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AQUATIC INVASIVE SPECIES NEWS IN A NUTSHELL

Joan Cabreza, Editor

This newsletter 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 1-28, go to [<http://www.aquaticnuisance.org/newsletters>]. To subscribe or unsubscribe from this newsletter please email me at the address above.

[Ed comment: No, in case you are wondering, you did not miss an issue of Nutshell. It was temporarily “on vacation” this summer due to funding constraints.]

[This Quarter's Unusual News](#)

Hydrilla and Milfoil Claim More Victims. On July 4, in Killeen, Texas, Primo Calvillo was drowned in a rural stock pond. The dive recovery team called to help search for the body said he became tangled in four feet of *hydrilla* algae. (*KYTX July 4.* [<http://www.cbs19.tv/Global/story.asp?S=12754568>].)

And then... in late July, Cameron Hartwell died in Pasco, Washington, after being tangled in milfoil [<http://www.keprtv.com/news/local/99511579.html>].

And then... on August 5, Rachell Wood, of Washington, was reportedly hospitalized in critical condition after she spent 10 minutes trapped underwater by milfoil at Horseshoe Lake in northeast Washington. [Ed Comment: *Is there anyone out there who still thinks these weeds are not a problem?*] (*From Stop Aquatic Hitchhikers, August 5.*)

Carp Knocks Kayaker out of MO340 Competition. A flying Asian carp has cut short a world-class kayaker's attempt to finish the 340-mile Missouri River race that began in Kansas City, Kansas. Texas resident Brad Pennington was considered a favorite among men's solo racers in the Missouri River 340, a contest for canoes and kayaks. Race officials said Pennington arrived at the Lexington, Missouri, checkpoint and reported that he was dizzy and could not continue because he had been hit in the head by a carp. "It felt like a brick hit me," said Pennington, who got a pounding headache but stayed on as a

spectator. (Excerpted from Associated Press article by Alan Scher Zagier, August 26.)
[http://seattletimes.nwsources.com/html/outdoors/2012730332_webkayakerfish26.html]

Lights at the end of the Tunnel?

First US Testing of Zequanox for Zebra Mussel Control. Marrone Bio Innovations Inc. of Davis, California, has been awarded a \$500,000 National Science Foundation grant to commercialize Zequanox, an environmentally friendly bacteria that kills invasive zebra and quagga mussels. They also received \$100,000 in supplemental funding for commercial partnerships. This promising solution to the zebra-quagga mussel invasion could soon be tested in open waters for the first time in the U.S soon. In August, the Bureau of Reclamation (USBR) received the EPA Section 18 permit for use of Zequanox at its Lower Colorado Davis Dam project. USBR is currently undertaking the necessary NEPA compliance review and hopes to begin full scale open water testing at Davis Dam in Spring 2011.



Quagga mussels in the Colorado River, attached to intake towers at Hoover Dam.
The mussel is about the size of a dime. (USBR photo)

Last year, Canadian researchers saw a 10 percent "kill rate" with Zequanox; this year, the rate has risen to 52 percent. Whether the bacterial product will be used in other quagga-infested areas, such as southern California, depends on the success of the test at the Davis Dam.

(Excerpted from the *Sacramento Business Journal*, September 27, and Sign On San Diego, August 31.)

[http://sacramento.bizjournals.com/sacramento/stories/2010/09/27/daily46.html?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+invasivenews+%28Invasive+Species+News%29 and

[<http://www.signonsandiego.com/news/2010/aug/31/researchers-seek-clues-quagga-quandary/>]

Galápagos off the World Heritage Danger List. The United Nations has removed the Galápagos Islands from its World Heritage danger list, citing improved efforts by Ecuador to protect the archipelago's unique biodiversity. The UNESCO World Heritage

Committee voted 15 to four to remove the islands from the list of sites endangered by environmental threats or overuse. Human settlers have brought in invasive species such as insects, cats, rats, cattle and fire ants that are now threatening a habitat which evolved in isolation over millennia. Although controls on migration and the introduction of invasive species have now been tightened, and various control efforts are underway, Johannah Barry, head of the Galápagos Conservancy, a Virginia-based research group, feels it is too soon to declare victory, the progress is still encouraging. (*Excerpted from an article by Rory Carroll, July 29, 2010, in the Guardian.*)

[<http://www.guardian.co.uk/world/2010/jul/29/galapagos-withdrawn-heritage-danger-list>]

Lady Bug Biocontrol Success in the Galapagos. Alien insects now constitute 23 percent of the Galapagos insect fauna. One of these insect invaders is the cottony cushion scale (*Icerya purchasi*), a sap-sucking bug native to Australia, that decreases plant



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vitality by sucking sap from the leaves, twigs, branches, and trunk of its host. In 2002, populations of cottony cushion scale were so high, and spread across so many islands, that several endemic and native plant populations were declining because of heavy infestations. But natural enemies, such as the lady bug, (*Rodolia cardinalis*), can bring the cottony cushion scale under control in a short time. Combating the cottony cushion scale was a joint effort between the Charles Darwin Research Foundation and the Galapagos Islands National Park Service. Lady bugs were released in 2002. In fall 2009, entomologist Mark Hoddle, and colleagues (University of California, Riverside) visited the Galapagos to assess the impact and safety of the lady bugs. Compared to similar data collected before the lady bug release, the cottony cushion scale populations were very low in most areas, and reduced by more than 99 percent on some native plants like mangroves, which are very susceptible to attack. The scale appears to have been completely removed from other, rarer, native plants. They found no evidence that the lady bug was attacking non-target species. “The cottony cushion scale project was born

in Southern California in 1888-1889, and saved their then-fledgling citrus industry. The project in the Galapagos is an extension of the California success story. But in the Galapagos the biocontrol agent is protecting native plants, instead of agricultural crops," Hoddle said.

[http://www.sciencedaily.com/releases/2010/04/100422164635.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+invasivenews+%28Invasive+Species+News%29] (*From Science Daily, April 22, 2010*)

Western Zebra Mussel Invasion (Updates)

*In the Western US, zebra and/or quagga mussels are now currently known to infest Water bodies in NV, CO, CA, OK, KS, AZ, UT, TX and **now ND**....*



Zebra Mussels Now in North Dakota. In early July, the first evidence surfaced that zebra mussels have made their way into North Dakota waters. The discovery of the zebra mussel came in the Red River near Wahpeton, during a routine plankton sampling at Kidder Dam. Lynn Schlueter, aquatic nuisance species coordinator for the Game and Fish Department, said the sample is a veliger, or a microscopic free-swimming stage of the bivalve. While disappointed in the find, he was not surprised. "The Minnesota Department of Natural Resources found them in the Red River watershed in the Pelican Lake chain well upstream of Wahpeton-Breckenridge last fall, and again this spring, new mussel infestations were documented in Minnesota upstream of the Red River, including in Lake Lizzie." Zebra mussel veligers can float along in river currents for weeks before eventually attaching to hard structures and growing into dime-sized mussels. (*Excerpted from an article in the Bismarck Tribune by Brian Gehring, July 8, 2010.*)

New Seaplane Inspection Video Available Soon: In September, the Pacific States Marine Fisheries Commission (PSMFC), in conjunction with the National Seaplane Pilots Association, filmed a new seaplane video at Black Lake, in western Washington. The video follows the recently compiled *Recommendations for Seaplane Inspection and Decontamination for Aquatic Nuisance Species*, and is expected to be available on-line at [www.aquaticnuisance.org] by the end of this calendar year. The video will take the viewer through the process of inspection, self-cleaning and professional decontamination for several common types of seaplanes, including traditional float planes, amphibious float planes, and flying boats. The 10 minute education and training video will also be used as one segment in the up-coming production of a new watercraft training video to be filmed early next spring, and made available for next summer's boating season. This new video will replace the highly successful "Don't Move a Mussel" video produced by PSMFC in 2008. Contact Bill Zook at <bjzook2@msn.com> for further information.

Commercial Watercraft Industry Report Now Available: A DRAFT report was recently completed summarizing the results of last summer's survey of 500 active commercial watercraft transport businesses. It will be available online by the end of October at [www.aquaticnuisance.org]. The survey was distributed by the PSMFC at the direction Columbia River Basin 100th Meridian Initiative Team, with the intent of gathering information about current industry practices and standards for cleaning watercraft and equipment; general knowledge of ANS issues; understanding of regulations that apply to trailered watercraft; and opinions about ways to improve industry standards. Results will generate a set of recommendations for future outreach, education and regulation of this industry. Contact Bill Zook at <bjzook2@msn.com> for further information.

Economic Estimates for a Snake River Mussel Invasion. The worst-case cost scenario for a zebra or quagga mussel invasion of the upper Snake River has estimated at hundreds of million of dollars annually. In an economic report produced by the Northwest Power and Conservation Council's (NPCC) Independent Economic Advisory Board (IEAB), economists developed the worst-case Snake River cost estimates because an infestation there is considered to be relatively likely. The report, *Economic Risk Associated with the Potential Establishment of Zebra and Quagga Mussels in the Columbia River Basin*, was released July 15. According to the report:

Calcium concentrations in the Basin are highly variable over time and between locations. In the mainstem Columbia and Snake Rivers below the Clearwater River, calcium concentrations are seasonal and within a range believed to limit mussel populations. Within this range there remains much scientific uncertainty about the viability, growth or density of mussel populations. However, for much of the Snake River above the Clearwater River, some parts of the Salmon, John Day and Pend Oreille River basins, and other local areas, calcium conditions may be generally favorable for mussels. Establishment and reproduction in these favorable locations could produce large numbers of veligers (free-floating juveniles) that could quickly establish themselves at other suitable locations downstream.

