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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>.

This Quarter's Unusual News

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

A New Sport. Ah, American ingenuity! The Asian carp population in the Illinois River has exploded, and due in part to their habit of jumping from the water when boats approach, the fish



are a real hazard. But now, they are also a new sport that Chris Brackett, of Brackett Outdoors, in Mapleton, IL has coined "extreme aerial bowfishing". He has perfected a method of shooting leaping fish with a bow from a high-speed boat, and the sport is catching on. The size and number of carp that can take to the air is astounding, but it's not all fun and games; many end up in the boat, or collide with shooters onboard. During a recent DVD shoot, one woman was hit in the face with a flying carp, breaking her jaw. (*Excerpted from Field and Stream, August 21. Photos by Bill Conway.*) [http://www.fieldandstream.com/photos/gallery/fishing/2009/08/when-carp-attack]

Ed Comment: If you haven't seen the carp in action, go to <http://www.youtube.com/> and search for "flying carp".

Lights At The End Of The Tunnel?

Rainbow Trout Rebounding From Whirling Disease. Rainbow trout are rebounding in the Madison River, a world-class fishing stream where Montana's first known outbreak of whirling disease occurred about 15 years ago. In the U.S., whirling disease was first observed in about 1958; it now exists in about 20 states. A microscopic parasite, it attaches to the skin of young fish, causing them to swim in circles. In the 1990s, whirling disease reduced the rainbow trout population by 90 percent from 1960s-70s levels. But now, rainbows under 10 inches have "pretty well recovered to pre-whirling levels" and the population of the larger ones is about 60 percent of what it was before the disease, said Dick Vincent, previous whirling-disease coordinator for the MT Department of Fish, Wildlife and Parks. The fish have developed considerable resistance to the disease. How the resistance developed is unknown, but Vincent suspects whirling-disease resistance in Madison River fish is tied to disease-resistant trout in southwestern MT's Willow Creek Reservoir, that somehow ended up in the Madison years ago and shared favorable genes with fish there. But the infection level in the river is still quite high. Prevention and control efforts include use of ultraviolet systems intended to kill spores at hatcheries, and restrictions on stocking of trout from hatcheries that test positive. (July 20, 2009, Billings Gazette, [http://www.billingsgazette.com/news/state-and-regional/montana/article_436aa078-74f3-11de-8520-001cc4c03286.html])

Connecticut vs. Mile-A-Minute Vine. New Milford, CT, has focused its efforts on stopping the spread of Mile-a-Minute vine (*Persicaria perfoliata*), a highly invasive annual weed that grows up to six inches a day, and outcompetes and overgrows native species. Two



Photo: Leslie Mehroff

years ago, when it was first identified in New Milford, CT, the Mad Gardeners, a private regional group of more than 500 professional and amateur horticulturalists, spent a summer rooting it out before it could go to seed and spread further. Since then, Mad Gardeners has expended \$20,000 to \$30,000 annually to fight its spread. "We have seen incredible success this year, even with just pulling the plants," said Kathleen Nelson, chairman of their Invasive Species Advisory Committee. "And now we have been able to introduce weevils that eat the plants. It has been only a week and we can already see the effect the weevils are having." Over the past two years, teams of college students removed the plants and canvassed local properties for undiscovered patches. "We think we have limited it to a half-mile in diameter section in New Milford, and as far as we know it hasn't escaped downstream," Nelson said. "There is another patch about a mile in diameter on the New Milford/Bridgewater line. But the college crew has had such a success we almost ran out of work for them. So they've been knocking on doors and checking people's

backyards." Introducing the small stem-boring weevil, *Rhinsoncomimus latipes Korotyaev* was a bonus for this year's program. A thousand weevils were released in the two areas where Mile-a-Minute has a foothold. "It's amazing," Nelson said. "Where they were released last Thursday it already looks like the leaves were hit with a shotgun." (*Ed Comment: This illustrates two key ingredients needed for success: a large number of volunteers, plus persistent monitoring!*) (*Excerpted from a Kathryn Boughton article, Litchfield County Times, August 6.* [http://www.zwire.com/site/news.cfm?BRD=2303&dept_id=478844&newsid=20355759&PAGE=461&rfi=9]

Fungus Takes On Kudzu. Kudzu, "The Vine that Ate the South," could meet its match in a naturally occurring fungus. By one estimate, kudzu spreads at the rate of 150,000 acres annually, easily outpacing the use of herbicide spraying and mowing, and increasing the costs of these



controls by \$6 million annually. But in Stoneville, MS, plant pathologists are testing a fungus, *Myrothecium verrucaria*, which infects kudzu so quickly that kudzu plants sprayed with it in the morning start showing signs of damage by mid-afternoon. In greenhouse experiments, spray formulations killed 100 percent of kudzu seedlings and 90 to 100 percent of older plants in outdoor trials. *Myrothecium* also works under a wide range of conditions, including the absence of dew, and host-range tests in 2005 showed that it caused little or no injury to many of the woody plants occurring in kudzu-infested habitats, including oak, cedar, pine, hickory, pecan, sassafras and blackberry. *Myrothecium* also showed potential as a pre-emergence bioherbicide for controlling purslane and spurge in transplanted tomatoes. Read more about the research in the July, 2009, issue of Agricultural Research magazine, at: [<http://www.ars.usda.gov/is/AR/archive/jul09/fungus0709.htm>]. (*Excerpted from Science Daily, July 9; Thanks to Jan Haertel*)

Rat Island, Alaska, Eradication (Update). After a three million dollar eradication, the rats that have infested Rat Island since a late 1700's shipwreck now appear gone. The bad news: more than 250 dead birds were found on the island last spring, and the carcasses tested positive for brodifacoum, the poison used on the rats. Some gull deaths were expected, but 43 dead eagles were a surprise. If the rats are truly exterminated, this is the third largest island in the world to be rendered rat-free. Worldwide, some 300 other islands have now also been rendered rat-free. USFWS hopes to replicate this project on a dozen other islands in the Aleutian chain that remain over-run with rats. (*From 'Ecological Problems Follow Rat Riddance', by Erika Bolstad, for McClatchy Newspapers, August 25*)

Western Zebra Mussel Invasion Update

In the Western US, zebra and/or quagga mussels are now currently known to infest waterbodies in NV, CO, CA, AZ, UT, and TX...and "The U.S. Coast Guard has estimated that economic losses and [zebra/quagga] mussel control efforts in states already infected is costing **\$5 billion a year.**" Bellingham Herald, August 25.

[<http://www.bellinghamherald.com/102/story/1041310.html>]



Watercraft Interception Program Protocols (Update). The Western Regional Panel (WRP) on Aquatic Nuisance Species adopted the *Recommended Uniform Minimum Protocols (UMPs) and Standards for Watercraft Interception Programs for Dreissenid Mussels in the Western United States* at its September annual meeting in Seattle, WA. The WRP did not formally commit its member agencies to implementing the recommendations, but it will promote the UMPs as a guidance document for watercraft interception programs. This is a "living" document that will evolve as new information becomes available. The completed report has recommendations for three program levels, a self inspection program and protocols and standards for screening interviews, inspection, decontamination, quarantine, exclusion, and certification. The next steps will be to broadly promote the UMPs use by the various state and local entities. The protocols document is online 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>]. For technical questions on the document and recommendations for improving future drafts, contact Bill Zook <bjzook2@msn.com>.

An online survey was used in developing these protocols. Some of the results are interesting:

- Over 500 people are working on watercraft interception in the western states, and 72% received their training from PSMFC.
- Over 3000 training videos were distributed
- 52% of the respondents offer decontamination services
- 60% will treat contaminated water
- 52% require drying after decontamination
- 48% use the 100th Meridian Calculator for determining drying times needed
- 60% do not accept another agencies' certification
- 90% support development of Uniform Minimum Protocols (UMPs)

Ed Comment: While mussels were the impetus for protocol development, these protocols will be beneficial in stopping the spread of many other aquatic species as well.

Request for Proposals: *Experimental Evaluation of Protocols for Eliminating Live Dreissenid Mussel Larvae and Adults from Recreational Watercraft.* Uncertainty remains about protocols intended to eliminate live larval and adult mussels from contaminated watercraft. Proposals are

requested to implement additional scientific investigation of watercraft decontamination practices (e.g., pressurized hot water wash) to help set minimal thresholds for associated decontamination and inspection parameters. Proposals are due October 30, 2009, and should not request more than \$66,372 in funding. Matching funds are highly desirable, but cost-sharing or in-kind resources are not required. Federal, state, provincial or local agencies, institutions of higher education, commercial or non-profit organizations, Tribes, and international organizations are eligible for funding as investigators or cooperators. Projects must be completed by September 30, 2010. View full details for submitting a valid proposal online at [<http://www.psmfc.org/RFPs>] under "Open RFPs". (Thanks to Stephen Phillips)

Q-Zap: The Quagga-Zebra Mussel Action Plan. In December, 2008, the national ANS Task Force requested that the Western Regional Panel write a quagga/zebra mussel action plan for the Western US. A draft was prepared and presented to the Taskforce in May, and is now currently under revision. It will be presented to the ANS Task Force again at the November 2009 meeting in Silver Spring, MD. While this is a good start in standardizing activities in the West, many questions remain, including how the plan will be funded and implemented, and how it will be incorporated into state plans.

