



ISSUE 23

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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 invasive events 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 <Joan\_cabreza@psmfc.org>. To access all past Nutshell issues 1-22, go to <http://www.aquaticnuisance.org/newsletters/>. To subscribe or unsubscribe from this newsletter please email - [joancabreza@msn.com](mailto:joancabreza@msn.com)*

### **A Quote To Ponder...**

“...quaggas have now outcompeted zebra mussels so successfully, you’d be lucky to find a zebra mussel in Lake Michigan. ... If you had told me 10 years ago that you wouldn’t be able to find a zebra mussel in Lake Michigan, I’d have said you’re crazy.”

- Gary Fahnenstiel, senior ecologist with NOAA’s Great Lakes Environmental Research Lab

### **This Quarter’s Off-The-Wall News**

#### **Squids Invade The WA-OR Coast.**

A small “invasion” from California bloomed into to a large invasion, with hundreds of Humboldt squid (*Dosidicus gigas*) washing up in parts of the WA and OR coastlines in late October. First, a couple of dozen dead squid washed up on beaches between Warrenton and Cannon Beach. When the big influx started happening, hundreds washed up on north OR coastal beaches, and it became hard to walk on many parts of the northern coast without stepping on one. Within a few days, the numbers were so huge near Westport, WA, that state authorities issued a kind of emergency open season, allowing fishermen to scoop as many out of the water as they wanted. They make good crab bait, and when taken alive,



**Photo: Seaside Aquarium**

are also good eating. The squid were all three to four feet in length, but they are known to reach 6 feet and up to 100 pounds. Humboldt squid reside in the warmer waters off of the CA coast. But occasionally a warm offshore current will bring the squid up north, and when the warm water current eventually dissipates, the squid get hypothermia, and start to wash ashore. This is not the first time: in 2004, a record year, hundreds of Humboldt squid washed ashore on the OR coast, some still alive, and hundreds washed up on San Diego and Orange county beaches in CA, in 2002 and 2005. [*Ed comment: An effect of global warming?*] (From the Oregon Coast Beach Connection, October 21, thanks to Doug Frazer)

## **Successes & Lights at the End of the Tunnel**

**Birch Leaf Miner.** The birch leaf miner (*Fenusa pusilla*) arrived in the U.S. in 1923, probably in a shipment of plants and soil sent to Connecticut, and soon it spread throughout the Northeast and into the Midwest. The insect is not fatal to birches, but it disfigures the tree and makes it unattractive for landscaping. Now researchers at the University of RI say the leaf miner is all but eradicated in the Northeast, thanks to a tiny European parasitic wasp they began releasing in 1989. A recent survey showed that the leaf miner was under control in RI, MA, CT, NY, PA and northern NJ. (*Excerpted from a December 1, Boston Globe, greenblog article, Beth Daley*). [*Ed Comment: Come on folks! Send me some more success stories....I know we have more successes than just one!!*]

## **Zebra Mussel Invasion Updates**



**Columbia River Plan and Response Exercises.** The state of WA, OR, ID, MT, as well as the USFWS and Columbia River Inter-Tribal Fish Commission have all signed the regional *Columbia River Basin Interagency Invasive Species Response Plan: Zebra Mussels and Other Dreissenid Species*. The plan describes actions that should be implemented in the event of a zebra or quagga mussel introduction. Revisions to the plan will be posted based on new information and findings from ongoing response exercises. An associated strategy to enhance implementation of the plan, and reports for past exercises, are now posted online at [<http://www.100thmeridian.org/ColumbiaRT.asp>].

A second interagency mock response exercise was held in October, 2008. It was more focused than the first exercise, and attendees considered it to be very successful. A report on the October exercise is now available at [[http://100thmeridian.org/ActionTeams/Columbia/CRB\\_Dreissenid\\_Exercise\\_2008report.pdf](http://100thmeridian.org/ActionTeams/Columbia/CRB_Dreissenid_Exercise_2008report.pdf)]. A *third exercise is planned for April in Boise Idaho.* (Thanks to Paul Heimowitz)

**Western Mussel Action Plans.** The national ANS Task Force has requested the Western Regional Panel on Aquatic Nuisance Species (WRP) develop a western zebra/quagga mussel action plan for the 19 WRP member states. The Western Association of Fish and Wildlife Agencies is conducting a similar effort that is intended to be brief, define actions and needs, and build on and incorporate existing activities, so

the two groups will be coordinating their efforts. An initial WRP draft plan is expected in the spring. For more information, contact Paul Heimowitz <paul\_heimowitz@fws.gov>.