In its key findings, the IEAB advises that delaying what is a "likely" invasion of the upper Snake is advisable, to allow time for development of control technologies, and to plan for potential infestation responses. "In the short run, prevention buys time that can be used to prepare," the report says. Programs for preventing an invasion are currently under-funded; state budgets total about \$3 million annually.

The cost estimates summarize existing estimates for impacts on hydropower and fish passage facilities at dams and hatcheries; impacts on habitat and valuable species; and water diversion and pumping facilities, including fish screens. The report emphasizes potential effects on facilities, resources, ecosystems and species that are closely related to the NPCC's Columbia River Basin Fish and Wildlife Program and the Federal Columbia River Power System. "The potential costs, especially in the Snake River Basin, would likely involve habitat replacement; reduced chances for recovery of protected-status species; an increased chance of listing for other species; increased costs of compliance

with endangered species laws; and reduced populations of other economically important species including game fish," the IEAB report says. "We assume that existing policies would require that anadromous fish and rare species populations be returned to their without-mussel status. The cost of this compensation is unknown, but could be tens to hundreds of millions of dollars annually." The IEAB says that more biological analysis is needed to determine how variable calcium concentrations, calcium in the diet, pH, water velocity, and temperature affect the mussels' ability to survive in different areas of the Columbia basin. "Such research is important to refine the estimates of potential costs of mussel infestations should they occur," the IEAB said. The report can be found at [<http://www.nwcouncil.org/library/ieab/ieab2010-1.htm>] (*Excerpted from the Columbia Basin Bulletin, July 16, 2010*)

Interesting Zebra Mussel Article. Here are a couple of excerpts from a very interesting article on zebra mussel impacts in the Great Lakes:

- On June 1, 1988, Paul Hebert sent two of his undergraduate students into Lake St. Clair to collect clams, using a dredging tool called a Ponar Grab. ... "The device came up with a rock caught in its jaws, and on the rock, was the first zebra mussel," recalls Prof. Hebert, now director of the Biodiversity Institute of Ontario at the University of Guelph.... "I said: 'I've never seen one of those before; we'd better take a picture in case it's the last one I ever see.'"

- Tim Johnson, a research scientist with Ontario's Ministry of Natural Resources, says the mussels' filtering creates more problems than it solves. Clear water not only drives many fish to greater depths, but it promotes the growth of *Microcystis*, a blue-green algae that releases microcystin, a toxin harmful to many creatures, including humans. Sadly, it's one of the few algae unpalatable to *Dreissena* mussels, and he believes increased levels of microcystin may be partly responsible for Lake Erie's famed "dead zone", a lifeless patch of 500 to 1,000 square kilometres primarily attributed to chemical pollutants.

- Among the first casualties were the big clams Professor Hebert's students were sampling for pollutants back in 1988. Within two years of his study, they had been all but wiped out. "The Lake St. Clair bottom went from being the rich mussel bed it had been for many thousands of years, to being stripped. The most charismatic of the big mollusks in the Great Lakes were gone, because of this single invading species.... They were some of the oldest organisms in the Great Lakes - certainly the oldest organism on the bottom - and they were destroyed in one fell swoop."

- Roxy Lancaster, fifth generation of his family to fish the waters of Lake Ontario, says "our food processor in town says when he splits [whitefish] open their gut is full of zebra mussel shells. "While this poses no risk to people, it has substantially reduced the health of the whitefish (*Coregonus clupeaformis*), because the mussels lack a fatty acid the fish need for membrane development. (The acid is present in the *Diaphoreia* amphipod, a tiny shrimp once favoured by the whitefish, whose disappearance may also be linked to the mussel invasion.) So now the fish are thinner, grow half as quickly, and spawn every seven years instead of every four. They are also being driven to greater depths to escape the clear water because the extra light causes cataracts on their eyes."

- Lancaster believes that the lake can fight back. "Our experience . . . is there are whitefish wherever we go, which suggests to me the assessment process has made a huge

mistake." He also says that this year there are more native clams among the mounds of mussel shells that carpet the beach, and the "windrows" of shells in the shallows are becoming smaller, suggesting that now-dominant quaggas reproduce less rapidly than zebras....That said, mussels have plugged the entrance to Point Traverse harbour three times in the past five years; the dredged mounds of gravel and shell are easily three metres high. And the beach, like many in the province, is carpeted by a thick layer of shards that makes it excruciating to walk barefoot.

• We have a whole new ecosystem now that we have zebra mussels," Mr. Johnson says flatly. "And while 50 to 100 years of research on the Great Lakes hasn't exactly gone out the window, we're pretty close to starting from scratch. For the entire article, go to [<http://www.theglobeandmail.com/news/technology/science/mussel-fatigue/article184617/>] (*Excerpted from the Globe and Mail, November. 25, 2006.*)

Unique Filtration System Keeps Out Mussels. Short Elliott Hendrickson Inc. (SEH®) has designed a filtration system meant to prevent the spread of a zebra mussel infestation in Shoreview, Minnesota. The pumping system allows water to move between Sucker Lake and Snail Lake while filtering out zebra mussels and their larvae. The system was designed, in part, to respond to the zebra mussel's biology. Zebra mussels remain dormant when the water temperature is below 50 degrees F, and the system operates only when conditions trigger the mussels to become active. When in operation, the pump and 40 micron filter filtration system screen out both the adult zebra mussels and veligers. The filter also improves the quality of water flowing from Sucker Lake by removing many contaminants and particulates. The system pumps a minimum of 1,800 gallons per minute, which has allowed enough water into Snail Lake to raise the lake level by three feet. For more information about SEH, visit: [<http://www.sehinc.com>]. (*Excerpted from Businesswire, August 19*) [http://eon.businesswire.com/portal/site/eon/permalink/?ndmViewId=news_view&newsId=20100819006613&newsLang=en]

USFWS Funds Priorities in Western Waters Action Plan. On August 25, the USFWS announced that it will give nearly \$600,000 to nine projects targeting three of the highest priorities from the *Quagga-Zebra Mussel Action Plan for Western U.S. Waters*. Projects funded in this round of grants include:

- Publish a Containment Procedures for Positive Waters manual to complement the State ANS early-detection Handbook (\$40,000 to Colorado Division of Wildlife)
- Increase early detection in Montana waters by strategically sampling 10 high-priority Montana water bodies (\$28,754 to Montana Wildlife and Parks)
- Develop a standard protocol for killing and removing 100 percent of the quagga and zebra mussels in watercraft decontamination, by field testing the efficacy of water temperature, high pressure, and duration of exposure (\$100,378 to University of Nevada, Las Vegas).
- Develop effective decontamination protocols for wildland firefighting equipment: testing the efficacy of quaternary ammonium compounds against dreissenid veligers and adults (\$118,283 to University of Nevada, Las Vegas.)
- Increase early detection in Montana waters by strategically sampling at least 10 high priority waters in OR. (\$45,489 to Portland State University)

- Monitor waters in northeastern Texas and to develop and test an accurate and economically feasible zebra mussel monitoring system for aquatic habitats (\$55,000 to University of Texas at Arlington.)
- Implement a pilot laboratory testing program to determine and improve the reliability of laboratory performance in early detection of Dreissena larvae in plankton samples (\$103,559 to Bureau of Reclamation.)
- Workshops to address key bottlenecks in the effort to expand early monitoring projects, and improve the reliability of laboratory results by developing a standard protocol. (\$72,23 to Bureau of Reclamation.)
- Survey and update the *Recommended Uniform Minimum Protocols and Standards for Watercraft Inspection Programs for Dreissenid Mussels in the Western United States* document (\$28,232 to Pacific States Marine Fisheries Commission.)
(Excerpted from *Trade Only Today*, August 25,
[<http://www.tradeonlytoday.com/home/505950-feds-hand-out-invasive-species-grants>] and the *Columbia Basin Bulletin* [www.cbulletin.com].)

WY Mussel Regulations Become Law. The Wyoming Game and Fish Department has checked more than 21,000 boats for invasive zebra and quagga mussels since inspections began under emergency regulations in late May. Those regulations were made permanent in late July, when the Governor signed into law a new Game and Fish Commission-approved state aquatic invasive species management plan. For more information about Wyoming's Aquatic Invasive Species program and the new AIS regulations, go to [<http://gf.state.wy.us>].