Veliger Monitoring Method. The FlowCAM[®], an optical imaging device, can now be used by water quality professionals to detect, identify, and enumerate zebra and quagga mussels in their larval, or veliger state. "Equipped with cross-polarizing lenses, the FlowCAM[®] takes advantage of a unique optical property of mussel veligers, capturing the birefringent image that comes from the calcite of the veliger shell." A ten ml of sample can be analyzed in as little as 20 minutes. On request, the FlowCAM[®] people will provide a paper describing how the device can be used to detect veligers, and a brief summary of a Bureau of Reclamation study on the accuracy of the FlowCAM[®]. Any organization interested in learning more about the FlowCAM[®] can arrange for an analysis of a sample and a follow-up 'web demo' showing the results of the analysis. For more information, contact Victoria M. Kurtz, <victoria@fluidimaging.com>.

San Justo Reservoir Likely Closed For Another Year. There is a "99 percent probability" that the San Justo Reservoir will remain closed for another year as local water officials await



(Hollister Free Lance photo)

government approval of proposed mussel eradication options, including water drawdown. The reservoir has been closed since mussels were discovered in January 2008, to ensure that boaters or fishermen did not inadvertently transport the mussels to other waterways. The focus is on protecting the water users, not the recreational users.

[<http://hollisterfreelance.com/news/259533-san-justo-reservoir-likely-closed-for-another-year>]

Mussels Spread In Texas. Since 2006, five cases of zebra mussels have been documented found on boats trailered into Lake Texoma from other states. All five boats were quarantined and cleaned of mussels prior to being allowed to launch. But this year, on April 3, the first adult zebra mussel was documented living in TX, and additional live specimens were later reported in Lake Texoma, where they are now believed to be well-established. Then, on August 3, live zebra mussels were found in West Prong Sister Grove Creek in Grayson County, 300 yards downstream of the Lake Texoma water transfer pipe. This creek flows into Lake Lavon, the largest drinking water source in North Texas that supplies water to 1.5 million people in dozens of communities. (*Excerpted from the Tribune, August 25.*
[<http://ourtribune.com/article.php?id=8023>]

...and....

The spread of zebra mussels from Lake Texoma, TX, into the head waters of Lake Lavon has been confirmed, and experts fear they could eventually spread throughout the Red River and Trinity River watersheds. The mussel was first spotted in the lake in April, and was confirmed to be reproducing there earlier this summer. Now, the goal is to keep mussels from going to other waterways along the Trinity, and the North TX Municipal Water District has stopped pumping water from Lake Texoma to Lake Lavon. (*Excerpted from the Herald Democrat, August 24, Mussels Invade Lake Texoma*)

Unexpected Consequences of ZM Treatment: During an underwater training exercise, Buffalo Police Department divers discovered an 8-foot-high pile of zebra-mussel shells partially blocking Buffalo's drinking water intake pipe in Lake Erie. The Buffalo Water Department had installed a chlorine treatment system for controlling the invasive species in its water intakes. Although the chlorine treatment has worked, it did not prevent the buildup of the dead mussel shells. Buffalo officials are seeking to determine the most cost-effective way of removing the dead mussels; but for now, the shell pile is not large enough to prevent the city from obtaining an adequate supply of water from the lake. (*From July 22, Water Technology Online*
[http://watertechonline.com/news.asp?N_ID=72280], thanks to Mark Sytsma)

A New Vector: Fire Departments. Dry fire hydrants are non-pressurized pipes permanently installed in surface water bodies to provide a dependable water source for fire suppression. But they may also be a vector for invasive species spread. During routine maintenance of dry hydrants, back-flushing of the hydrant intake screens to remove debris moves water between hydrants and water bodies. Recently, a KS Fire Department used a dry hydrant at Cheney Reservoir, and Asian clams were drawn into their truck, causing problems with the holding tanks, pumps, and distribution lines. Parts of the truck had to be disassembled to remove about five gallons of shells. An alert was subsequently sent to all fire departments, informing them of this issue, and teaching best practices for dry hydrant use, in an attempt to prevent future issues with invasive species. It is recommended that protocols be established to protect the hydrants from fouling by invasive species and prevent the spread of invasive species through their use (Excerpted from a report by Jason Goeckler, in the Association of Fish and Wildlife Agencies (AFWA) *Newsletter*. Contact him for more information, at <jasong@wp.state.ks.us>.)

...and...

Until recently, the fact that fire department tanker trucks transfer thousands of gallons of water from one location to another was overlooked, and yet the trucks are essentially acting as "on-land

ballast containers”. Each fire department training exercise or back-flushing of dry hydrants can transfer between 5,000-80,000 gallons of water from one waterbody to another. Jennifer Holman (Holman Environmental) has now developed some “quick, non-destructive, cost-effective protocols” to disinfect tanker trucks and landscaping equipment. The protocols are remarkably cheap, and only cost about \$243 per fire department per year. Jennifer has also been instrumental in getting an ordinance established in WI. For more information on the protocols or the ordinance, contact her at (505) 471-3631, or email her at <Jennifer@holmanenvironmental.com>.

Mussels Threaten Artifacts. Lake Champlain historians are trying to stay ahead of a mussel invasion that may threaten one of the lake’s most treasured artifacts. During the Oct. 11, 1776, Battle of Valcour, the American gunboat Spitfire was heavily damaged by the British, and abandoned on the open waters of Lake Champlain. American Commander Benedict Arnold and his remaining fleet slipped from the battle under darkness, and hours later, the Spitfire vanished beneath the surface to settle on the lake bottom, 200 feet below. In 1997, a Lake Champlain Maritime Museum underwater survey of the lake bottom discovered the intact boat, preserved by the deep lake’s cold water. The boat remains in pristine shape, and has become an official project of the federal program called Save America’s Treasures. The wreck has been protected from the lake’s zebra mussel invasion because it is so deep, but the quagga mussel has already established in Lake Ontario, and it tends to colonize deeper waters than zebra mussels. When they arrive, it could be catastrophe for the Spitfire. Meanwhile, a dive team visits the Spitfire annually to update its condition, and the Maritime Museum is now seeking public input on the best option for protecting the Spitfire: on-site preservation, or recovery, conservation and public exhibition. (*Excerpted from an August 5 Press Republican article by Jeff Meyers.*)
[http://www.pressrepublican.com/midday/local_story_217101716.html]

Idaho Invasive Species Program (Update). Thirty seven invasive species highway signs, warning incoming vessel owners about the mussel threat, and stating penalties and contact information for obtaining free inspections are now posted at the ID borders. The State of WA supplied the template. All 370 public boat launches will be posted with a “Clean, Drain, and Dry” message and 11 billboards are posted at or near the state line throughout the boating season. Outreach activities, including live radio spots, began running in the Boise, Idaho Falls, Pocatello, Twin Falls, Spokane and Logan markets during the July 4th weekend. Utility stuffers, posters, brochures and other outreach materials are being distributed statewide. Inspection and decontamination services were provided by an Idaho-based contractor during boating season at 10 locations. An additional 9 inspection stations were sited at high priority boat launches, such as Redfish Lake. These were mainly operated by local governments. To facilitate the potential for eradication, Idaho’s waterbodies have been prioritized based on calcium levels, use by recreational boaters and threats to endangered and threatened species. Ninety “Critical” and “Very High” risk waterbodies have been sampled periodically throughout the season, as veliger densities fluctuate significantly.



An online website allows users to track interagency monitoring efforts with an interactive map (<http://gis.idaho.gov/quaggamap>). Go to [www.invasivespecies.idaho.gov] for a short informational video, locations for boat sticker purchases, frequently asked questions, a map of the inspection/decontamination sites, and an example of the IISF sticker.

For a [YouTube video](#) on Idaho's Invasive Species program, see [<http://www.youtube.com/watch?v=J4EVAy8adMk>] (*Thanks to Amy Ferriter*).

Other West Coast Activity

New Bryozoan In WA. A non-native bryozoan, *Waterspiroa subtorquata*, is now appearing in northern locations in Puget Sound. In protected areas, colonies may become quite large, forming



Photos from CA Academy of Sciences and Andrew Cohen

cauliflower-like masses of lobes and frills up to 25 cm in height. It is typically a bright orange or red, with varying (sometimes large) amounts of black. (*Guide to exotic species of San Francisco Bay*)

It has been noted on floating docks in John Wayne Marina, in Sequim, and divers recently noted it on the Bremerton Warren Avenue bridge, where large patches are covering the bridge supports and surrounding boulders. The SSG database indicates it “is considered cosmopolitan and widely invasive among cool temperate water ports. Preventative measures are the only practical means of control at this time”. For more information on these sightings, contact Greg Jensen, <gjenson@u.washington.edu>. *Ed Comment:* Distribution in WA appears limited at the

moment. But, as with other invaders, there is a limited window of opportunity for its eradication. **Is anyone going to get excited about this species, investigate its possible distribution and consider eradication while it is still possible?**

Oregon Invasive Species Survey. One of the outcomes of the 2008 Oregon Invasive Species Summit was the recognition that OR needed a statewide management assessment of invasive species, to understand where existing resources are going (outreach and education, management, surveillance, etc.) and to identify gaps in legislation and policy. The OR Invasive Species Council responded to this need by launching a survey of federal, state, tribal, and local governments, nonprofit organizations, academic institutions, and industry representatives. The deadline for survey completion was August 18, 2009. The survey results will be shared at a statewide invasive species summit in 2010, and will be used in developing an invasive species strategic plan for OR. *(Thanks to Dan Hilburn)*

Asian Clams in Lake Tahoe. The population of coffee-colored Asian clams has soared in the southeast portion of Lake Tahoe, threatening to hog food sources and excrete nutrients that foster algae growth, according to the annual *Tahoe: State of the Lake Report* by UC Davis researchers. Scientists worry that calcium in the clams' shells could make the lake more hospitable to a



Zebra mussel invasion, although quagga and zebra mussels have not been sighted at Tahoe. The Tahoe Regional Planning Agency, which has spent more than \$1 billion in federal, state, local and private money on lake restoration efforts, has been aware of the Asian clam problem in Tahoe since 2002, clams have proliferated fairly rapidly only in the past couple of years. Investigations are underway to determine whether the clams have moved from southeast areas to other parts of the lake. Authorities are testing removal methods such as suctioning out the clams, and covering their beds in plastic to smother them. Environmentalists have also called for increased boat inspections to make sure quagga and zebra mussels don't get in. "We think the time has come for additional measures to protect the lake," said Rochelle Nason, executive director of the League to Save Lake Tahoe. "Specifically, we need to start examining boats as they enter the basin, before they make it to the shoreline. The day may come when Tahoe must be closed to traveling boats." *(Excerpted from an Amy Littlefield article in the Los Angeles Times, August 19.)*

WA Mosquito Permit. The WA Department of Ecology is working on reissuance of its mosquito NPDES permit. It is expected to cover adulticides, in addition to the larvacides

currently covered under the existing permit. Contact Jon Jennings for more information, at <jjen461@ecy.wa.gov>.