**Response System Database.** A discussion on how to improve regional coordination/communication regarding preliminary, unconfirmed reports of quagga/zebra mussel detections and contaminated watercraft "on-the move" identified the need for a notification database within the 100<sup>th</sup> Meridian Initiative website. Rather than individuals trying to keep contact lists up-to-date for unique efforts like the Columbia Basin rapid response plan, this database would serve as a centralized directory, with each jurisdiction responsible for including and updating their contact information. The 100<sup>th</sup> Meridian Initiative and its Columbia River Basin Team have been working to create such a tool. The database is also intended to facilitate rapid sharing of preliminary information to a core group of ANS contacts to facilitate regional cooperation and response, and it uses password protection and includes notification criteria. A prototype database is now on-line, and being evaluated in the Northwest, before expanding to include the entire west or possibly the entire country. It should be operational and ready for data population by April 1. For further information on the database contact David Britton, at <david\_britton@fws.gov>.

**Watercraft Inspection Training.** In an amazing effort, over the last couple of years, approximately 35 Level 1, and 5 Level 2 (or "train the trainer"), watercraft inspection trainings have now been held. About 2,000 people have been trained in Level 1 and 50 people on Level 2. Approximately 50 agencies now do some type of screening for mussels in 80 waterbodies. So now, it is time for the focus of zebra mussel activity to evolve. Three major areas have been identified: the need for a peer-reviewed study of decontamination procedures and their effectiveness; uniform minimum inspection and decontamination standards; and more outreach training and model standards for the commercial boat transport industry.

Two new Level 2 trainings have been scheduled for March 3-4 and April 7-8 at Lake Mead. This training is intensive, and designed for professionals in all fields that expect to be actively involved in the inspection and decontamination of trailered watercraft, as well as those who wish to become trainers within their state or workgroup. To register for these or future courses, contact Bill Zook, <bjzook2@msn.com>. For further information go to <http://www.aquaticnuisance.org/> and click on "WIT".

**Dreissenid Monitoring Workshop and Detection Plan.** The 100<sup>th</sup> Meridian Initiative sponsored a monitoring workshop on January 21-22, in Denver, CO. The meeting discussed the relative strengths and weaknesses of existing water sample techniques that analyze for veliger larvae (primarily microscopy and PCR), shared sampling and analysis protocols, and ultimately began development of a dreissenid detection and monitoring plan for the West. A rough draft of the plan will be available by mid March, and a final plan is expected by April 1. The workshop was immediately followed by the National 100<sup>th</sup> Meridian meeting, on January 23. For more information, go to [[www.musselmonitoring.com](http://www.musselmonitoring.com)] or contact David Britton, at <david\_britton@fws.gov>.

**Prioritizing Zebra Mussel Monitoring In The Columbia River Basin.** Portland State University, PSMFC, and USGS are ranking watersheds for risk of zebra mussel introduction and establishment in the Columbia River Basin (OR, WA, ID, MT, UT, WY and NV) and California. A preliminary ranking has narrowed the list of potential waterbodies from 772 to 556, and a more formal assessment is now in

progress. The next steps during spring and summer are to develop the final list of lakes, develop an online document for data management, compile water quality data and identify water bodies lacking data, and collect additional water quality and boater day-use data. A final report is expected in fall, 2009. For more information, contact Steve Wells, Portland State University (sww@pdx.edu).

**WRP Decontamination Survey**. As part of the 100<sup>th</sup> Meridian Initiative, the Western Regional Panel (WRP) has developed a list of all western US agencies and organizations that are currently engaged or planning to become engaged in a watercraft inspection program. An on-line survey was distributed in January, to determine how various agencies are currently doing inspections. Fifty five groups responded to the 43 question survey. The WRP will use the information to encourage and support improved coordination and more effective watercraft and equipment inspection and decontamination programs throughout the west. The results will allow development of more consistent and predictable methods, help identify training and research needs, and ensure that everyone is maximizing the effectiveness of the available resources. Survey results will be available by mid-March to everyone who participated in the survey and anyone requesting copies of the report. For questions, or to request copies of the report contact Bill Zook at <bjzook2@msn.com> or (360) 427-7676. The survey is located at [[http://www.surveymonkey.com/s.aspx?sm=qQ75EQVT5Y9GcM9P5dew\\_2fg\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=qQ75EQVT5Y9GcM9P5dew_2fg_3d_3d)].

