default.php]

*** * * * * ***

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- Joan_cabreza@psmfc.org.* Managing Editor: Stephen Phillips, ANS Program Manager, Pacific States Marine Fisheries Commission, email – Stephen_phillips@psmfc.org