WA Crayfish Rules. The Aquatic Nuisance Species Committee will be reviewing and commenting on a Washington Department of Fish and Wildlife proposal to allow possession and transportation of live invasive crayfish that are obtained under the department's recreational native crayfishing rules, and only for consumption or upland disposal purposes. The proposed regulation was drafted because the department believes that people should be penalized for removing invasive crayfish from infested waters during otherwise legal fishing activities. This does not require the ability to distinguish between native and nonnative species, and it does not change the size criteria and harvest limits that may otherwise promote the deliberate illegal spread to other water bodies. (*Thanks to Allen Pleus; contact him for more info on the crayfish rules at <pleusaep@dfw.wa.gov>*)

King County (WA) Biocontrol Results. The King County biocontrol program has had promising results this year; the Canada thistle gall-fly (*Urophora cardui*) has established at all sites they have released at in past years, and at some sites the number of galls appears to be increasing. The Scotch broom seed-feeding beetle, *Bruchidius villosus*, has also been found at almost every Scotch broom site surveyed, including one at an elevation of 1500 feet; although the beetle was not previously thought to survive above 900 feet. The purple loosestrife foliage-feeding beetle, *Galerucella* spp., has also been extremely effective. Within four years of surveying purple loosestrife along the boardwalk trails of Marymoor Park, Redmond, the purple loosestrife population has been reduced to a handful of stems. But in contrast, releases for Dalmatian toadflax and spotted knapweed in the Green River Watershed have been only marginally successful. Establishment has been slow for the stem-mining weevil (*Mecinus janthinus*) for Dalmatian toadflax, and remains unknown for the seed-feeding beetles (*Larinus minutus*, *L. obtusus*) on spotted knapweed.

King County biocontrol releases this year to-date include:

- 5 releases of *Bruchidius villosus* (1100 insects)/ Scotch broom
- 1 release of *Chrysolina* spp. (300 insects)/ St. Johnswort
- 3 releases of *Galerucella* spp. (1150 insects) / purple loosestrife
- 1 release of *Hylobius transversovittatus* (100 insects) / purple loosestrife
- 2 releases of *Larinus minutus* (750 insects) / spotted knapweed
- 3 releases of *Larinus obtusus* (1500 insects) / spotted knapweed
- 1 release of *Mecinus janthinus* (200 insects) / Dalmatian toadflax
- 3 releases of *Urophora cardui* (960 insects) / Canada thistle

(*Excerpted from KC Weed News; contact Sasha Shaw <sasha.shaw@kingcounty.gov> for more information.*)

Oregon Fights Feral Swine. Wild hogs denude the landscape, create large muddy wallows, dig up native plants, and create the perfect environment for invasive plant establishment. Restoration of ecosystems and losses to agriculture and livestock due to wild hogs is estimated to exceed \$800 million in the US annually. Although recently escaped or released domestic hogs look and behave like farm pigs, with each generation, their domestic characteristics diminish, and they develop characteristics that make them more capable of surviving in the wild. In 2004, OR developed a wild hog risk assessment and a wild hog management plan. In OR, wild hogs are defined as escaped

domestic pigs, wild European boars, and/or a hybrid of both. The assessment designated wild hogs as a “very high-risk species” due to great potential for establishment, environmental and economic impacts, and disease transmission to wildlife, livestock, and humans. In 2009, legislators passed House Bill 2221, making it a crime to knowingly allow wild hogs to roam on private land, or to sell or purchase hunts for wild hogs. The goal is eradication of these large, dangerous mammals – not creation of hunting opportunities. In states such as CA, failure to act quickly has resulted in large populations of wild hogs that are unmanageable and uncontrollable. Oregon’s wild hog population is believed to be small and dispersed, although lack of funding to monitor these species is a concern, particularly given how quickly this species multiplies. Eradication of wild hogs is estimated to require a four-year, \$1.29 million effort, and follow-up control of new releases and escapes will require a maintenance effort estimated at less than \$50,000 per year. But these costs are small, relative to the value of the \$3.6 billion OR agriculture and livestock industries, and the investment OR has made in riparian restoration. Sustained control of wild hogs will also require a long-term commitment that will include annual domestic hog marking, education, and monitoring. (*Excerpted from an OISC Press Release, August 12, 2009, thanks to Lisa DeBruyckere*)

WA Inspects Boats on I-5. As part of an ongoing effort to keep aquatic invasive species out of WA waters, all northbound vehicles transporting watercraft past the Ridgefield weigh station on Interstate 5 were required to stop for an inspection on September 25. The mandatory inspections were the latest in a series of more than two-dozen check stations for aquatic invasive species planned by the Washington Department of Fish and Wildlife (WDFW). The inspections can usually be completed in 10 minutes, but failure to stop for an inspection can result in a citation. Neither quagga nor zebra mussels have been found in Washington waters, although WDFW has intercepted and decontaminated 17 boats infested with the tiny mussels in the past three years. Importation of aquatic invasive species is a gross misdemeanor punishable by up to \$5,000 in fines and up to a year in jail. Knowingly bringing such species into WA is a felony and can result in even greater fines and jail time. (*From a WDFW Press Release, September 18*)

New Fruit Fly in Oregon. An exotic species of Asian fruit fly, *Drosophila suzukii*, has appeared in OR. It has been found in cherries, strawberries, blueberries, peaches, and plums, so far, but other fruits are also likely to be hosts. Luckily, it appeared late in the year, but this could be a future headache for fruit growers. Thankfully, at least one organic product, GF-120, may be useful in managing this pest. ODA hosted an information meeting in Salem, on September 22, for fruit growers and other interested persons. More information is available at: [<http://oregon.gov/ODA/PLANT/IPPM/index.shtml>] (*Thanks to Dan Hilburn*)

Another Problem Vine. Now is the time to look for Old Man's Beard (*Clematis vitalba*), a perennial woody vine originally planted as an ornamental. Like English Ivy, this plant climbs and smothers objects like trees, shrubs, or fences and can aggressively grow vertically 100 feet or more. It is very problematic in areas such as Portland, but there are scattered populations in many parts of WA and OR. It blooms throughout summer, and has green to white, perfect flowers (stamens and pistils on all flowers) about one inch in diameter, arranged in clusters. Prolific seed clusters look like white puffy spheres, and persist through late fall and into winter. The best control is achieved by a combination of manual, mechanical and chemical



methods. Climbing vines can be cut at waist height, allowing the upper vines to die back. Lower vines and growth along the ground can be dug up anytime or treated with an herbicide when the plant is actively growing. Applying herbicide to freshly cut vines is also effective. See [<http://www.kingcounty.gov/environment/animalsandplants/noxious-weeds/weed-identification/old-mans-beard.aspx>] for more info on this plant. (*Excerpted from Weed Watcher newsletter; thanks to Tania Siemens. For more information, contact her: < tania.siemens@oregonstate.edu>*)

NAS Database Alert for Oregon. An American Alligator (*Alligator mississippiensis*) was found in a new State, (Oregon) in the Applegate drainage (17100309), southeast of Grants Pass. More information on this specimen can be found at: [<http://nas.er.usgs.gov/queries/specimenvviewer.asp?SpecimenID=262363>] , and more information on this species can be found at: [<http://nas.er.usgs.gov/queries/SpResults.asp?SpeciesID=221>]

Alaskan Slug Invasion: Another Hybrid Story. The European black slug, *Arion ater*, appeared in AK a few decades ago, and has adapted to its new environment at an alarming rate



and spread quickly. Like all slugs, it can devastate gardens and agricultural areas with alarming speed. It can reach an impressive six inches in length, is shiny jet black, and has lateral grooves running along the back half of its body, with a pebbly texture on the front half. There is also a less-common white colored version of this slug. The slug is hermaphroditic, although it prefers a mate. In some parts of AK over the past two decades, the black slug has started mating with the non-native pest species *Arion lusitanicus* or Spanish slug, resulting in a more resilient hybrid exhibiting increased tolerance to Alaska's colder environment. (*Excerpted from 'Invasive slugs can decimate your neighborhood', in the Cordova Times, July 16. [<http://www.thecordovatimes.com/news/show/6648>].*)