**Mussels Confirmed In Utah** On November 18, the UT Division of Wildlife Resources announced that zebra mussel DNA has been found in water samples taken from Electric Lake. This small, high-mountain lake in southeastern UT is the first body of water in UT to test positive for zebra mussels. It is also the water source for Rocky Mountain Power's Huntington electric generation plant and the primary source of water for the Huntington-Cleveland Irrigation Company. The finding is supported by observation of the mussel's veligers via cross-polarized microscopy and two independent PCR tests. UDWR presented the Electric Lake information to the Wildlife Board in December, requesting the lake be added to the state's list of Infested Waters as identified in Rule R657-60. This will be the first water added to the list.

In early February, two independent PCR tests confirmed that the Red Fleet Reservoir veligers earlier viewed under the microscope are indeed quagga mussels. The state will soon present this information to the Utah Wildlife Board for a formal change to Rule R657-60 to include Red Fleet Reservoir in Uintah County as a Dreissenid infested water body. Red Fleet Reservoir will be Utah's second water body to be deemed infested in rule by the Utah Wildlife Board. Several other waters (Lake Powell, Pelican Lake, Midview Reservoir, Colorado River at Moab, Huntington North Reservoir, Joe's Valley Reservoir, and Paiute Reservoir) remain on the "watch" list, since microscopy and in some instances only a single PCR finding show the presence of Dreissenid DNA. Continuing lab work may show these waters to be infested, too, but they are waiting for the labs to finalize their assessments. To learn about the UT AIS Management Plan, watercraft decontamination protocols, or Dreissenid sampling results for the waters tested during the 2008 field season, see the UDWR web site or go to [[www.wildlife.utah.gov/mussels](http://www.wildlife.utah.gov/mussels)].  
(Thanks to Larry Dalton, Utah ANS Coordinator)

**Quagga Mussels In Lake Michigan (Update)**. Zebra mussels, then followed by quagga mussels, have been systematically filtering nutrients out of Lake Michigan's water and reducing food for microorganisms at the base of the food chain. Quaggas have now outcompeted zebra mussels so successfully that it is hard to find a zebra mussel in Lake Michigan. Zebra mussels were confined to near-shore areas, but Quaggas can live on softer bottoms and in cooler water, and they are filtering huge areas of the lake. According to Gary Fahnensteil, senior ecologist with NOAA's Great Lakes Environmental

Research Lab, the effects of mussels are showing up in everything from chlorophyll measurements to bottom trawls. 2007 and 2008 were two of the lowest three years ever for chlorophyll production in Lake Michigan, and primary production is at a fifth of the level it was prior to 1983. *Diporeia*, a zooplankton vital for young fish, was once measured at 15,000 per square meter in Lake Michigan. Now, near shore at least, there are not measurable numbers.

An estimated 330 trillion quagga mussels are now in Lake Michigan (!); in comparison, the total number of all fish in the world's oceans combined is estimated at four trillion. Although zebra mussels reached a critical mass in Lake Erie and then crashed, Fahnenstiel won't predict such a fate for quaggas in Lake Michigan. He noted that lake whitefish have been eating quagga mussels, and other species of fish, such as perch, smallmouth bass and walleye could increase, with more quagga mussels in the lake (*Excerpted from a Brian Mulherin article, Changes Ahead: Quagga mussels robbing nutrients from Lake Michigan, in the Luddington Daily News, January 12, 2009.*)

**Zebra Mussels Found In Lower Susquehanna River.** The Maryland Department of Natural Resources (DNR) recently confirmed the presence of zebra mussels in the lower Susquehanna River. The latest zebra mussels found in MD were recovered from a boat docked in Harford County. Since inadvertent introduction into the Great Lakes in the mid-1980s, the zebra mussel has spread rapidly into freshwater habitats from LA to NH. The DNR and Chesapeake Bay Trust are posting signs at all MD boat ramps to inform boaters about the problem and tell them how to avoid being carriers. For the past few years, owners of recreational craft of trailer-able size have received mailed brochures from the DNR informing them how to prevent zebra mussel spread. The stakes are high for uninfected areas: the Army Corps of Engineers calculated economic losses between 1993 and 1999 at over \$5 billion, even without accounting for ecological damage. For more information on the MD program, see [[www.dnr.state.md.us](http://www.dnr.state.md.us)]. (*Excerpted from 'DNR calls on boaters to help prevent species' spread', MDNR, December 10, 2008*)