Equipment Cleaning Manual - Revision. The 2010 revision of the *Reclamation Equipment Inspection and Cleaning Manual* has been completed, and is available at: [<http://www.usbr.gov/pps/EquipmentInspectionandCleaningManual2010.pdf>]

RECLAMATION
Managing Water in the West

Technical Memorandum No. 86-68220-07-05

**Inspection and Cleaning Manual for
Equipment and Vehicles to Prevent
the Spread of Invasive Species**

2010 Edition



The revision includes more detail for construction site management, facility equipment and materials discussion, and improved information citation throughout. There are additional photographs, drawings and text to better illustrate equipment inspection and cleaning issues. (Thanks to Joe Divittorio, USBR)

Utah Mussel Boater-Aware Program Now Online. Utah issued a news release urging boaters to become certified and more aware of the invasive species issues, and one-quarter million aquatic invasive species educational brochures, and 300,000 Decontamination Certification Forms (single-use self-certification) are being dispersed across the state at boat launch sites and other places frequented by boaters. The aquatic invasive species educational certification is now online. The self-certification form urges boaters to take the online course [http://wildlife.utah.gov/mussels/form_options.php] to secure a multi-use Decontamination Certification Form, as a preferred alternative to the single-use form. *(Thanks to Larry Dalton)*

Utah Detection Efforts Summary. Utah's early detection results for Dreissenid mussels are summarized by high interest waters, at [<http://wildlife.utah.gov/mussels/waters.php>]. Statewide sampling is ongoing, so the table is being updated multiple times this summer and fall. Results are typically obtained via microscopy of plankton samples at the Bureau of Reclamation's Denver, CO lab, and positive finds are subjected to molecular verification using two independent PCR methods and genetic sequencing performed by the Pisces Molecular lab in Boulder, CO. *(Thanks to Larry Dalton)*

Dead Mussels Cause Problems Too.... Buffalo, NY, is now removing a large mound of dead zebra mussels that have been piling up at the opening of a Lake Erie intake pipe that supplies water throughout the city. The underwater graveyard has been slowly growing in the pipe, and the shells haven't been removed since the control system was installed in the early 1990s. In one spot, the shells are blocking nearly two-thirds of the pipe's opening. The pile of dead shells was detected last year, during a training exercise. City officials said they weren't performing annual inspections, because they didn't think the mussels would be able to latch on to pipes, even for short periods, given the chlorine. The accumulation of shells proves that the chlorine treatment system for controlling zebra mussels is working, but the discovery also underscored the need to deal with the issue. Experts said the eight-foot-high mound hasn't caused any problems to-date, but stressed the need to remove the debris to prevent future problems. Once the Army Corps of Engineers signs off on the removal, bids will be solicited for a project that is expected to cost between \$400,000 and \$600,000. The project is expected to begin this fall, and take between four and six weeks to complete. The state permit will allow the city to perform the shell-removal missions as needed over the next five years. *(Excerpted from a Buffalo News article, by Brian Meyer, April 28.)*

[http://www.buffalonews.com/2010/04/28/1033692/dead-zebra-mussels-to-be-removed.html?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+invasivenews+%28Invasive+Species+News%29 Dead zebra mussels to be removed]

Idaho's Boat Inspection Stations. Idaho mandatory watercraft inspection stations began opening on April 27 and are now closed for the year. Idaho inspected more than 44,000 boats this year and intercepted **eight** with dreissenid mussels. The purpose of these stations is to inspect watercraft coming in from outside of Idaho. Watercraft inspectors are looking for high-risk boats that have been in quagga mussel and zebra mussel-impacted states. Boats are inspected for any attached mussels and/or standing water, and owners are asked where they have boated in the previous 30 days. For further

information go to

http://www.agri.state.id.us/Categories/Environment/InvasiveSpeciesCouncil/Inspection_Stations2010.php (Thanks to Amy Ferriter, IDA)

Texas Zebra Mussel Eradication Effort: The Texas Parks & Wildlife Inland Fisheries Division personnel have been waging environmentally safe chemical warfare in North Texas against a formidable invader – zebra mussels. First discovered in Lake Texoma in April 2009, the fingernail-sized bivalves propagate rapidly and play havoc with their surrounding environment, clogging pipes, covering boat bottoms and ultimately threatening other aquatic life including game fish. An unprecedented week-long effort on the part of 32 TPWD Inland Fisheries Division personnel to draw the line on the spread of zebra mussels in Texas ended at 4:30 p.m. Sept. 24, with a final dosage of potassium chloride in Sister Grove Creek. The stream flows through Grayson and Collin counties and empties in Lake Lavon, which so far is clear of the invasives. (*Excerpted from <http://www.tpwd.state.tx.us/newsmedia/releases/?req=20100929b>*)

Washington Stops Contaminated Boat: Washington State got a close call in September when a commercial truck hauling a 57-foot boat contaminated with zebra mussels was stopped. If the boat had entered Washington waters, it could have caused hundreds of millions of dollars in damage should those zebra mussels become established here. To date in 2010, Washington has intercepted **five** watercraft contaminated with dreissenid mussels (*For further information go to: <http://www.invasivespecies.wa.gov/press/2010/077ZebraMusselBoatStopped.shtml>*)

Promising First Year for Oregon Aquatic Invasive Species Prevention Program: The Oregon State Marine Board (OSMB), reports that it's been a little over a year since the Oregon Legislature directed the OSMB and the Department of Fish and Wildlife to implement an aquatic invasive species prevention program paid for by Oregon boaters. With its first season of implementation winding down, program managers are talking with boaters and natural resource professionals to make the program more user-friendly and less costly. According to Glenn Dolphin, the Aquatic Invasive Species Prevention Program Coordinator for the OSMB, "This program put 10 new AIS inspectors on the ground this season. ODFW inspection team personnel are highly trained and worked throughout their regions to inspect as many boats as they can at boat ramps and roadside inspection stations. During the 2010 boating season, the five teams conducted 1,898 boat ramp inspections, 690 roadside inspections and decontaminated four boats with the mobile hot water decontamination units. Fortunately the teams did not detect any quagga or zebra mussel infested watercraft and they educated every person they came in contact with about the importance of cleaning, draining and drying their watercraft after each use to prevent the spread of unwanted species." To see the full OSMB news release go to <http://www.boatoregon.com/OSMB/news/2010/AISPStatusRel.shtml>

Boater Fined \$5,000 for Illegal Launch at Lake Tahoe: According to the Tahoe Regional Planning Agency, on August 25, a boater who refused a mandatory invasive species decontamination earlier in the summer was fined a \$5,000 penalty for evading watercraft

inspectors in order to launch illegally into Lake Tahoe. For further information go to:
http://www.trpa.org/documents/press_room/2010/Watercraft_Violation_Release_8-25-10.pdf

Other West Coast Activity

European Fire Ant Found in WA. John Longino, from Evergreen State College, has identified ant specimens collected from Seattle Arboretum on Foster Island as *Myrmica rubra*, the European fire ant. He has developed a webpage that shows pictures of *M. rubra* and tells how to distinguish it from other *Myrmica* spp. in the region. To learn more, go to:
[\[http://academic.evergreen.edu/projects/ants/antsofthewashington/genera/myrmica/species/rubra/rubra.html\]](http://academic.evergreen.edu/projects/ants/antsofthewashington/genera/myrmica/species/rubra/rubra.html) (Thanks to Jeni Cena, via Kevin Aitkin)

New US Arrival: Green Alder Sawfly. Green alder sawfly (*Monsoma pulveratum*) was recently found in Washington State - the first time this insect has been detected in the continental U.S. Andrei Karankou deserves much appreciation for making the initial discovery of the sawfly in Vancouver, Washington, and posting some great photos online at [<http://bugguide.net/node/view/383192>]. Additional specimens collected in Portland, Oregon, and near Seattle, Washington, are pending confirmation. A summary of these recent detections, and links to a green alder sawfly webpage, are available at [www.fs.fed.us/r6/nr/fid/invasives/green-alder-sawfly.shtml]. The new Pest Alert is available at [www.fs.fed.us/r10/spf/fhp/pubs/MonsomaPestAlert.pdf].

Oregon Invasive Species Blogs. Oregon has established a webpage that houses a number of blogs on invasive species issues in Oregon and the Pacific Northwest. They include such topics as yellow jackets, aquarium fish, and a number of others. Check out the main website at [<http://oregoninvasivespecies.blogspot.com/>]

New Bubble Snail Parasite Causes Swimmer's Rash. Researchers report that a previously unknown parasite carried by the Japanese bubble snail (*Haminoea japonica*) is responsible for a nasty rash that has been affecting swimmers and waders at Crown Memorial State Beach in Alameda, California, for the past several years. The ¾-inch snail was discovered in the Bay in 1999, and in Alameda by 2003. Although they initially assumed the cause of the swimmer's itch was the same parasite that caused swimmer's itch in 1954 at Crown Beach, researchers later discovered a previously unknown microscopic flatworm, parasitic in the bubble snails. The snails could have been brought to the Bay in the ballast water, on ship hulls, with oysters planted in the Bay, or with oysters used in 1990s oyster experiments. Swimmer's itch was nearly nonexistent on the West Coast until a 2001 outbreak in British Columbia and, in 2005, a rash of rashes in Alameda. Although common in freshwater lakes and ponds, swimmer's itch also occurs along the coast of New England and Australia. The severity of the rash, which is an immune system reaction to the parasite, can vary from a minor annoyance to something like poison oak. Although invaders are generally considered primarily an ecological threat, this is a clear example of a marine invasion impacting both public health and recreation. (Excerpted from an article by Mike Taugher, in the Contra Costa

Times, September 26.) [http://www.mercurynews.com/top-stories/ci_16173809?nclick_check=1]

Washington Launches Firewood Campaign. Despite the vast amount of forest land in the United States, 27 states import a significant amount of firewood. According to a recent USDA study, from 1996–2007, the U.S. imported \$83 million of firewood from 27 countries in Africa, Asia, the Caribbean, Central America, Europe, and North and South America. On average, 76 percent of the annual firewood imports originated in Canada. Imported firewood enters the U.S. through 27 states. But wood-boring insects, such as emerald ash borer (*Agrilus planipennis* Fairmaire) and Asian longhorned beetle (*Anoplophora glabripennis*), can travel inside firewood, and they are responsible for widespread defoliation of forests in midwest and eastern states. Traditionally, people have moved firewood to favorite camp spots, or even new homes, without recognizing that this is a pathway for the movement of invasive species. Now, in a joint effort with ID and OR, the WA Invasive Species Council is launching a “Buy it Where You Burn It Campaign,” which encourages people to obtain their firewood as close as possible to the place where it will be burned. The tri-state, \$481,000 campaign includes billboards, radio spots, and other advertising. The three states are not the first to launch campaigns; most states have launched outreach programs. A national Web site also provides more information on the problem [www.dontmovefirewood.org/]. (Excerpted from a WISC Press release, July 16. Thanks to Wendy Brown, OISC.)