Wyoming Invasive Species Legislation. Wyoming now has a draft bill underway for control of aquatic invasive species. The current version provides for inspection of conveyances; decontamination; impoundment and quarantine of vehicles; rules; and civil and criminal

penalties. The bill is currently a working draft (not approved for introduction), and will likely be considered in the 2010 legislative session. To view the draft, go to [<http://legisweb.state.wy.us/interimCommittee/2009/10lso-0037w1.pdf>]. (*Thanks to Amy Ferriter*)

National And International Activity

Coast Guard Ballast Water Rulemaking. Efforts to fix environmental damage caused by organisms in ships' ballast water can prove quite costly: an estimated \$200 million a year for the Great Lakes alone. On August 28, the Coast Guard proposed national standards for regulating the release of ballast water. It proposes to amend its regulations on ballast water management by establishing standards for the allowable concentration of living organisms in ships' ballast water discharged anywhere in U.S. waters. The Coast Guard also proposes to amend its regulations for approving treatment systems by establishing an approval process for ballast water management systems. These new regulations would aid in controlling the introduction and spread of nonindigenous species from ships discharging ballast water in U.S. waters. Comments and related material must either be submitted to the online docket via [<http://www.regulations.gov>, Docket No.USCG-2001-10486] on or before November 27, 2009 or reach the Docket Management Facility by that date. Remaining public meetings will be held in Washington, DC (October 8, 2009), Oakland, CA (October 27, 2009), and New York, NY (October 29, 2009) to provide opportunities for oral comments.

The regulations would establish a limit on the number of invasive organisms that can be released along with ballast water while the ship is in port. That limit would initially be the same standard as that used by the International Maritime Organization (IMO), a standard favored by some states, but considered weak by many environmentalists. The goal is to establish a national standard which is 1,000 times more stringent than the IMO standard by 2016. This goal may be modified by a practicability review set to begin in 2013. (*August 28 Federal Register, page 44631-44672*). (*Thanks to Randy Marshall*)

EPA Vessel General Permit. The EPA Vessel General Permit has been discussed in several back issues of Nutshell, and won't be repeated here. But the WA Department of Ecology has a good webpage for information on the federal permit, with pertinent links. See it at [<http://www.ecy.wa.gov/programs/wq/permits/VGP/index.html>] (*Thanks to Randy Marshall*).

NPDES Permit Development for Pesticide Discharge. In 2006, EPA implemented a rule that exempted pesticide application from Clean Water Act provisions requiring a National Pollution Discharge Elimination (NPDES) Permit. Early this year the Sixth Circuit nullified the rule, saying that an NPDES permit is required for applications over or near US navigable waters. EPA indicates that the application of pesticides and herbicides to control nonnative species will be affected. EPA also requested a stay of two years to develop a new rule. In April, the Court agreed. On October 7, EPA is hosting a webcast to describe Agency efforts to develop an NPDES general permit for discharges from the application of pesticides in the few remaining areas nationwide where EPA is the NPDES permitting authority. This EPA expects the 45 states that are authorized as NPDES permitting authorities to use EPA's general

permit to guide them in developing and issuing their own permits. The Webcast will cover current legal status of NPDES requirements for discharges from the application of pesticides; the schedule for developing NPDES general permits for such discharges; current agency thoughts on general permit conditions related to the scope of general permit; Notice of Intent (NOI) for obtaining permit coverage, technology-based effluent limits; water-quality-based effluent limits; and monitoring, reporting, and recordkeeping requirements. The Webcast is open to the public and free of charge. A link to the Webcast will be available on EPA's NPDES training Web site. You must be registered for the webcast to participate. To register, go to: [http://cfpub2.epa.gov/npdes/courses.cfm?program_id=0&outreach_id=483&o_type=1]. For information about EPA's pesticide program, visit the homepage: [<http://www.epa.gov/pesticides/>] (*Thanks to Kevin Aitkin*)

National Invasive Species Awareness Week. The National Invasive Weed Awareness Week (NIWAW), established a few years back, has now been changed to the National Invasive Species Awareness Week (NISAW), and expanded to include issues related to all taxa of invasive species. This national and regional trend to envelop the entire invasive species problem as a consistent single message to the public is an exciting step forward. As information becomes available, the details will be posted at [<http://www.weedcenter.org/nisaw/>] (*Thanks to Mike Ielimi*)

US National Aquatic Animal Health Plan. A National Aquatic Animal Health Plan (NAAHP) is now available for public review and comment. The NAAHP was developed by a Task Force led by APHIS, FWS, and NMFS. It is anticipated that this plan will provide a framework for how these agencies should develop programs for diseases that affect the health of aquatic animals such as finfish, crustaceans, and mollusks. The agencies will consider all comments received on or before October 20, 2009. Find the Federal Register Notice at: [<http://edocket.access.gpo.gov/2009/E9-19702.htm>], and the draft plan at [http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/naah_plan.shtml]. (*Thanks to Paul Zajicek*)

\$1 Billion Proposed in 2010 for Great Lakes Restoration Congress is poised to nearly double its funding commitment to the Great Lakes, adding up to \$475 million for restoration that would deter invasive species, clean up polluted sites, and create jobs in Michigan and the region. The unprecedented amount of money being considered for the Great Lakes reflects President Obama's campaign pledge of \$5 billion for large-scale restoration, including \$60 million for combating zebra mussels and other invasive species. In response, the EPA will soon roll out recovery programs known collectively as the Great Lakes Restoration Initiative. The project could ultimately cost \$20 billion, but this is an important start, and that it will be administered by one agency may help avoid the scattershot funding that has undermined earlier restoration efforts. (*Excerpted from a NY times editorial august 31, and article September 03, 2009*) [http://www.nytimes.com/2009/09/01/opinion/01tue3.html?_r=2]

National Wood Packaging Rule. In the first step in developing a national treatment rule, the U.S. Animal and Plant Health Inspection Service (APHIS) is holding public meetings seeking input on ways to lessen the impact of interstate movement of solid wood packaging materials and firewood. The spread of invasive species, particularly the emerald ash borer and the Asian

longhorned beetle, has become a major forest health concern, and the spread of wood pests has led local and state governments to impose their own requirements, creating competitive advantages for packaging suppliers in states neighboring quarantine areas. A national rule would reduce the confusion associated with the current mosaic of state and local restrictions. The National Wooden Pallet & Container Association has been lobbying for a national rule requiring all pallets to be treated according to ISPM-15, the international standard for wood packaging materials. Given the billions of pallets in the U.S. supply chain, any treatment requirements could have a significant impact in the interim. Comments on the proposed rule must be received on or before October 26. Submit comments and/or view supporting and related materials electronically at

[<http://www.regulations.gov/fdmspublic/component/main?main=DocketDetail&d=APHIS-2009-0016>]. (*Excerpted from a Chaille Brindley article, September 2, [http://www.materialshandling.net/articledatabase/view.asp?articleID=2942]*)

Another Introduction Pathway: Craig's List. A dozen pythons were seized from Bradley Dean, a teenager who tried to illegally sell the snakes on Craig's List. The pythons seized included two eight to nine foot adult Burmese pythons, four reticulated pythons four to nine feet long, and six small juvenile albino pythons. Just last month, FL began its new python hunting permit program, in an attempt to eradicate them. Floridians are required to have a license to own pythons, and another license to sell them. Once the pythons reach two inches in diameter, a microchip must be implanted to identify the snake's owner. Dean reportedly had no licenses, and the larger snakes weren't properly microchipped. The snakes were taken to a pet shop in New Port Richey for safe keeping, and Dean faces several misdemeanor charges. (*Excerpted from an August 28, Miami article, '12 Pythons Seized in Undercover Sting in Florida'*) [<http://www.nbcmiami.com/news/local-beat/12-Snakes-Seized-in-Undercover-Sting-55753522.html>] (*Thanks to Kevin Aitkin*)

Promising *Arundo donax* Controls. The giant reed *Arundo donax* has been particularly destructive in the Southwest U.S., where it invades riparian habitats and irrigation canals. In its native Spain, the giant reed is kept under control by a host of insects. Now Agricultural Research Service (ARS) scientists have found four promising biological controls in Spain that could curb the reed's impact. A scale insect, *Rhizaspidiotus donacis*, attacks the reed's root, and this insect's release has been recommended by the Technical Advisory Group, a North American organization that oversees releases of weed biological control agents. A second biocontrol candidate, the *Tetramesa romana* wasp, was released in Texas in April 2009. This wasp attacks the weed's main stem, weakening the plant, reducing its overall height, and causing it to form galls and put out side shoots. The third promising biocontrol agent, the Arundo fly *Cryptonevra spp.*, eats the inside of new shoots of the plant, and the leaf sheath miner, *Lasioptera donacis*, destroys the plant's leaves. Of the four biocontrol candidates, the scale insect, which has an outstanding reproductive capacity and feeds on root rhizomes where most of the plant biomass occurs, shows the most promise. This biological control approach is sustainable over the long term, complements mechanical and chemical control strategies, and the potential release of the scale is a major accomplishment for the research unit. Read more about this research in the July 2009 issue of Agricultural Research magazine, available online at: [<http://www.ars.usda.gov/is/AR/archive/jul09/arundo0709.htm>] (*Thanks to Mark Sytsma*)

Yet Another Introduction Pathway: Crane Water Weight Bags. There is news of yet another little-known, but potentially significant introduction pathway for aquatic invasive species: water weight bags used by the crane industry as an alternative to fixed solid weights for crane calibration and lift testing. Cranes can be found working at almost any construction or industrial site, and crane testing is required by crane safety standards and regulations. These large, lightweight water bags are easily transported to a work site where a crane is being used. There, the bag can be filled with water to specified volumes that equal a precise weight, emptied after crane testing operations have concluded, and transported to another work site. If raw water



Crane testing at Glen Canyon Dam, 2005
(Photo by Gerry Jarin; photo courtesy of Jim Jota, Imes, Inc.)

is used for bag filling, such as happens at a remote site, and bags are not thoroughly dried or decontaminated, there is potential that residue water inside the bag will be transported to the next work site, which could be many miles away. Any organisms retained in the residue water, such as quagga mussel veligers, could be inadvertently moved in the process. Water weight bags generally cannot be easily inspected at the level required to find mussel veligers. More research is needed on this issue, and the Aquatic Nuisance Species Task Force will be discussing this further during the November meeting. Partnerships may also be formed to evaluate the efficacy of freeze treatments or other decontamination methods. For more information on this, contact Joe DiVittorio, at <jdivittorio@usbr.gov>.