## **Other West Coast Invaders And Activities**

**New Tunicate Papers:** Since Puget Sound still has tunicates, check out two new tunicate papers: (1) *Adventures of a sea squirt sleuth: unraveling the identity of Didemnum vexillum, a global ascidian invader*, by Gretchen Lambert, 2009, *Aquatic Invasions* 4: 5-28; and (2) *Genetic conspecificity of the worldwide populations of Didemnum vexillum* Kott, 2002, by Stefaniak et al., 2009, in *Aquatic Invasions* 4: 29-45. (*Thanks to Gretchen Lambert*)

**Spartina Report.** A new report, *Modeling habitat suitability for the invasive salt marsh cordgrass Spartina using Shore Zone coastal habitat mapping data in Southeast Alaska, British Columbia, and Washington State*, has now been completed. It was developed for the state of AK by Coastal and Ocean Resources Inc. To learn more, contact <[tammy.davis@alaska.gov](mailto:tammy.davis@alaska.gov)>

### **Idaho Plant Eradication Updates.**

- Summer treatment of the *Hydrilla* infestation in the Bruneau River system began in July, 2008 following high spring flows. Treatments included diver-assisted suction dredging, hand removal, and diquat spot treatment throughout the summer, followed by a diquat river injection in October. The established dense *Hydrilla* infestations have been found only in geothermally influenced areas. No *Hydrilla* has been found in CJ Strike Reservoir downstream, or in the Snake River, but survey efforts are

ongoing. The *Hydrilla* population in Boise has been treated by careful hand removal several times since its discovery in July. No *Hydrilla* has been found in the irrigation canal downstream or where the canal enters the Boise River. Survey efforts in this area are also ongoing.

- Three populations of *Egeria* have also been identified in Moscow and in Boise. All populations have undergone aggressive treatment and *Egeria* has not been found in follow-up surveys.

- Flowering rush (*Butomus umbellatus*) is an emerging concern in the lake Pend Oreille system. Roughly 200 acres have been identified in the lake, but no rush has been found downstream in the western part of the lake or in the river on the Washington side. Flathead Lake in MT is significantly impacted by the rush, and the plant's threat to irrigation ditches makes it a growing concern in the region. Treatment options are being discussed for 2009. (Thanks to Tom Woolf, IDA, [twoolf@agri.idaho.gov](mailto:twoolf@agri.idaho.gov), )

**New Zealand Mud Snail Control Research.** CA Sea Grant has awarded a grant to researchers from UC Santa Barbara and USGS to study whether the release of snail parasites can halt the New Zealand mud snail. The ultimate project goal is to investigate the feasibility of releasing trematode parasites to control mud snail populations in the Great Lakes and Western states, including CA. The snail has invaded the American River, Lake Shasta, and Alameda, Piru and Malibu creeks, among others. The first year, scientists will test the host specificity of the parasites they hope to release, to verify that the parasites won't infect native snails. They will also determine whether the parasites, a type of castrator, will curb invasive mud snail population growth enough to warrant their release. Field experiments will be conducted in CA and also in the mud snail's native New Zealand habitat. Research will start in February. (For more information, contact Cristina Johnson, [<csjohnson@ucsd.edu>](mailto:csjohnson@ucsd.edu))

**Flowering Rush Infestation in Columbia River Headwaters.** Ongoing GPS/GIS mapping in Flathead Lake, MT, has so far delineated ~ 2,000 acres of flowering rush (*Butomus umbellatus*).



It is an invasive Eurasian aquatic macrophyte with emerged and fully submerged forms that can dominate irrigation systems, wetlands, the littoral zone of lakes, and river edges. It has passed through Kerr Dam on Flathead Lake and infested the Flathead and Clark's Fork Rivers as far down river as Lake Pend Oreille in north ID. There is also a large infestation near the headwaters of the southern reach of the Columbia River System, in an irrigation canal system that spills into the American Falls Reservoir on the Snake River, and unconfirmed USGS database records of flowering rush in the Snake River and American Falls Reservoir.