Washington AIS Permit (Update). The Washington State Department of Ecology will soon issue an Aquatic Invasive Species Management General Permit to regulate the use of chemicals or control products for the management of aquatic invasive animals and nonnative invasive marine algae in surface waters of Washington State. Ecology accepted written comments on the draft permit, fact sheet, and environmental impact statement from April 21, 2010 through June 11, 2010, and held a public workshop and hearing on the draft general permit on June 7, 2010. Ecology recently posted all the comment letters on its website. Ecology is currently revising the draft permit based on the comments received, and expects to issue the final permit this winter. For more information, contact Kathy Hamel at <kham461@ecy.wa.gov> or download the documents at [<http://www.ecy.wa.gov/programs/wq/pesticides/invasive.html>].

Washington Watch List Addition Proposed: A proposal is out to add the bryozoan *Watersipora*, commonly known as lace coral or moss animal, to the Washington Watch List. Newly discovered populations exist, and out-compete native fouling communities in the Bremerton area, and *Watersipora* has demonstrated invasive tendencies in the San Francisco and Humboldt bays as well as in Australia, New Zealand, Japan and the United Kingdom. *Watersipora sp.* was discovered in the Bremerton Narrows in winter of 2008. The species of *Watersipora* in Bremerton is currently unnamed. *Watersipora* is a sessile filter feeding fouling organism. It is a hermaphrodite, but also has budding capabilities, and it will form colonies consisting of thousands of individuals in single or multi-layered structures. It will also survive fragmentation in the wild, if it lands in an appropriate place. The documented pathway for introduction is hull fouling. Its spread along the west coast of the United States began in California in the Mid 20th century, and by the 1980’s

it was well established in San Francisco and Humboldt Bays. By the 1990s it was in Coos Bay, Oregon; in 2004 it was noted in Sequim, Washington, and as of 2010, *Watersipora* is known to exist in four locations within the Puget Sound: John Wayne Marina (Sequim), Bremerton Marina, Port Washington Narrows in Bremerton, and Padilla Bay. This species is not known to be beneficial at any level, and the Padilla Bay Newsletter recognizes it as invasive and potentially detrimental. No known containment, control, or eradication measures exist for *Watersipora*, although results of initial predator tests indicate that green sea urchins will eat it when no other foods are available. To see the entire Watch List, go to [\[http://www.invasivespecies.wa.gov/documents/ANSCwatchlist.pdf\]](http://www.invasivespecies.wa.gov/documents/ANSCwatchlist.pdf) (Thanks to Allen Pleus)

Mudsnails Dry Up Fishing at Capitol Lake. On September 3, WDFW announced that Capitol Lake in Olympia will be closed to all fishing until further notice. The move was prompted by the spread of New Zealand mudsnails (*Potamopyrgus antipodarum*), an invasive species in the lake. Mudsnails can be transported on such things as shoes, a dog's paw, and fishing gear. The lake was closed to salmon fishing earlier this year. For more information, contact <larry.phillips@dfw.wa.gov>. (Excerpted from the September 3 News Tribune [<http://www.thenewstribune.com/2010/09/03/1326167/olympia-mudsnails-dry-up-fishing.html>])

Didemnum in Oregon (Update). The colonial tunicate *Didemnum vexillum*, an aggressive, invasive aquatic organism, is on the list of "100 Worst Invasive Species to Keep out of Oregon." It has now been discovered in both Winchester Bay and Coos Bay, Oregon. *Didemnum vexillum* was found in Puget Sound several years ago, and between 2007 and 2009, the WA Department of Fish and Game spent \$850,000 managing the tunicate invasion in Puget Sound. Its propensity to foul surfaces of boats, fishing nets,



water intakes, docks and buoys could make it costly to control, and its ability to smother shellfish beds and sensitive marine environments threatens other marine life. The Winchester Bay infestation is growing rapidly; in February there were mostly one-foot-square colonies, but by May more colonies were two-foot to three-foot square. A second invasion was subsequently discovered in the Charleston Boat Basin in Coos Bay. The Oregon Department of Fish and Wildlife is in the final stage of a risk assessment. When completed, recommendations will be made and an action plan developed. Support for such a project may come through an "Invasive Species Control" fund established by the Oregon Legislature in 2009, but the Oregon Invasive Species Council must declare an

emergency to activate this account. *(Excerpted from a May 13 article by Mark Floyd).*
[<http://www.kval.com/news/93702514.html>].

Oregon Invasive Species Summit. The Oregon Invasive Species Council is hosting a statewide invasive species summit on November 18, in Salem. The purpose of the summit is to share and discuss the recent results of Oregon's statewide management assessment of invasive species, identify and develop high priority strategies for inclusion in the statewide strategic plan, and introduce and discuss invasive species legislative issues that will be proposed during the 2011 Oregon legislative session. Contact Lisa DeBruyckere <lisad@createstrat.com> for more information.

Alaska Invasive Species Conference. Alaska will hold its annual invasive species conference October 26-28, in Fairbanks. The event includes the 11th annual Committee for Noxious and Invasive Plants Management Workshop and the fifth annual Alaska Invasive Species Working Group Workshop. An Invasive Plants of Alaska Educators Workshop will be held on October 25. This special preconference workshop offers teachers an opportunity to increase their knowledge and learn about new elementary and secondary level Alaska curriculum materials, allow teachers to gain hands-on experience with invasive plant activities, and get free materials to help teach about invasive plants. Download a conference [registration form and agenda](http://www.uaf.edu/ces/) at [<http://www.uaf.edu/ces/>] or [<http://alaskainvasivespeciesconference.wikispaces.com>]. For more information and preregistration on the Educators Workshop, contact <katie.spellman@alaska.edu>. For more conference information, email <mahebert@alaska.edu> or <dscarter@alaska.edu>.

Washington Aquatic Weed Grants. The Washington Department of Ecology began accepting applications for grants through the Aquatic Weeds Management Fund on October 1, 2010. For detailed information about the application cycle and for an application form, go to
[<http://www.ecy.wa.gov/programs/wq/plants/algae/grants/index.html>]

[Elsewhere Around the U.S.](#)

GM Canola Running Wild. According to a report presented in August at the Ecological Society of America, genetically modified (GM) canola is now growing in the wild, busily evolving into a plant that will outstrip efforts to contain it. It also has the potential to cross-pollinate with other wild non-GM plants. Researchers traveling through North



Dakota found more than 83 percent of the wild canola they sampled tested positive for GM genes, showing that transgenic plants have clearly established populations in the wild. But the scary part: of the 406 plants collected, 347 tested positive for CP4 EPSPS protein (resistance to glyphosate herbicide, aka Roundup) or PAT protein (resistance to glufosinate herbicide, aka LibertyLink). Commercial GM canola is resistant to either Roundup or Liberty, not both. The dual resistance evolved in the wild, after the plants had escaped. The wild canola is doing what living things do--mutating and selecting for traits that will best ensure their survival. The escaped GM canola, bred to be herbicide-resistant, is now in danger of transferring those genes to other wild plants. Meredith Schafer from the University of Arkansas, who presented the report, said we really don't know the consequences of the gene escape or what these plants are going to do. Sooner or later, as genes are swapped between GM and non-GM plants, GM and wild will be one in the same--there could be virtually no such thing as a non-GM food plant or food crop. There will be no more choice between eating GM and non-GM food crops. And all will be resistant to our known herbicides.