Second Python Species Raises Worries About Hybrids. Already fighting a giant Burmese python invasion, Florida now faces what one scientist calls one of the state's "worst nightmares". Six specimens of Africa's largest snake, the ill-tempered, 20-foot-long African rock python that is even more dangerous than the Burmese python, have been found in FL since 2002. The five African pythons recently caught or sighted include a 12-foot adult specimen, a hatchling, a two-foot snake that had eaten a common grackle, a large snake that had eaten a turkey, and a



(Photo by George Skene, Orlando Sentinel; (snake is 18' long and 30 inches around)

large pregnant female run over by a car. And although so far they have been found only in a single square mile west of Miami, they have only to cross the road to enter Everglades National Park. Like the Burmese python, the African snake is a constrictor, lacks poison, and it kills its prey by encircling and literally squeezing the life out of it. While Burmese pythons aren't known to eat people in their native habitat, the African rock python, unfortunately, has been known to do just that. Scientists also worry that the two python species could breed, yielding more aggressive offspring. Whether African rock pythons and Burmese pythons could produce fertile offspring remains a big question, but the looming possibility of "hybrid vigor" between nonnative species is sobering. (Excerpted from articles by Patrik Jonsson, in *The Christian Science Monitor*, September 14, 2009, and Christine Dell'Amore, in *the National Geographic News*, September 14, 2009.)

West Coast Crab Shows Up in Massachusetts. For the second time in three years, a Gloucester fisherman has caught and landed an adult male Dungeness crab (*Cancer magister*) off Cape Ann, MA. The 1.95-pound crab was trapped on sandy bottom, 120 feet down, about a mile south of Magnolia on August 21. Earlier, on July 19, 2006, another Gloucester gillnet hauled up a Dungeness crab snagged in a net set 270 feet down in East Gloucester, about two miles southeast of Thatcher's Island. This crab also weighed around 2 pounds. The most likely entrance pathway is transport as larvae in ship ballast water brought from the West Coast. (Excerpted from *Ebb & Flow*, Gloucester Daily Times, August 29, by Peter K. Prybot, [http://www.gloucestertimes.com/punews/local_story_241022256.html]).

Japanese Apple Rust Reported. Japanese apple rust found on an ornamental host, *Malus toringo*, has recently been reported from Delaware and Pennsylvania. This rust disease can infect a number of *Malus* and Juniper hosts, and can be a serious disease in apple production in its current area of distribution in Asia. See more information and images at [<http://nt.ars-grin.gov/taxadescriptions/factsheets/index.cfm?thisapp=Gymnosporangiumyamadae>] (Thanks to Robin Rosetta)

Ocean Policy Taskforce. On June 12, 2009, President Obama established an Interagency Ocean Policy Task Force, led by the Council on Environmental Quality (CEQ). The Task Force is charged with developing a recommendation for a national policy that ensures protection, maintenance, and restoration of oceans, our coasts and the Great Lakes. It will also recommend a framework for improved stewardship, and effective coastal and marine spatial planning. The Task Force seeks input on its work from interested communities, governments, tribes, businesses, associations, non-governmental organizations and the general public. For more information on the Task Force and the opportunity for public input, go to: [<http://www.whitehouse.gov/administration/eop/ceq/initiatives/oceans/>]. (Thanks to Kevin Aitkin)

Colorado Steps Up Tamarisk Battle. CO agriculture officials are widening their battle against the West's most voracious shrub, tamarisk (*Tamarix spp.*). Tamarisk, or salt cedar, was imported more than a century ago for erosion control, but then spread out of control,

now colonizing over 70,000 acres along CO rivers. A single tamarisk tree can take up more than 200 gallons of water per day, lowering water tables, drying up springs, streams and wetlands, and fueling fires. One tamarisk can produce 500,000 seeds a year, each germinating within 24 hours. East of the Continental Divide, officials are employing a controversial leaf-eating Chinese beetle, the yellow-striped *Diorhabda elongata*. Earlier, state teams released 100,000 beetles along banks of the Arkansas River, and then released another 100,000 in August. Proponents see these beetles as cost-savers, but there are concerns the *Diorhabdas* may affect the endangered southwestern willow flycatcher, which uses tamarisk in NM and AZ for nesting. A lawsuit recently forced the federal government to suspend its releases of *Diorhabda* beetles in eight Western states where tamarisk has invaded more than 1.5 million riparian acres, but CO biologists contend the beetle is relatively benign, and are pressing ahead. Imported from China eight years ago, *Diorhabda* beetles are native to the same parts of central Asia as the tamarisk. Experimental beetle releases began in 2001, and ever since federal authorities approved widespread use in 2005, they've been thriving, eating their way from tamarisk to tamarisk. Federal authorities are watching CO's expanding deployments. In early August, USDA officials revoked permits that let CO state-run teams move beetles across state borders, so their use of the beetle, raised in a state "insectary" east of Grand Junction, must be more confined. This was the first year the state had enough beetles to attack tamarisk along the Arkansas River. The first 400 beetles, delivered from northwestern China, have multiplied to more than 50 million. Most live wild along rivers and have the ability to move up to 20 miles a day on their own, into neighboring states. (*Excerpted from "Colorado officials unleash beetles to battle water-sucking weed", by Bruce Finley, Denver Post, August 10. bfinley@denverpost.com.*)

Asian Carp Saga (update). Electricity was recently doubled on the Chicago Sanitary and Ship Canal after reports that Asian carp are now just below the fish-shocking barrier that is considered the last line of defense for the Great Lakes. As a result, the Coast Guard closed the canal to all vessels other than tugs and barges. A deal was eventually struck to allow the vessels to be pulled through the canal with a towboat, provided no crew remained aboard. What makes transits so hazardous for wood boats is the potential for sparks to fly from their metal fittings. The barrier is now operating at two volts an inch, though it is designed to be cranked up to four volts an inch. (*Excerpted from JSOnline, August 29*)

[<http://www.jsonline.com/news/wisconsin/54642097.html>]

.....And.....

A new batch of regulations for barge operators comes along with the increased voltage. They included a "bow boat" requirement for some types of barges moving through the area. Barges normally are pushed by a single tow boat, but the addition of a boat at the front provides an extra safety measure to keep passing barges from getting too close to each other in the electrified water - and perhaps sending sparks. Some barges carry flammable materials. The Army Corps had agreed to pay for the bow boats when the barrier was turned on last spring, but officials say they no longer have the money to maintain the program. The Army Corps agreed to pay \$321,600 to provide the extra boats from June 5 through September 30. Now it appears the program will end when the money runs out. Army Corps officials say they don't have funds to provide the boats, to continue operating the barrier, and to fund a twin barrier that will be built in the coming years. Bow boat tows cost in the neighborhood of \$600 a trip. The added expense could gobble up about 3% of a barge

company's annual revenue. Recreational boats must also be towed through the barrier zone by a barge, and the Army Corps isn't paying for that, either. While people may be upset by the additional expense, the price of letting the fish into the Great Lakes could be *staggering* (Excerpted from *JSONline*, September 8, by Dan Egan [<http://www.jsonline.com/news/wisconsin/57756967.html>])

Biofuels Paper. The national Invasive Species Advisory Committee (ISAC) has recently approved a white paper on biofuels and invasive species. For more information, go to [<http://www.nytimes.com/cwire/2009/08/12/12climatewire-will-energy-crops-become-the-next-kudzu-16525.html>] (Thanks to Jeff Heys).

Crabs vs. Oyster Drills. Fully half the population of native oysters in Tomales Bay, about 40 miles north of San Francisco, has fallen victim to a predatory whelk snail indigenous to the Atlantic Ocean, according to a CA Sea Grant-funded study published in the July issue of *Oecologia*. The Atlantic snail (*Urosalpinx cinerea*), a type of oyster drill, bores into oyster shells and digests the soft tissue inside. It was inadvertently brought to the West Coast decades ago with shipments of Atlantic oysters, which people attempted, but failed to culture, in places such as Tomales Bay. As a result, shellfish farmers turned to growing Japanese oysters, which have proven a commercial success, but have also been vectors for yet another invasive species, the Japanese oyster drill (*Ocenebrellus inornatus*). Although both native and non-native oyster drills now inhabit the West Coast, in the more saline reaches of Tomales Bay, near the bay's mouth, red rock crabs keep native oyster drills in check, and hunt Atlantic drills to near local extinction. The indigenous crabs also scare away the invasive European green crab. But native crabs cannot defend the entire estuary because they are fundamentally a marine species. In prime oyster habitat near the bay's head, seasonal freshwater deluges kill native rock crabs. Atlantic drills and European green crabs invade these low-salinity zones, at the expense of native oysters, but green crabs, as it turns out, are terrible Atlantic snail hunters. (*Cordova Times Seaside*, August 20; Thanks to Kevin Aitkin)

National Phragmites Management Survey. Cornell University is conducting an online survey on *Phragmites australis* management options, funded from the NY Department of Transportation. *Phragmites australis* (common reed) management is of ongoing concern for many land management agencies and conservationists. Results of this survey will be used to develop guidelines and management suggestions and will aid in future research. Researchers Laura Martin and Professor Bernd Blossey are conducting this study. If you have any interest in the survey, contact Laura Martin at: <LJM222@cornell.edu>.