The Flathead Lake/Kerr Dam hydroelectric facility is operated to reach low pool levels in early spring, while an unregulated natural lake would reach low pool in late summer. This unnatural spring drawdown

appears to create seasonal conditions that are favorable for the establishment of flowering rush infestations, and disadvantages to native macrophytes evolved to a hydrologic cycle with a late summer low pool. It spreads primarily by rhizome fragments which are easily dislodged from the main rhizome by natural or anthropogenic disturbances. Flowering rush establishes in fine sediments, and can colonize the previously unvegetated portions of variable drawdown zones. It forms monotypic colonies in previously unvegetated literal zones and native shoreline and wetland communities. These large infestations at the headwaters of the Columbia River system are likely to spread downstream and infest much of the main stem of the system. (Excerpted from an abstract: to see the entire paper, *Flowering rush: an invasive macrophyte infesting headwaters of the Columbia River System*, by Peter M. Rice and Virgil Dupuis, contact Peter Rice at <peter.rice@umontana.edu>.)

**Nutria Update.** The Pacific Northwest nutria (*Myocastor coypus*) invasion is more extensive and costly than previously realized. Nutria damage in a Vancouver restoration project has been estimated at \$400,000, and presence of *Tularemia* has also been documented. Agencies will now also be testing for *Salmonella*. There is a strong interest in establishing regional cooperation, and many partnership



opportunities. Work is now underway to: (1) seek increased funding for nutria control (2) facilitate education; (3) write a nutria regional management plan; (4) research habitat suitability, migratory and behavior patterns, and disease prevalence for different urban and non urban populations; (5) create a central database to document damage; and (6) improve coordination and control methods. To join the regional nutria e-mail list go to [<https://www.lists.pdx.edu/lists/listinfo/nutria>]; to access the Pacific Northwest nutria reports, go to [<http://www.clr.pdx.edu/projects/ans/nutria.php>], and for other nutria information, contact Trevor Sheffels, <sheffels@pdx.edu>.

**New Nonindigenous Aquatic Species Database Alerts.** New USGS database alerts were generated for:

- *Nymphoides peltata* (yellow floating-heart): found in a new OR County. It is newly reported in Jackson Co, at Squaw Lake, in the Applegate Drainage. More information on this specimen can be found at [<http://nas.er.usgs.gov/queries/specimenviewer.asp?SpecimenID=259712>] and [<http://nas.er.usgs.gov/queries/SpeciesList.asp?SpeciesID=243>]
- *Orconectes virilis* (virile crayfish): found in a new WA County. It is reported in Snohomish Co, at Lake Ballinger, in the Lake Washington Drainage. More information on this specimen can be found: [<http://nas.er.usgs.gov/queries/specimenviewer.asp?SpecimenID=259870>]. More information on this species can be found at: [<http://nas.er.usgs.gov/queries/SpResults.asp?SpeciesID=215>]
- *Iris pseudacorus* (yellow iris): found in several new WA drainages. It is newly reported for Chambers Lake (Thurston Co), Devils Lake (Pend Oreille Co), Drano Lake (Skamania Co), Vancouver Lake (Clark Co), and Horseshoe Lake (Cowlitz Co).

**Himalayan Blackberry.** Oregon State University Extension lists several blackberry management strategies in their publication *Himalayan blackberry in western Oregon riparian areas*. The publication includes information on blackberry reproduction and distribution, specific management strategies, and information on herbicides and a biological control agent. The publication is online at [<http://www.pnw-ipc.org/>] under Invasives/Research/Single Species Research. (*Thanks to PNAMP AIS Workgroup*)

## **Other West Coast Activity**

**WA Aquatic Invasive Species Enforcement.** The WA Department of Fish and Wildlife has completed its 2008 AIS Enforcement Report for 2008. Accomplishments included establishment of the first-ever mandatory inspection station for watercraft, development of a combined vessel safety and AIS inspection form, ticket writing for aquatic weed transport on watercraft, a summary of mussel interdictions, marketplace enforcement actions, education and outreach activities, a certified Marine Yard program, and other activities. To obtain a copy of the report, contact Eric Anderson at <andereca@dfw.wa.gov>.