If GM canola can establish itself in the wild, evolve and potentially cross-pollinate with other plants, what about the other experiments lying in wait at the lab? Schafer's colleague, Dr. Cynthia Sagers, an associate professor at the University of Arkansas, says "There have been 1,100 plants approved for field trials and who knows what those are - pharmaceutical proteins, drought-resistant crops? Herbicide-resistances are very simple traits. Products in development are more complicated." Which leaves us with questions: Do we want those running wild, too? Can we trust the claims Big Ag has been making that GM crops, even those that escape into the wild, present little to no risk? Sagers said, "We are playing Russian roulette with our future and our children's future. We can no longer turn a blind eye to the consequences of trying to remake the natural world so it can turn a tidy profit for a privileged few. Nature has a way of showing us who's really the boss." (*Excerpted from an Andrew Gunther article, August 17, [*http://www.huffingtonpost.com/andrew-gunther/gm-gene-out-of-the-bottle_b_679294.html*] and [*<http://www.care2.com/greenliving/first-gm-plants-found-in-the-wild.html#ixzz12GrBYozw>*].*

Proposed Pesticide General Permit (PGP) (update). On June 2, 2010, EPA announced the public availability of a draft National Pollutant Discharge Elimination System (NPDES) permit for point source discharges from the application of pesticides to waters of the United States. This permit is also known as the Pesticides General Permit (PGP).

It was developed in response to a decision by the Sixth Circuit Court of Appeals (*National Cotton Council, et al. v. EPA*) that vacated EPA's 2006 rule that said NPDES permits were not required for applications of pesticides to U.S. waters. As a result of the Court's decision, discharges to waters of the U.S. from the application of pesticides will require NPDES permits when the court's mandate takes effect, on April 9, 2011. EPA intends to issue the final PGP by December, 2010. This general permit will provide coverage for discharges in six states and territories, Indian Country lands, and federal facilities where EPA is the NPDES permitting authority. In the other 44 NPDES-authorized states, the state authorities will issue the permits. The Pesticide General Permit, General Permit Fact Sheet, Federal Register Notice and other information are available on the EPA website at [http://cfpub.epa.gov/npdes/home.cfm?program_id=410]

USDA Expands Emerald Ash Borer Quarantine Area. USDA-APHIS is amending the emerald ash borer (*Agrilus planipennis Fairmaire*) regulations by adding portions of Kentucky, Michigan, Minnesota, New York, Pennsylvania, Wisconsin, and the entire state of West Virginia, to the list of quarantined areas. This action will restrict the interstate movement of regulated articles from areas in these states. The interim rule is necessary to prevent the artificial spread of the emerald ash borer to non-infested areas of the United States. (*Thanks to Lisa DeBruyckere, OISC*)

Tegus in Florida. The tegu (*Tupinambis merianae*), an exotic 4-foot-long lizard from Argentina, has been spotted in Ocala National Forest. In the past few years, tegu breeding populations have been discovered in Miami-Dade, the Everglades, and western Polk County, and last fall, state biologists caught four tegus in one trap in Hillsborough County. So far, the Ocala Forest tegu is the first recorded sighting in Central Florida, but biologists fear there may be more. In recent years, tegus have become popular pets in the U.S. because of their docile nature, and it is likely the tegu was dropped off by an overwhelmed pet owner who could no longer handle or feed it. But some fear this could possibly tip the “ecological applecart”. The tegu is common in South America, and one of the most abundant lizards in southern Brazil. It is a sharp clawed omnivore, and will compete with native snakes and raptors for food. Its liking for gopher-tortoise eggs, a Florida native that already faces a number of dangers, is particularly worrisome.



Unlike many exotic animals, tegus can survive cold winters because they dig burrows and hibernate. If more tegus are found in the Ocala forest, then it may be time to take action. But capturing a tegu is not easy; it can race up to 18 mph. (*Excerpted from 'Biologists worry that reptile could tip ecological balance', by Martin Comas, Orlando Sentinel May 11. [<http://www.chron.com/dispatch/story.mpl/nation/6999624.html>]*)

New Biocontrol for Water Hyacinth. Agricultural Research Service (ARS) scientists and cooperators have released a new biocontrol insect, the plant hopper *Megamelus scutellaris*, to help control the invasive water hyacinth (*Eichhornia crassipes*) at the Edgefield Regional Stormwater Treatment Facility near Palatka, Florida. A free-floating aquatic plant native to South America, the hyacinth has infested freshwater ecosystems from North Carolina to California, but is especially problematic in the southeastern U.S. Its prolific growth affects water traffic, water quality, infrastructure for pumping and hydroelectric operations, water use and biodiversity, and it causes fish kills due to low oxygen levels. ARS scientists worked closely with the South American Biological Control Laboratory (SABCL) in Buenos Aires, Argentina, to find and test *M. scutellaris*. The researchers collected adults of *M. scutellaris* from Argentina in April, 2006, and brought them to the quarantine facility in Ft. Lauderdale where extensive host-range studies were conducted. A native of South America, both the nymphs and adults feed on the sap of water hyacinth. Nymphs are active and readily hop, even off the surface of the water, and the insect's population also increases rapidly, which will enable it to quickly impact the water hyacinth population. Herbicides are the primary method for reducing water hyacinth, but their use directly interferes with the biocontrol agents currently deployed against this weed. The scientists believe *M. scutellaris* may integrate better with existing herbicide programs because its mobility should improve its survival in such highly managed systems. The plant-hopper is highly host-specific, and does not pose a threat to native or economically important species. (*Excerpted from Science Daily, May 18, thanks to Katharine Sheehan.*)

Everglades Video. The Everglades National Park has just posted their video about invasive species within the Florida Everglades National Park. Everglades Invasives: Burmese Pythons and Beyond....can be viewed at [<http://www.nps.gov/ever/photosmultimedia/invasives.htm>] An Adobe Flash Player is required. (*Thanks to Kevin Aitkin*)

Trematode Genes Found in Lake Sturgeon Purdue University researchers found that the lake sturgeon (*Acipenser fulvescens*) genome contains trematode genes that didn't originally belong to it, and that may harbor a protozoan parasite (*Trichomonas*) that causes a sexually transmitted disease (STD) in humans. Andrew DeWoody and Matthew



photo: Zeb Hogan

Hale found the parasite and pathogen genes while analyzing DNA from the gonads of lake sturgeon, a species declining because of overfishing and habitat pollution. DeWoody said about 15 genes found in the lake sturgeon came from *Schistosoma*, a parasitic worm. Lateral gene transfer from one organism to another is rare, especially in multi-cellular animals, he said, but could be part of some evolutionary process for the sturgeon. While lateral gene transfer from a trematode worm could ultimately benefit the lake sturgeon, evidence of the *Trichomonas* pathogen is more likely to have a negative effect. According to the Centers for Disease Control and Prevention, a human version of this pathogen causes *Trichomoniasis*, a common STD that can cause pregnant women to deliver early or have children with lower birth weights. The finding is the first suspected case of *Trichomonas* in a fish, DeWoody said. Next, DeWoody and Hale would like to determine what effect, if any, the *Trichomonas* parasite has on lake sturgeon. Hale said lake sturgeon can live more than 100 years, and females do not reach sexual maturity for more than 20 years. Even then, they only lay eggs about every five years. So understanding how a pathogen or humans are affecting the sturgeon could be a key to conserving them. (Excerpted from *Lake Sturgeon Have Genes from Parasite, Signs of Human STD*, *Science Daily*, May 11, 2010.)

[http://www.sciencedaily.com/releases/2010/05/100511141749.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+invasivenews+%28Invasive+Species+News%29]

Knotweed Hybrids Spreading Rapidly. When two plant species contribute to a hybrid, new capabilities for invasion can also be created, and recently formed plant hybrids have been shown to spread rapidly. A study reported in the current issue of the journal *Invasive Plant Science and Management* examines the hybridization and spread of Japanese knotweed (*Polygonum cuspidatum*) and giant knotweed (*Polygonum sachalinense*) in the United States. Previous studies have focused on this occurrence in the plants' native Asia and in Europe, but not in North America. Using flow cytometry, researchers investigated DNA content of established plant families in a common garden, seedlings grown from common garden parents, and wild populations. Not only did the two varieties of knotweed cross-breed in a controlled garden setting, but the hybrids were identified in field populations in Massachusetts as well. Nearly all the created hybrids showed strong growth, seed set, and the production of viable pollen. Significant introgression, where a hybrid crosses once again with one of its parents, is also suggested by the study results. As introgression progresses, a more diverse swarm of invasive plants is created. Once populations are established, options for eradication become more limited. The authors emphasize the importance of managing sexual reproduction of invasive species. Careful management of giant knotweed is essential to limiting its role as a parent to a hybrid. Hybrids also should be recognized as invasive species that are diverse, vigorous, and fertile. (Excerpted from a *USAgNet* article, October 8, 2010)

[<http://www.wisconsinagconnection.com/story-national.php?Id=2014&yr=2010>]

Narrow-Leaved Cattail. In southern Minnesota, where native cattails once stood, sprinkled among bullrush, smartweed and other plants, now there's almost certainly a vast lawn of narrow-leaved cattails (*Typha angustifolia*) or their hybrid offspring. These relative newcomers are taller, with narrower, darker-green leaves and slimmer spikes at

the tops. They out-compete the natives, upsetting the ecological balance by creating a monoculture that's inhospitable to other plants, animals and birds. In 1973, Larry Gillette, director of the University of Minnesota Center for Hardwood Ecology, conducted his first wetland survey in what is now the Three Rivers Park District and found a couple of narrow-leaved cattail plants along Lake Katrina in Medina. Now, that ratio is reversed, and native cattails are the ones hard to find. Over the past 37 years, Gillette said surveys have revealed songbird numbers are also down, perhaps because longtime seed sources are missing. There also appear to be fewer muskrats, who favor native cattails. Runoff containing nutrients such as nitrogen seems to favor narrow-leaved cattails.