Over Time, Garlic Mustard Loses Its Toxic Edge. Like most invasive plants, garlic mustard first found it easy to dominate the natives. A new study indicates that eventually, however, its primary weapon – a fungus-killing toxin injected into the soil – becomes less potent. The study by Richard Lankau and Greg Spyreas, in *Proceedings of the National Academy of Sciences*, is one of the first to show that evolution can alter the very attributes that give an invasive plant its advantage, suggesting the plant's defenses are undermined by its own success. Unlike most plants, which rely on soil fungi to supplement them with phosphorous, nitrogen and water, garlic mustard gets by without the soil fungus. Instead,

garlic mustard produces glucosinolates, pungent compounds that leach into the soil and kill off many soil fungi, especially those native to North America. This weakens the native plants. As a result, garlic mustard now grows in dense patches in many North American woodlands, over-running the native plants. But once garlic mustard has vanquished most of its competitors, why would it invest as much effort in maintaining its toxic arsenal? Lankau correctly predicted that levels of glucosinolates in the plant would diminish over time. Herbarium records provided the researchers with a 140-year record of the age of garlic mustard populations across the eastern half of the U.S. Tests found that populations present in an area for more than 30 years produced lower levels of the fungicidal compounds than those that began less than two decades ago. To determine if the decline in glucosinolate production was allowing native plants to return to areas previously dominated by garlic mustard, the researchers used the IL Critical Trends Assessment Program to determine if native plants were declining or advancing in the presence of garlic mustard. Again, they found that older populations of garlic mustard, though still problematic, posed less of a threat to native plants than the newer ones. The results indicate that some invasive plants evolve in ways that may make them more manageable over time, and suggests that conservation efforts might be more effective if they focus on the most recently invaded areas, which – in the case of garlic mustard, at least – is probably where the most damage occurs. (*Excerpted from ScienceDaily, September 1*)

[<http://www.sciencedaily.com/releases/2009/09/090901105146.htm>]

Kudzu Provides Health Benefits. Previous studies have suggested a chemical in kudzu may help alcoholics curb addiction. Now a study shows it can also help regulate blood pressure, glucose metabolism, and cholesterol levels. Kudzu root contains polyphenols, and is already available in health food stores as a dietary supplement. In a new study published in the *Journal of Agricultural and Food Chemistry*, researchers found “polyphenols in kudzu root may provide a non-pharmacological complement to traditional approaches for treating hypertension.” (*Excerpted from: Invasive species may bring health benefits, LA Times, September 7*) [<http://www.baltimoresun.com/health/bal-to.hs.kudzu07sep07,0,3202040.story>]

Asian Oyster Controversy Officially Resolved In mid August, Norfolk District Army Corps Commander Col. Andrew Backus signed a Record for Decision for the Chesapeake Bay oyster restoration, ending a five-year, USD \$17 million-study to determine the potential environmental consequences of incorporating the disease-resistant Suminoe oyster (*Crassostrea ariakensis*) into the Bay. The restoration strategy will focus only on the native Eastern oyster (*Crassostrea virginica*). The introduction of the Suminoe oyster was proposed in response to the overharvesting of the disease-stricken native oyster and the damage of the bay’s ecosystem, and led to a Programmatic Environmental Impact Statement, which analyzed the environmental impact of placing both species in the same environment, and required both the study and a range of options for the restoration of the native oyster to the Chesapeake Bay. The consensus was that *C. ariakensis* would have posed “unacceptable ecological risks” to the bay’s ecosystem. The record of decision reflects a sustainable solution to restoring the oyster in the Chesapeake Bay, and is also compliant with the Army’s Chesapeake Bay Strategy and President Obama’s Executive Order 13508 (Chesapeake Bay Protection and Restoration). (*From an August 18 article by*

Natalia Real, [www.fis.com]; thanks to Kevin Aitkin)

Starlings and Shakespeare. If Shakespeare had not mentioned the European starling (*Sturnus vulgaris*) in the third scene of "Henry IV," arguably the most hated bird in North America might never have arrived. In the early 1890s, a group dedicated to bringing to America every bird ever mentioned by Shakespeare, released about 100 starlings in New York City's Central Park. By the 1950s, starlings had reached CA. Today, they are one of the most common birds in the U.S. and some 200 million European starlings exist in North America, ranging from AK to Mexico's Baja Peninsula. The enormous flocks endanger air travel, chase off native songbirds, leave corrosive, foul-smelling droppings, and Cornell University estimates that nationwide, they cause \$800 million in damage to agricultural operations each year. Starlings are also responsible for the most deadly bird strikes in aviation: a 1960 civilian crash in Boston that killed 62, and a 1996 military cargo plane crash that killed 34 in the Netherlands. Since then, there have been close calls, including a Boeing 747 that ran into a flock in Rome last fall. Last year, U.S. government agents poisoned, shot, and trapped 1.7 million starlings, more than any other nuisance species. In WA alone, starlings caused \$9 million in damages to agricultural operations over five years, and last year, WA poisoned nearly 650,000 birds. At one feed lot, some 200,000 starlings gathered each day, lining fence tops, wires, water troughs, and even perching on top of cows. When killing is not an option, agents often turn to harassment campaigns. In downtown Indianapolis, flocks as large as 40,000 appear around dusk in the winter, and crews are deployed nearly every night to scare them off with lasers, fireworks and noise devices. (Excerpted from a September 6 article by Mike Stark)

[http://www.google.com/hostednews/ap/article/ALeqM5hCrgf1Nz23-kq_pZYObs-MDTdp_gD9AHUL700]

Experimental Harmful Algal Bloom (HAB) Forecast System. NOAA has announced an experimental HAB forecasting system in Lake Erie. HABs produce toxins that may pose a significant risk to human and animal health, and form scum that is unsightly and odorous to beach visitors. Forecasts depicting current and future locations of blooms, as well as intensity, can alert scientists and managers to possible threats to the Great Lakes beaches, and assist in mitigation efforts. When a harmful bloom in Lake Erie is detected, scientists issue a forecast bulletin depicting the HABs' current location and future movement, and categorize its intensity on a weekly basis. The experimental forecast incorporates data from various ocean-observing systems, including commercial and government satellite imagery, coastal forecast modeling and field data, and reports received from resource managers in the field. The information is then synthesized and interpreted to determine the current and future location and intensity of *Microcystis* blooms. The experimental forecast created for Lake Erie and the state of OH was based on a detection system designed for FL Gulf Coast in 2004. The system was jointly funded by NOAA's Oceans and Human Health Initiative and the Centers for Disease Control and Prevention's National Center for Environmental Health, and will serve as a model for other areas of the U.S. impacted by HABs. (Excerpted from ScienceDaily, September 17) [<http://www.sciencedaily.com/releases/2009/09/090917161736.htm>]

Montana Moves to Reduce Russian Olive. In the extreme climates of northeast MT, Russian Olive fruit has become a primary food source for some upland game birds, when

every other food source is snow-covered. But it grows thick in riparian areas, and now occurs in many western states. An estimated 50,000 acres in WY are now covered with Russian olives. In August, 2008, the MT Native Plant Society and the Audubon Society petitioned to list Russian olive as a noxious weed, noting that several states have already done so. In the year since the petition was filed, a new weed classification system has been developed that has a new weed category that accounts for beneficial uses of an invasive plant such as the Russian olive, as well as the practical aspects of managing it. Instead of eradication, which at this point probably isn't possible, the new category would prevent more from being planted. Until recently, state and federal agencies recommended the tree for shelterbelts and distributed an average of 40,000 nursery stock plants a year. (*Ed Comment*: Once again, as Pogo said, "we have met the enemy and it is us".) It is a very expensive plant to remove; cutting it down or burning it just forces new shoots to emerge from the roots. Birds and wildlife consume seed and spread it, and seeds can float on water and ice for up to three days until they are deposited on a likely stream bank or wetland, and they can lie dormant for up to three years, waiting for the right conditions to germinate. Cleared areas must also be monitored to keep the trees from coming back, and clearings provide an excellent opportunity for entry of other invasive plants. Since it takes six to 10 years for the trees to mature enough to produce seed, the best way to control plants before they become fertile is to graze the area or mow it while plants are young. (*Excerpted from the Billings Gazette, August 2*) [http://billingsgazette.com/news/state-and-regional/montana/article_005cf908-7f0b-11de-bffe-001cc4c03286.html]