**Alaska Non-Native Plants Invasiveness Ranking System .** Naturalized taxa represent roughly 14 percent of the total AK flora; 157 non-native plant taxa have naturalized and an additional 136 non-native taxa are apparently ephemeral. The Alaska Invasiveness Ranking system is largely a hybrid of four existing systems, but it also includes a climate screening procedure to eliminate species unlikely to establish in AK, a numerical ranking, and a system for handling missing data. If a species passes the climate screening, it is then ranked for invasiveness based on scores for 21 questions grouped into four sections: ecological impacts (40 points), biological characteristics and dispersal ability (25 points), distribution (25 points), and feasibility of control (10 points). Questions range from two to 10 points in value, and each question has a documentation section that presents the rationale and information sources for the question. Scores and the number of points possible are tabulated for each section. If insufficient information is present to respond to a question it is scored as "unknown" and the maximum potential points for that question are removed to obtain "points possible." The final invasiveness score is given as the relative maximum score, which is equal to the sum of scores from each section divided by the total possible. (*Thanks to the PNAMP invasive Plant Council*)

**WA Ballast Water Rules.** WA WDFW is revising the state ballast water rules (WAC 220-150-010) in order to help promote consistency with other west coast states. This is important because, in the absence of a national discharge performance standard, differences among states will be difficult for the shipping community. The revision is expected to be sent to the state Code Revisor in March 4. (For more info, contact Alan Pleus at <pleusae@dfw.wa.gov>.

**Oregon Public Broadcasting Wins Documentary Award.** The Alfred I. DuPont-Columbia University award, which is sometimes referred to as the Pulitzer Prize of broadcast journalism, was given to an Oregon Public Broadcasting documentary *The Silent Invasion*. The Oregon Field Guide special showed how invasive species are changing the environment in OR. To watch the entire program, go to: [<http://www.opb.org/programs/invasives/videos.php?page=full>] (*Thanks to Jan Haertel, EPA R10*)

**OR Economics Of Invasive Species.** The prevention, eradication, and control of invasive species is an economic and policy issue having less to do with biology and ecology than many natural resource managers realize. A report produced for the Oregon Invasive Species Council, *The economic of invasive species*, by Chris Cusack, Sam Chan, and Michael Harte, examines the costs of invasive species and the costs and benefits of various prevention, eradication and control measures. Some statistics from the report include: noxious weeds in OR (\$125 million/yr); SOD in OR (\$81-310 million/yr); zebra mussels at 13 hydropower facilities (\$25.5 million/yr); and invasive plant removal on 40% of public lands in Portland (\$31 million/year over a 5 year period.) Get a copy online at [<http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g09001.pdf>]. High resolution printed copies are

available for sale as well. Contact Cindy Newberry at <cindy.newberry@oregonstate.edu> or call 541-737-4849 (Thanks to Sam Chan, ORSG).

**Tribal Aquatic Invasive Management Plan.** The 44 page *Skokomish Tribe Aquatic Nuisance Species Management Plan* is now available. It discusses both freshwater and estuarine/marine species. Since Tribal lands often have slightly different considerations than other areas, other tribes may want to take a look at this plan as a model for developing their own plans. To obtain a copy or get more information, contact Randy Lumper at <rlumper@skokomish.org>.

**Columbia River Brochure (Update).** With support from the Lower Columbia River Estuary Partnership, the USFWS is preparing to print an initial run of 30,000 brochures and 2,000 associated posters on existing exotic species found in Columbia Basin waters. Now titled *Intruders Among Us! Nonnative Aquatic Species in the Columbia River Basin*, this outreach project of the 100<sup>th</sup> Meridian Initiative's Columbia Basin Team aims to complement the numerous prevention/detection-oriented outreach materials, with the "back story" about nonnative aquatic species already in the Pacific Northwest. Distribution of both documents is anticipated no later than March. For more information, contact <paul\_heimowitz@fws.gov> or call 503-736-4722.

**Pacific Oyster And Gallo Mussel Review.** An Ecological Society of America review, *Assessing the global threat of invasive species to biodiversity*, warns about the serious ecological impacts of the Pacific Oyster and Gallo Mussel used in Puget Sound. The authors state: "The Pacific Oysters (*Crassostrea gigas*) high ecological impact score (of 3) should cause decision makers and regulators to reconsider plans for introduction of this oyster into new areas. While its harvest brings economic gains, the ecological impact of introductions of this species is potentially dramatic. Oysters play a role in many estuarine ecosystem processes; altering their abundance or distribution causes complex changes." The report also documents that in OR, WA, and Vancouver, BC, aquaculture has been the most common pathway for introduction of invasive species (73% from aquaculture vs. 68% from shipping). A (3) rating is defined as: "Disrupts multiple species, some wider ecosystem functions, and/or keystone species or species of high conservation value (e.g. threatened species)." The Gallo mussel (*Mytilus galloprovincialis*) has the highest ecological impact score (4). A (4) rating is defined as: "Disrupts entire ecosystem processes with wider abiotic influences." The Coalition to Protect Puget Sound Habitat recently sent a letter to various state and federal officials, urging them to seriously evaluate the new information on these species. (Excerpted from an Ecological Society of America review, November 2008; thanks to Kevin Aitkin)