Narrow-leaved cattails are believed to have come from Eurasia, reaching North America long ago and hybridizing with the native broad-leaved cattails. Starting in the eastern United States, they've gradually spread westward, and they are especially common in the South. Because they looked similar to the native species, by the time they hit the agency's radar screen, they were already too widespread to regulate. The most effective ways to kill the invasive cattails are to cut them below water level, so water fills the hollow stems, and to apply herbicides, but neither is considered an effective large-scale solution.

Minnesota still doesn't consider narrow-leaved cattails or their hybrid offspring an invasive species, so anyone who wants to remove them on public waters or protected wetlands needs a permit from the DNR. With wetlands overrun with narrow-leaved or hybrid cattails, and techniques to control them limited, some officials feel research on control technologies may offer the best answer. *[Ed Comment: We should be more concerned about these in the PNW as well!]* (Excerpted from 'Cattail catastrophe' By Dennis Lien dlien@pioneerpress.com, August 30. Purchase of article required.

[http://www.twincities.com/ci_15935971?nclick_check=1]. For more information on narrow leaf cattail go to: http://dnr.wi.gov/invasives/fact/narrow_cattail.htm

Carp Solution: Reverse the Chicago River? Over 100 years ago, Chicago completed decades of work to reverse the Chicago River's flow, so untreated waste did not flow into Lake Michigan, the city's drinking water source. The reversal also linked Chicago to the nation's shipping waterways. But the project also diverted a significant amount of water from Lake Michigan, and created a way for invasive species like Asian Carp to move from the Mississippi River into the Great Lakes ecosystem. Now, as carp worries grow,



Glf.org



Chicagonow.com



news.stv.tv



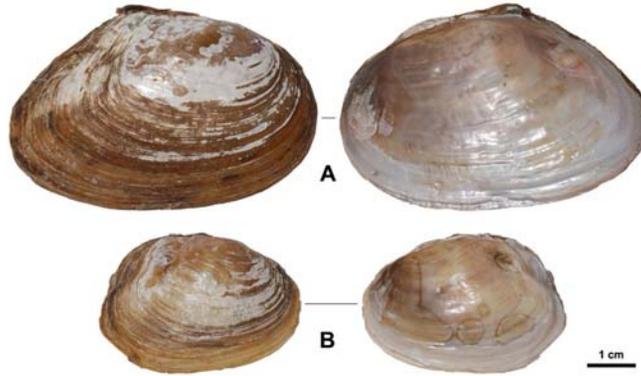
buffalonews.com

an unthinkable difficult and costly idea has been getting a lot of consideration, especially after a live Asian carp was recently found just outside Lake Michigan, miles past the electric barriers that were supposed to stop the voracious fish at Lockport. The question: Should Chicago waterways be separated from their connection to the Mississippi River, effectively reversing the Chicago River again, to block invasive species? Sen. Richard Durbin, D-Ill., and Sen. Debbie Stabenow, D-Mich., have introduced legislation requiring

an 18-month study of how to sever the Chicago-area connections between the Mississippi River and Lake Michigan. But that's not fast enough for the Great Lakes Commission and the Great Lakes St. Lawrence Seaway Cities Initiative, two non-profit groups that are trying to line up \$1 million to \$2 million in foundation grants for a crash study. There are many obstacles to separating Chicago waterways from Lake Michigan: it would likely cost tens of billions of dollars; the difficulty of reversing the Chicago River again after a century of metropolitan growth; more than 5.5 million people depend on the waterway system to flush their waste and stormwater, keeping it away from the city's drinking-water supply; a large barge-shipping industry relies on the river to haul some 25 million tons of cargo annually from New Orleans to Chicago and points north on the lake; and there are the thousands of pleasure boaters and tour operators.

If the decision were made to reverse the river, one of the first decisions would be where to create a watertight separation between the Chicago waterways and Lake Michigan. A single separation point at Lockport, where the manmade waterways begin, would force all of Chicago's wastewater and storm water to flow into Lake Michigan, dictating a massive upgrade in water treatment facilities that would double or triple current treatment costs. Putting the separation close to the lake would allow much more shipping to continue normally, and water treatment plants to the west would not need to be upgraded. A separation point at the main branch of the Chicago River, would allow the north and south branches to flow freely, which is better than putting the break point at the mouth of the river, which would threaten much of downtown with flooding during major storms. Putting a separation point on the south branch, near where the Chicago Sanitary and Ship Canal begins, would preserve lake access for most boaters and industrial users. The most difficult choice for a separation point would be the Lake Calumet area, where barge traffic is heaviest, as some kind of lift mechanism would be needed for dozens of 1,500-ton barges that cross that area every day. All of these things are possible, but one thing is sure: if this idea of closing the canals actually moves forward, no matter which separation point is chosen, it is sure to create large and heated discussions. (*Heavily excerpted from an article by Paul Merrion, July 05, 2010, [*<http://www.chicagobusiness.com/cgi-bin/article.pl?articleId=33624>*], and a September 10 news blog [*http://newsblogs.chicagotribune.com/clout_st/2010/09/daley-lets-reverse-flow-of-chicago-river-back-into-lake-michigan.html*].*

First North American Sighting of Chinese Pond Mussel. The large, freshwater mussels discovered in Hunterdon County, New Jersey, last spring could mark the first North American invasion by a mollusk already a problem in European waters. Recent DNA tests have confirmed that mussels found at a former fish farm are Chinese pond mussels (*Sinanodonta woodiana*). The mussels reach almost 8 inches in length, so their size indicates they have been there for many years. The mussels are believed to be limited



(photograph by R. Zorer)

to the 51-acre property where they were found. For 35 years, until 2007, an aquaculture business known as Huey Farm, imported carp fingerlings from China, and raised them to full size in eight spring-fed ponds. The mussels were found as the Nature Conservancy began the time-consuming task of ridding the ponds of bighead carp, and it is assumed that the mussels arrived with the carp. The spread of Chinese pond mussels is reported from Italy, France, Germany, Greece, Romania, Hungary and about 10 other European countries, and the spread of the mussels in Europe has been linked to the importation and commercial cultivation of Asian fish. (Thanks to David Britton) (Excerpted from a September 26, 2010, Brian T. Murray article in the Star-Ledger)

[http://www.nj.com/news/index.ssf/2010/09/hunterdon_county_finds_first_n.html] For an article on this clam in *Aquatic Invasions*, go to:

[http://www.aquaticinvasions.net/2009/AI_2009_4_4_Cappelletti_etal.pdf]

Bird Deaths Linked to Hydrilla Lake Varner, Georgia, has a problem. About 70 percent of the 820-acre Lake Varner is now covered in *Hydrilla*. But there's a much more serious concern: birds are dying at the lake. At least three bald eagles have been found dead at Lake Varner since 2007, and ospreys, Canada geese, and especially coots that take up residence at Lake Varner in the fall, are also being affected. The birds are victims of Avian Vacuolar Myelinopathy (AVM), a neurological disease first documented during the winter of 1994-1995 at DeGray Lake, Arkansas, when 29 bald eagles were found dead or dying. It has since been confirmed in Texas, Georgia, North and South Carolina, according to Dr. Susan Wilde, assistant professor at the University of Georgia. Research implicates plant-associated Cyanobacteria, or blue-green algae, as the source of the neurotoxin. The toxins do not appear to be in the water, but are closely adhered to the plants. The algae grow on the leaves of aquatic plant species, primarily *Hydrilla*. Coots, mallards, geese and other plant eating water birds consume the vegetation and become sick or die from ingesting the toxin. Birds with AVM have brain and spinal cord lesions, lose muscle coordination, and have difficulty flying and swimming. They will sometimes swim with a list, get stuck upside down in the water, wobble when flying, or even fall from the sky in mid-flight. The eagles die when they consume the sick or dead water birds that have toxin in their bodies. To date, there are 17 reservoirs where AVM has been documented, and AVM is responsible for the death of more than 130 bald eagles and thousands of coots. The U.S. Army Corps of Engineers Aquatic Nuisance Species

Research Program has called AVM “the most significant unknown cause of eagle mortality in the history of the United States.”