Undaria Spreading In California. Asian kelp, or wakame, (*Undaria pinnatifida*), a flavorful and healthful ingredient in miso soup, is also an aggressive, costly intruder in waters from New Zealand to Monterey Bay. Wakame harms native kelp, fouls marinas and boats, and damages aquaculture, and it is listed as one of the "100 of the World's Worst Invasive Alien Species". Since the discovery in May, researchers from the Smithsonian Research Center have pulled up nearly 140 pounds of kelp attached to pilings and boats in the San Francisco Marina alone. Wakame first arrived at the ports of Los Angeles and Long Beach in 2000; a year later it had moved into Baja California and Monterey Bay. The kelp, which can grow an inch a day, could spread as far north as Canada before the water becomes too cold to sustain it. Nonprofit groups and state and federal agencies have been pooling resources, and volunteers with scuba and snorkel equipment are filling black plastic trash bags with the kelp. But before trucking it to the landfill, some will be shipped to Texas, to someone considering its use as a biofuel. (*Excerpted from a Seattle Times August 4 Malia Wollan article*) [http://seattletimes.nwsourc.com/html/nationworld/2009593742_seaweed04.html]

Hawaii Battles Limu Algae. As part of an ongoing effort to eradicate invasive algae from Molokai's reefs, the HI Division of Aquatic Resources removed over 10,000 pounds of gorilla ogo, or limu (*Gracilaria salicornia*) from the Kaunakakai wharf area. It was first brought to Molokai in the early 1990s, hitchhiking among native species that were



(hear.org)



(Raingarden.us)

brought to the island for aquaculture. The native species didn't grow, but the limu did well, and it has continued to spread throughout fish ponds and other rocky surfaces on the west side of the island. It spreads quickly, and completely covers the shoreline reefs; some reefs on Oahu are said to be covered by patches up to three feet thick. After removing nearly 200 bags of the algae in August, the Division will move west on their next visit, but will return once a month to help clean a different spot. A grant last year from the National Fish and Wildlife Foundation will pay for the project. There is enough money to pay for an employee on Molokai to keep an eye on things, and be in charge of operating the "Manini" algae removal machine, a miniature version of two barges on Oahu that are used to suck algae off of the rocks. The algae is not going to waste; what is pulled out of the ocean is given to local farmers, who have been using it as fertilizer for years. The College of Tropical Agriculture and Resources also received a large batch of the limu for experiments, to see how it responds to liquefying and dehydration, and then share the results with local farmers. (*Ed comment: Maybe the guys in CA should consider donating their wakame as fertilizer, for a useful disposal option?*) (Excerpted from *Molokai Dispatch* September 3, by Dan Murphy) [<http://www.themolokaidispatch.com/?q=node/3345>]

Elsewhere Around The World

Australian Camel Burgers, Anyone? The Australian government plans to fly in sharpshooters on helicopters to shoot 650,000 camels and turn them into burgers and other dishes. In the 1840s, explorers first brought camels of all types to Australia from India and the Middle East. Today, there are more than 1 million animals in Australia, and their population has been doubling every nine years. In a land where vegetation is already scarce, camels compete with native fauna and livestock. They are also apparently fond of breaking water pipes and bathrooms in their search for water. Last month, the government authorized up \$16 million to cull the camels, which rank as Australia's largest invasive species. Animal rights groups are upset about the proposal, but the University of Canberra's Invasive Animals Cooperative Research Center brushes off their concerns, saying the shooting is a quite humane eradication method. (Excerpted from *Scientific American*, 60 second science blog, August 11 by Brendan Borrell).

[<http://www.scientificamerican.com/blog/60-second-science/post.cfm?id=camel-burgers-australia-plans-to-sh-2009-08-11>]

Kudzu Found In Ontario. Kudzu (*Pueraria montana*) has been discovered in Ontario, on the shores of Lake Erie. A native of Eastern Asia, it was first brought to North America in 1876 for a centennial exhibition. It was later used for erosion control by the Soil

Conservation Service (who reportedly planted an estimated 32 million plants!) and promoted as a forage crop. Eventually, it took over much of the southern states and despite attempts to stop it, has continued to spread northward. Like other invasive species, when the vine takes to its new environment it spreads quickly at the expense of native species, including trees, which are girdled by the vine; broken by its weight; or killed by lack of light. The kudzu grows at an astounding rate of 30 centimeters (one foot) per day, and in a single season can grow up 30 meters (90 feet) in length. (*Excerpted from Marketwire - Sept. 21, 2009*) [<http://www.marketwire.com/press-release/Ontario-Federation-Of-Anglers-And-Hunters-1047652.html>] (*Ed Comment*: Kudzu was always considered a warm climate plant; that it could be found that far north is scary; and states like WA with milder winters should stay alert for this; we have already eradicated it once.)

Britain's First Biocontrol To Be Used On Knotweed? Introduced into Britain in the 19th century as an ornamental plant, Japanese knotweed (*Polygonum cuspidatum*) will grow a meter high in four weeks, push through concrete and tarmac, and quickly create an impenetrable 3m high thicket. Its roots can spread at least 7m horizontally underground and



Photograph: David T Grewcock/Corbis

5m deep and the plant can stay dormant underground for a decade. Its unusually deep leaf litter smothers rival plants, and it can reproduce from a tiny fragment of stem or leaf. All Japanese knotweed plants in Britain are female, and reproduce through rhizomes or vegetation fragments. James MacFarlane, vegetation adviser for Cornwall County Council, says Japanese knotweed is one of the first plants to sprout up immediately after a volcanic eruption. It can survive being covered by ash. It can tolerate sulphur, heavy metals and toxic gases, and can push up through roads. It even survives being washed out to sea, bobbing in the ocean and then taking root when it is washed ashore again.

Japanese knotweed was first recorded in Cornwall growing in the wild in 1906, but it has only really become a problem in the last few decades. The real accelerator has likely been the moving of topsoil and building material around the country, and MacFarlane now monitors 1,800 knotweed sites in the county. Knotweed is a problem in many countries. He says. "Ireland has a tremendous problem and they haven't yet realized it", and officials from France and Switzerland have visited Cornwall to see how the council has tackled it. Cornwall has been using orthodox chemicals and education, cajoling developers to save money in the long term by eradicating knotweed from brownfield sites before they start building. Today, faced by estimates that its clearance would cost £2.6bn, the government is looking at a Japanese psyllid beetle, *Aphalara itadori* that could be released next spring, if a public consultation begun last month is successful. If released, it would be the first

biological control ever deliberately introduced into Britain. (*Excerpted from The Guardian, August 14, [http://www.guardian.co.uk/science/2009/aug/14/japanese-knotweed-introduction-insect]*)

Japan Surveys Coastal Invaders. A new survey has found at least 76 alien marine species have invaded coastal waters around Japan, and 37 have established a foothold. The survey focused on marine species which have entered Japanese coastal waters and/or been reported in academic papers. Arthropods topped the list with 24 species, followed by 18 species of marine mollusk. Of the 76 species, 29 arrived on ship hulls or in ballast water, 28 were deliberately introduced for breeding purposes, and 15 are believed to have been introduced accidentally. More than 20 other species could be added to the 76. Most of the non-indigenous marine species are not subject to legal restriction, even though they threaten the local ecological system. Marine invasions in Japanese waters have increased sharply since the 1960s, at a pace of 1.3 species per year, and researchers have called for drastic measures to prevent further invasions. The 2005 law on invasive alien species bans 96 species from being imported or kept in Japan. But the law is mainly aimed at land and freshwater species, not marine organisms. The only marine species on the list are mitten crabs. The Plankton Society of Japan and two other academic societies have set up a special committee to study the influence of the invaders on the ecosystem. The first meeting is scheduled for October, in Hokkaido. [http://www.asahi.com/english/Herald-asahi/TKY200909090062.html] (*Excerpted from a Tomoyuki Yamamoto article September 9, 2009, in the Asahi Shimbun. Thanks to Randy Marshall*)

UK Big Seaweed Search. There are 650 species of seaweed around the United Kingdom's coast. The 24-hour Big Seaweed Search will help detect how far species are spreading and whether they are competing with native species. The Big Seaweed Search is a new national survey launching at the Wembury Bioblitz. It encourages anyone, whatever their age or seaweed knowledge, to take part in surveying the seaweeds all around the UK coast. The survey covers sub tidal waters, the rocky shore, beach, coastal cliffs, wet and dry meadows, scrub, and a freshwater stream. The survey is ongoing, and people can send in their results any time of the year. There are easy-to-use identification guides on the website and recording sheets to print off. Data from the Big Seaweed Search will help scientists from the British Phycological Society and Natural History Museum learn more about the distribution of these important, but often overlooked, organisms (*Excerpted from Natural History Museum, August 21*). For more information on the Big Seaweed Search go to: <http://www.nhm.ac.uk/nature-online/british-natural-history/seaweeds-survey/index.html>

Lime Trees Killing Bees. The Czech Republic (CR) has almost 2000 non-indigenous animal and plant species, placing it in fourth among 217 EU countries. In May, Czech environmentalists warned that exotic lime trees are killing hundreds of protected bumblebees. They said municipalities are planting more and more exotic species and cultivated varieties of lime trees in large towns, because they tolerate even high air pollution levels. The trees have a heavily aromatic nectar that attracts the bumblebees, but the bumblebees spend more energy in sucking it than they receive, and they eventually die of hunger. Environmentalists say that is why hundreds, if not thousands, of dead bumblebees are found below every tree. (*Prague Daily Monitor, Aug 14*).

[<http://praguemonitor.com/2009/08/12/czechrep-fourth-eu-non-indigenous-species-number>]

New Materials and Resources

Assessment of US Invasive Snail And Slug Pests. University of Hawaii researcher snail/slug biologist Robert Cowie and team have published the first-ever assessment of snail and slug species of potential threat to the nation's agriculture industry and the environment. The team evaluated all known global snail and slug pests in terms of their potential impacts on U.S. agriculture and the environment, to determine which species would be of greatest concern if introduced in the U.S. The evaluation was funded by a USDA grant, and the research is intended to assist national agriculture inspection officials in their efforts to keep such invasive pest species out of the country. Authors hope it will not only be invaluable in protecting the U.S., but that it will also serve as a stimulus to increase research efforts regarding these poorly understood animals. Check out their July, 2009, article in the *American Malacological Bulletin*. (Excerpt from *ScienceDaily*, July 30). [<http://www.sciencedaily.com/releases/2009/07/090731085825.htm>]

New Book: Biological Invasions in Marine Ecosystems. Rilov, G. and J.A. Crooks (ed). 2009. *Biological Invasions in Marine Ecosystems: Ecological, Management, and Geographic Perspectives*, from Springer. (Thanks to Erin Williams)

Rusty Crayfish Paper. A new paper documents the first presence of the rusty crayfish west of the North American Continental Divide. Over the last 50 years, rusty crayfish have spread from their historical range in the Ohio River drainage to waters throughout much of 18 additional eastern and central states, provinces of Ontario and Québec in Canada, and the Laurentian Great Lakes. *O. rusticus* is omnivorous and aggressive, causing numerous ecological and evolutionary impacts across the entire food web, including negative effects on aquatic plants, invertebrates, snails, and fishes, and displacing and hybridizing with native crayfish. In July, 2005, a field survey conducted by the Xerces Society revealed the occurrence of a non-native crayfish in the upper mainstem of John Day River, OR, a sub-basin of the Columbia River. Originally believed to be *Orconectes neglectus neglectus*, re-examination identified these crayfish as *O. rusticus*. The discovery of a dense, well-established population of *O. rusticus* in the John Day River is of significant concern, because the basin contains one of the Columbia River's healthiest runs of naturally reproducing spring Chinook salmon. But this population is highly depressed relative to historic levels, and invasive crayfish prey on fish eggs and compete with the juvenile salmon for habitat. (Excerpted from Olden, J.D., Adams, J.W. and E.R. Larson. 2009. *First record of Orconectes rusticus (Girard, 1852) (Decapoda, Cambaridae) west of the Great Continental Divide in North America*. *Crustaceana* 82:1347-1351). You can download the paper from [<http://www.fish.washington.edu/research/oldenlab/>]. (Thanks to Mark Sytsma.)

New Newsletter. The Association of Fish and Wildlife Agencies Invasive Species Committee has developed a new newsletter designed to communicate their activities and those of their member agencies. The various state coordinators contribute articles of relevance to their individual states. To see their first newsletter, go to [http://www.fishwildlife.org/pdfs/IS_Bulletin_Summer09.pdf] (Thanks to Lisa DeBruyckere)

Climate Change & Invasive Species: Double Trouble Bulletin The latest issue of *Double Trouble*, the e-bulletin for the Invasive Species Council's climate change and pests project, is available at [<http://www.invasives.org.au/newsletter.php?NewsletterId=16>]. The bulletin features a wide range of stories about the interactions of climate change and invasive species, including the risks of moving species threatened by climate change. Subscriptions are free – sign up at [<http://www.invasives.org.au/subscribe.php>]. (*Thanks to Carol Booth*)

New Scottish Website. The Rivers and Fisheries Trust's Scotland's Invasive Nonnative Species website is now available at:

[http://www.invasivespeciesscotland.org.uk/biosecurity_programme/rafts_biosecurity_programme.asp]. Invasive non native species and fish diseases cost the Scottish economy upwards of £500 million per year, and the UK economy £2-£6 billion per year. (*From Protect Your Waters, August 25*)

New Tool For Water Weeds? Retired tool designer Justo Zarazua of Pinconning, MI, has created a tool to remove weeds and algae from the edges of his 18-acre pond. He didn't want to



strain his back spending hours throwing a weed removal tool out into his pond and then pulling it back to shore. His device works on milfoil, hydrilla, duckweed, Lilly pads and other aquatic weeds, but is not recommended for cattails. The WeedGator submerges itself using a ballast method. Holes in the nose of the handle let water in, pushing air out through the back. That allows the device to descend into the water at a 45-degree angle, so it can glide underneath a dock. As the operator brings the device up out of the water, the water is replaced by air, making it lighter again. It works on the water surface, slightly below the surface or on the bottom of the pond or lake. The five-foot handle is made of polished marine grade aluminum tubing, and the two 14.5-inch-long folding blades are made of flex steel, coated to resist corrosion. The blades have removable plastic guards. The WeedGator sells for \$139.99, weighs just 2 pounds and includes 25 feet of rope. (*From: Mich. man invents a better way to kill water weeds, August 10, 2009, AP, by Cheryl Wade in the Midland Daily News*)

Reader Feedback

From Kevin Aitkin: (Assisted Migration). I wanted to send you some background info on the new "assisted migration" issue, where scientists propose helping wildlife relocate due to climate change. For those who want to look into the issue a bit more:

[<http://www.cbc.ca/technology/story/2009/05/25/assistedmigration-wildlife.html>]

[<http://www.nature.com/climate/2008/0809/full/climate.2008.86.html>]

[http://www.nsf.gov/news/news_summ.jsp?cntn_id=114849&org=OLPA&from=news]

[http://www.nd.edu/~hellmann/MRWorkingGroup/Managed_relocation.html]

[[http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VJ1-4VXCDBS-1&_user=489835&_coverDate=05%2F31%2F2009&_rdoc=9&_fmt=high&_orig=browse&_srch=doc-info\(%23toc%236081%232009%23999759994%231064049%23FLA%23display%23Volume\)&_cdi=6081&_sort=d&_docanchor=&_ct=13&_acct=C000022718&_version=1&_urlVersion=0&_userid=489835&md5=0ff585205e12aa412a2c68c7d9881663](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VJ1-4VXCDBS-1&_user=489835&_coverDate=05%2F31%2F2009&_rdoc=9&_fmt=high&_orig=browse&_srch=doc-info(%23toc%236081%232009%23999759994%231064049%23FLA%23display%23Volume)&_cdi=6081&_sort=d&_docanchor=&_ct=13&_acct=C000022718&_version=1&_urlVersion=0&_userid=489835&md5=0ff585205e12aa412a2c68c7d9881663)]

From Josh Nehring: (Antifouling Technology). I'm sure you receive plenty of phone calls from power plants and industrial facilities concerned about biofouling due to zebra and quagga mussel infestation. I am writing to introduce you to Absolute Aquatics and a little known eco-friendly technology to control biofouling within these plants called a Copper Ion Generator. We currently have about 40 installations in nuclear and coal fired power plants and industrial facilities with excellent results. Please let me know if you have any questions regarding this technology. (To obtain a copy of the AAI antifouling mussel brochure, contact Josh at josh@absoluteaquaticsinc.com) (*From an Email, August 7.*)

From Paul Zajicek: (Wildlife Importation). The quotes [in issue #25] you selected from Smith et al, Reducing the risks of the wildlife trade, are particularly irksome to ornamental fish importers/exporters. USFWS Form 3177 that wildlife importers and exporters are required to use for every shipment of live species clearly states that genus and species are to be identified. However, USFWS port inspectors instructed the importers/exporters to use broad categories. Some importers/exporters adopted that advice, others did not. I was asked by Florida importers/exporters to contact USFWS Law Enforcement and explain this predicament, which I did, and never received a response. Several people that are familiar with the logistical problems within LEMIS wrote a rebuttal to the Smith et al article but the magazine did not accept it for publication. Businesses that import or export live animals must have an annual license from the USFWS, at a cost of \$50 per year. These businesses report each shipment by using a document entitled, "Declaration for Importation or Exportation of Fish or Wildlife" (USFWS Form No. 3177). The form requires the business to report: date; import/export license number; port of clearance; purpose code (research, commercial sale, personal use, educational, etc.); customs entry number; name of carrier; waybill or bill of lading number; transportation code (air, foot, mail, ocean, etc.); number of cartons; live species carton markings; foreign supplier or receiver contact info; customs broker; agent or freight forwarder contact info; species scientific and

common name; foreign or US CITES Permit Number; description code (live or specific part or piece); quantity (number, weight or volume); monetary value; and country of origin for the animal. Costs vary from port to port. If a non-designated port of entry is used then a "Non-Designated Port Permit" must be acquired at a cost of \$25 (good for two years). Authorizing legislation is the Endangered Species Act. There are three exemptions to providing a Form 3177 to the Service and undergoing inspection. The exemptions are: 1) Live shellfish and fishery products taken commercially or recreationally for the purposes of human or animal consumption, 2) live species of the Class Pelecypoda (oysters, clams, mussels and scallops) and their eggs, larvae or juvenile forms exported for research are exempt and 3) live farm-raised fish and farm-raised fish egg exports were exempted by USFWS Director's Order Number 48 dated June 11, 1992. (E-mail, August 6, from <Pauzajicep@doacs.state.fl.us>)

Major Upcoming (Invasive) Meetings

October 28-30, 2009. Hartford, CT. North American Lake Management Society (NALMS) Annual Symposium. <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/>].

November 4-5, 2009, Silver Spring, MD. Aquatic Nuisance Species Task Force. <http://www.anstaskforce.gov/default.php>

January 10-14, 2010. Washington, DC. National Invasive Species Awareness Week. <http://www.nisaw.org/>

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