The most ecologically friendly method for cleansing the lake appears to be stocking it with sterile grass carp. They have been successfully used to remove *hydrilla* in other locations, but this may be the first time they have been used on an AVM positive lake in Georgia. The county is pursuing a grant to help fund the carp stocking and build a barrier to keep them from moving downstream into state waters. Assuming the grant is awarded, around 4,000 fish would be stocked next spring, but it will be an ongoing process, requiring stocking of 3,000 to 5,000 carps annually for five to seven years. (*Excerpted from an article by Crystal Tatum, Newton Citizen.com, September 16.*

[<http://www.rockdalecitizen.com/newtonnews/headlines/103104724.html>]

New Firewood Reports. The USDA Animal and Plant Health Inspection Service (APHIS) has examined factors that may affect the risk associated with the movement of firewood, potential impact to natural and urban forests, and trends in firewood use. From the assessment, they estimate firewood to be a high-risk pathway for the movement of forest pests. Their *Risk Assessment of the Movement of Firewood within the United States* is now posted on the APHIS website along with the National Firewood Task Force (NFTF) *Recommendations document* under the News and Information section. The Risk Assessment document is more technical in nature, but both documents reflect the attention that APHIS is putting towards preparing regulatory action to protect our nation's forest resources. See them at:

[http://www.aphis.usda.gov/newsroom/hot_issues/invasive_species&firewood/index.shtml]. (*Thanks to Lisa DeBruyckere, OISC*)

"Weed calculator" Estimates Landowner Costs from Invasive Plants. Matt Rinella, a rangeland ecologist with USDA's Agricultural Research Service, has developed a weed impact calculator that ranchers can use to calculate the economic impact of invasive weeds on their property. It is based on a computer model that he developed utilizing data from 30 weed scientists to predict invasive plant impacts on forage production. Ranchers can download datasheets for recording weeds, which they tally, grouping them by height. The necessary data can be gathered in about 30 minutes. When the numbers are entered into the calculator, the ranchers learn how many pounds of weed they are producing per acre, and how many more cattle they could raise per acre if those pounds of weeds were replaced by forage plants. This tool could be particularly useful to help show private landowners the financial benefits of controlling invasive weeds on their property. Rinella said currently the calculator can be used only for spotted knapweed and leafy spurge - two of the worst invasive plants in North America. To add other weeds to the calculator, he would need to integrate information on the plant's impact per unit density, i.e., how the abundance of desirable plants declines as weed density increases. This information is likely already available for other well-studied invasive species, so hopefully more weeds will be added to the calculator application in the near future. The calculator can also be used to estimate the economic impacts of invasive weeds on livestock production. For example, Rinella estimated that if leafy spurge were eliminated from the western US, ranchers in the region could graze an additional 200,000 cows per year. See the calculator

at [<http://199.133.173.229/WeedImpact/>]. (Excerpted from a *Conservation Maven* article by Rob Goldstein, May 11.) [<http://www.conservationmaven.com/frontpage/weed-calculator-estimates-the-landowner-costs-from-invasive.html>]

[Around The World](#)

NY State's Ballast Law Fought by Canada. The government of Canada has asked the U.S. State Department to intervene in New York's implementation of the ballast regulations, which would require ships stopping in or passing through New York waters to be outfitted with ballast treatment systems far more advanced than international shipping standards recommend. For the full story go to: <http://www.watertowndailytimes.com/article/20101015/NEWS02/310159940/-1/news>

Drug-filled Mice Airdropped Over Guam. Dead mice packed with drugs were recently airdropped into Guam's dense jungle canopy—part of a new effort to kill the brown tree snake (*Boiga irregularis*) on the U.S. Pacific island territory. Tablets of concentrated acetaminophen, the active ingredient in Tylenol, are placed in dead thumb-size mice, which are then used as bait for the snakes. When ingested, the drug disrupts the oxygen-carrying ability of the snakes' hemoglobin blood proteins. Only about 80 milligrams of acetaminophen—equal to a child's dose of Tylenol—are needed to kill an adult brown tree snake. Once ingested via a dead mouse, it typically takes about 60 hours for the drug to kill a snake. Very few snakes will consume something that they haven't killed themselves, but brown tree snakes will scavenge as well as hunt, and that's the "chink in the brown tree snake's armor."



(Photograph by George Grall, National Geographic)

Before the mice are airdropped, they are attached to "flotation devices" consisting of two pieces of cardboard joined by a 4-foot-long (1.2-meter-long) paper streamer. The flotation device was designed to get the bait stuck in upper tree branches, where the brown tree snakes reside, instead of falling to the jungle floor, where the drug-laden mice might inadvertently get eaten by non-target species. But there are few other species left

on Guam that could be tempted by the mouse bait, because the brown tree snakes have eaten most of them. On September 1, USDA researchers in helicopters performed a small-scale airdrop of about 200 baited mice onto 20 acres (8 hectares) of jungle around the U.S. Naval Base. The drop was done to help refine the technique before a larger field test is conducted in late 2010 or early 2011. A small subset of mice in the latest drop was equipped with radio transmitters, which the team will use to determine the baits' efficiency. All of the tools currently at scientists' disposal, including the drug-filled mice, will at best, simply control the island's snake population, not eradicate it entirely. But the aerial delivery of oral toxicants is a control tool that can be applied across a larger landscape. Longer term, USDA researchers hope to create a non-biological substitute for dead mice in the bait, something that the snakes will eat but that won't rot or attract flies, ants, and maggots in the jungle. (Excerpted from an article by Ker Than, in *National Geographic News* September 24, 2010)

[<http://news.nationalgeographic.com/news/2010/09/100924-science-animals-guam-brown-tree-snakes-mouse-tylenol/>]

Mammals the Most Effective Invaders. According to the “tens rule”, roughly ten percent of introduced species become established, and ten percent of those become invasive. But according a study by Jonathan Jeschke, this doesn't hold for mammals or birds. The Munich researcher found that fifty percent of introduced bird species become established, and 34 percent of those become invasive. Mammals are even more successful colonists, with an amazing 79 percent establishing and 63 percent of those becoming invasive. That makes mammals almost fifty times more effective invaders than the “tens rule” predicts. Check out the article: Jeschke, J.M. (2008) *Across islands and continents, mammals are more successful invaders than birds*. Source: *Diversity and Distributions*, Volume 14, Number 6, November 2008 , pp. 913-916(4).

[<http://www.ingentaconnect.com/content/bsc/ddi/2008/00000014/00000006/art000006>]

Knapweed Claims Turtle Hatchlings. In British Columbia, in May, 2010, Fish & Wildlife Compensation Program (FWCP) staff found nine dead western painted turtle hatchlings (*Chrysemys sp.*) buried in the sand, so entangled in the roots of spotted knapweed that they had no chance of survival. They were found during routine removal of invasive weeds and loosening of the sandy soil prior to the females' arrival in early June. The fibrous roots of invasive species such as knapweed and hawkweed can either encase the turtle eggs so that the hatchling cannot emerge, or entangle the hatchling as it remains in the nest. “In the Columbia region painted turtle eggs are laid from late-May to early-July and hatch in late-August, but remain in the sand until they emerge the following spring,” says FWCP wildlife biologist Ross Clarke who oversees the turtle work. “In the southern part of their range they hatch and then emerge from the ground straight away, but here at the northern extent of their range there is a much longer duration when the hatchlings remain in the ground. As a result they are more vulnerable to invasive weed growth. In most cases the roots actually feed on the eggs and hatchlings which are nutrient-rich. We have even found dead hatchlings literally skewered by couch grass roots.” This shows the importance of monitoring and removal of invasive plants at known hatch sites. (Excerpted from an article by Angus Glass, *The Deadly Reach of*

Other Resources and Materials

New Publication: Census of Marine Life Thirteen National and Regional committees, composed of over 360 scientists, have just completed a landmark, decade-long, Census of Marine Life. Released October 4, in London, it is an inventory of species distribution and diversity in 25 biologically representative regions (Antarctica, Atlantic Europe, Australia, Baltic Sea, Brazil, Canada (East, West and Arctic), Caribbean Sea, China, Indian Ocean, Japan, Mediterranean Sea, New Zealand, South Africa, South America (Tropical East Pacific and Tropical West Atlantic), South Korea, the Humboldt Current, the Patagonian Shelf, and the USA (Northeast, Southeast, Hawaii, Gulf of Mexico, and California). Major inventories continue in highly diverse areas such as Indonesia, Madagascar and the Arabian Sea, which have yet to report. The papers help set a baseline for measuring changes caused by human or natural causes, provide a baseline for still thinly-studied forms, especially small animals, and will help guide future decisions on exploration of still poorly-explored waters, especially the abyssal depths. The Census papers collection, freely available at PLoS ONE [www.coml.org/plos-one-collections], includes links to maps, databases and a suite of the first nine regional papers on which the summary drew, with several more to be added in weeks to come.

A few interesting facts from the Census:

- The number of species is likely to exceed 230,000.

Australian and Japanese waters are by far the most biodiverse; each has almost 33,000 life forms that have earned the status of "species" (and thus a scientific name). The oceans off China, the Mediterranean Sea, and the Gulf of Mexico, round out the top five areas most diverse in known species.

- On average, about one-fifth of all species were crustaceans which, with mollusks and fish, make up half of all known species on average across the regions. Even less diverse regions such as the Baltic or Northeast USA still have about 4,000 known species. Relative to its volume of water, the Baltic, followed by China, has some of the highest known diversity. Relative to their seabed area, South Korea, China, South Africa and the Baltic, had most species.

- The Mediterranean had the most alien species among the 25 regions, with over 600 (4% of the all species inventoried), most of which arrived from the Red Sea via the Suez Canal. Many aliens have also invaded the European Atlantic, New Zealand, Australian Pacific, and Baltic waters, and mollusks, crustaceans, and fish were the most common invading aliens. (*Excerpted from Science Daily, August 3, 2010*).

New Rapid Response Model From Hawaii: *A successful model from Hawaii for rapid response to invasive species;* by Fred Kraus and David C. Duffy (2010). *Journal for Nature Conservation* 18 (2010) 135-141 . Abstract: "We outline a functional management model for the eradication of incipient populations of invasive species that avoids reliance on official governmental response. This model involves formation of informal multi-

partner committees that utilize outside funding to achieve pest-management goals. We describe why such a system was needed in Hawaii, how it is structured, how it operates, its achievements, and its advantages and limitations. Fragmented and incomplete governmental authorities are currently the rule for invasive-species management in many parts of the world, and typically lead to non-response or an ineffective response. The model we describe serves the useful function of allowing eradication of incipient pests to proceed while comprehensive biosecurity programs are devised through more traditional governmental channels.”

Handbook of Forestry BMPs. The Wisconsin Council on Forestry has developed BMPs that offer a framework for addressing the state’s invasives problems. *Invasive Species Best Management Practices* offers voluntary practices that can be integrated with forest management activities, and includes standards of practice that will aid landowners, land managers, and loggers in limiting the introduction and spread of invasive plants, invertebrates, and diseases. To access the handbook, go to:

[<http://council.wisconsinforestry.org/invasives/>] (Thanks to Kevin Aitkin)

New Journal. The Weed Science Society of America (WSSA) announces a new peer-reviewed quarterly journal, *Invasive Plant Science and Management*. The journal includes fundamental and applied research about invasive plant biology, ecology, management and restoration of invaded non-crop areas, and educational, sociopolitical, and technical aspects of invasive plant management. To learn more, go to

[<http://www.wssajournals.org/>]

New Status and Trends Report. The Environmental Law Institute and the Union of Concerned Scientists announces the publication of *Status and Trends in State Invasive Species Policy: 2002-2009*. The report reviews developments in state laws and regulations governing invasive species in eleven states. It finds that invasive species laws and regulations are often fragmented and incomplete, and that they have been developed primarily on a species-by-species basis in response to crisis. As a result, they often fail to address potential future invaders or close off known invasion pathways. Fortunately, states have begun regulating invasion pathways and identifying species that may become invasive in the future due to climate change or other factors, and they are increasingly creating interagency councils and management plans to coordinate invasive species responses. The report concludes that federal action is needed in the form of legal reform and increased funding. Download the report at:

[http://100thmeridian.org/documents/ELI_Invasive_Species_State_Policy_Report_05_2010.pdf]

Guide to Ballast Water Treatment Technology. Lloyds Register has released the third edition of its *Guide to Ballast Water Treatment Technology*. This revision provides updated information on suppliers, and indicates the status of systems in relation to the approval process as well as an outline description of water treatment processes and an appraisal of commercially available and developing technologies for ballast water treatment. Full data, referenced against individual suppliers, are provided in the Annex. To get a pdf copy, go to: [<http://www.psmfc.org/ballast/wordpress/wp->

content/uploads/2010/06/Ballast-Water-Treatment-Technology_Feb-2010.pdf

(Thanks to Keith Strieck, DFW)

New Encyclopedia of Biological Invasions. The first Encyclopedia of Biological Invasions, by Simberloff and Rejmanek, will be published in January 2011. The website abstract: “This pioneering encyclopedia ...written by leading scientists from around the world, addresses all aspects of this subject at a global level - including invasions by animals, plants, fungi, and bacteria - in succinct, alphabetically arranged articles. Scientifically uncompromising, yet clearly written and free of jargon, the volume encompasses ...biology, demography, geography, ecology, evolution, sociology, and natural history. [It features] many cross-references, suggestions for further reading, illustrations, an appendix of the world’s worst 100 invasive species, a glossary, and more.” (*Ed. Comment: There is a current special price reduction from \$96 to \$76.*) [<http://www.ucpress.edu/book.php?isbn=9780520264212>]. (Thanks to Marcel Rejmanek, UC Davis).

Earthworm Article. For general invasive earthworm information there's a great website: [<http://www.dnr.state.mn.us/invasives/terrestrialanimals/earthworms/index.html>] And a great-titled review article: Pandora's Box Contained Bait: The Global Problem of Introduced Earthworms (Annual Review of Ecology, Evolution, and Systematics, Vol. 39: 593-613, December 2008) or [<http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.ecolsys.39.110707.173426>] Here’s the abstract: ‘Introduced exotic earthworms now occur in every biogeographic region in all but the driest or coldest habitat types on Earth. The global distribution of a few species (e.g., *Pontoscolex corethrurus*) was noted by early naturalists, but now approximately 120 such peregrine species are recognized to be widespread from regional to global scales, mainly via human activities. Species adapted to human transport and to colonization of disturbed habitats, are most widespread and are the principal invasive species. We identify a number of endogenous and exogenous factors that may contribute to the successful establishment and spread of peregrine species. Quantification of these factors may help to determine why certain species become invasive while others do not. Recent advances in theory and modeling of biological invasions and in molecular techniques should prove fruitful in improving our understanding of invasive earthworms, as well as in predicting their impacts on ecosystems.’ (Thanks to Miranda Plumb, NPS)

Weed Disseminules Tool. The second edition of *Federal Noxious Weed Disseminules of the U.S. (FNW E2)*, a tool for the identification or verification of plant disseminules (seeds and fruits) of taxa of the U.S. is now online. Abstract from the website: This interactive tool provides photographs, text and keys that aid in determining whether or not an unknown disseminule (e.g., seed, fruit) found as a contaminant in imported botanicals and agricultural products is a Federal Noxious Weed (FNW) and is therefore actionable. The total FNW list of 114 taxa is broken down into smaller groupings, first by Disseminule Type - Fruits & Seeds vs. Spores vs. Vegetative. Within Fruits & Seeds, these angiosperm taxa are further broken down into three family groupings - Poaceae, Fabaceae, and Other Families - each of which is accompanied by a key for further discrimination. A Key to Keys assists the user in deciding which of the three family keys

is appropriate to use for taxon identification. Fact Sheets for each FNW taxon pull together relevant descriptions, including distinguishing characteristics and photographs. View the tool at [<http://keys.lucidcentral.org/keys/v3/FNWE2/>] (Thanks to Miranda Terwilliger)

Invasive Species Website: The University of Georgia's Center for Invasive Species and Ecosystem Health has a website with a wealth of information for both invasive animals and plants. Go to <http://www.invasive.org/> (thanks to Kevin Aitkin)

The Zebra Mussel in Europe: (Gerard van der Velde, Sanjeevi Rajagopal & Abraham bij de Vaate, Editors): This recently released book provides an up-to-date overview of scientific specialists with contributions on all aspects of the zebra mussel. It includes information on fossil and recent species, distribution and dispersal, genetics, food, growth and life history, ecology and ecological impacts, endosymbionts, parasites, predation, indication for water quality and applications, biofouling and control. [http://shop.margraf-publishers.net/index.php?id=863&no_cache=1&L=9&backPID=822&tt_products=1282]

Readers Respond

RE: Giant African Land Snail (Nutshell #28). Thanks to Paul Zajicek who commented “I wish you had communicated the serious aspects as well. Please see [<http://www.doacs.state.fl.us/pi/plantinsp/gals.html>].” [*Ed comment: We didn't expand on the impacts of this serious pest, because there have already been previous articles on this snail and its impacts.*]

Major Upcoming Invasive Meetings

October 25-29, 2010. 2nd Invasive Species in Natural Areas Conference. Coeur d'Alene, ID. [<http://www.nripc.org/conferences.html>]

October 26-28, 2010. Alaska Invasive Species Conference, Fairbanks. Download registration form and agenda at [<http://www.uaf.edu/ces/>]

November 2, 2010. Chinese mitten crab workshop, Arlington, VA. Register via e-mail to: <ronald_smith@fws.gov>

November 3-4, 2010. Aquatic Nuisance Species Task Force (ANSTF) meeting. For more information, contact Susan Mangin, 703-358-2466.

November 8-10, 2010. Minnesota-Wisconsin Invasive Species Conference 2010, St. Paul, Minnesota. [<http://www.minnesotaswcs.org/>]

November 13-17, 2010. 5th National Conference on Coastal and Estuarine Habitat Restoration, Galveston, TX. [www.estuaries.org/conference].

November 18, 2010. Oregon Invasive Species Summit, Salem, OR. Contact Lisa DeBruyckere <lisad@createstrat.com> for more information.

November 30 – December 2, 2010. Western Weed Coordinating Committee Annual

Meeting, Las Vegas, NV [<http://www.weedcenter.org/wwcc/docs/Invitation-2010.pdf>]

December 7-9, 2010. Invasive Species Advisory Committee, Washington, D.C.

http://www.invasivespecies.gov/global/ISAC/ISAC_index.html

December 7-9, 2010. Oregon Interagency Noxious Weed Symposium. LaSells Stewart Center, Corvallis, OR.

February 16-17, 2011. Landscape Ecology of Tamarisk, 2011 Research Conference, Tucson, AZ.

February 28 – March 4, 2011. 2nd Annual National Invasive Species Awareness Week, Washington, D.C. Go to [<http://www.nisaw.org/>] for updates and information.

August 23-25, 2011. 7th International Conference on Marine Bioinvasions, Barcelona, Spain. [<http://www.icmb.info/>]

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