**Milfoil Weevils Planned For Lake Pend Oreille.** Local groups seeking alternatives to herbicides for control milfoil are promoting a biological control project using the milfoil weevil. Partners for Milfoil Control has secured \$90,000 toward the project, and needs another \$85,000 to fully fund it. Over the past three years, more than \$5 million has been spent in unsuccessful attempts to eradicate Eurasian water milfoil in Lake Pend Oreille and Priest Lake. Most of the money has been spent on herbicides. Results from this year's treatment of about 2,100 acres of milfoil are still uncertain. Weevils have been used for more than a decade in the East and the Midwest with some success. The weevil does not eliminate milfoil, but burrows into and feeds on the milfoil stems, killing or stunting the weed's growth, controlling its spread and giving native aquatic plants a chance to reestablish. Lake Pend Oreille already has a native milfoil weevil in low densities. The proposed project would involve collecting native weevils and producing thousands of them in a culturing facility, stocking them in beds of milfoil in Lake Pend Oreille, and studying the results. The demonstration project would contribute to on-the-ground knowledge about

non-chemical treatments that can be used locally and in other waterways. The weevil project will begin in 2009 if adequate funds can be raised in time. For more information, go to [www.tristatecouncil.org], or call 208-265-9092. (Excerpted from "Milfoil weed- munching weevils planned for Lake Pend Oreille", in *The River Journal*, January 7, 2009).

**Blackberries Join The WA Noxious Weed List.** The WA Noxious Weed Control Board has completed the 2009 State Noxious Weed List. Both Himalayan and evergreen blackberry (*Rubus armeniacus* and *Rubus lasiniatus*) have now been added to the List as Class C noxious weeds. This gives county weed boards the option to require control of blackberry for all or parts of their county. These two species probably cover more area than any other invasive plant in western WA; they have not been previously listed because they are so abundant that control or eradication in many areas would be nearly impossible. Other changes to the state noxious weed list include the upgrade of the Class B weed smooth cordgrass (*Spartina alterniflora*) to the Class A list (good news since this shows how successful the state has been in reducing this weed to the point where eradication could be possible), and three new Class A noxious weeds: shiny geranium (*Geranium lucidum*), false brome (*Brachypodium sylvaticum*); and flowering-rush (*Butomus umbellatus*). For more information on these and other changes to the State Noxious Weed List, go to the Washington State Noxious Weed Board [www.nwcb.wa.gov]. (Thanks to Sasha Shaw, *King County Weed News*, November, 2008)

**Oregon Bans Sale Of Butterfly Bush Cultivars.** Beginning in 2009, Oregon nurseries cannot propagate or sell named cultivars of butterfly bush (*Buddleia davidii*). In 2004, the OR Department of Agriculture banned the sale of the species *Buddleia davidii*, but excluded all the named cultivars. They added the cultivars after seeing the results of research on the invasiveness of the cultivars in OR by James Altland, extension agent for OSU, and student Julie Ream. As suspected, all of the cultivars contribute to the spread of this plant. Property owners are allowed to keep existing plants, but will need to remove seed heads in the fall to prevent spread. Nurseries have until the end of 2009 to sell existing stock, but they are not allowed to restock or propagate. The ban includes all cultivars including popular varieties such as 'Harlequin,' 'Black Knight,' 'Purple Prince,' 'Nanho Purple' and 'Royal Red.'. (From *King CO Weed News*, November 08, based on an article in [http://www.oregonlive.com/hg/index.ssf/2008/11/butterfly\_bush\_the\_state\_adds.html])

**OR Invasive Species Calendar.** To help promote the 100 Worst List of invasive species in OR and raise awareness about invasive species in general, the Oregon Invasive Species Council (OISC) has developed an invasive species calendar for 2009. The online version includes a risk assessment for each species, and a hyperlink to the 100 Worst List on the OISC web page, and includes a calendar of events, provides a photo or two of the species, and four basic facts - What is it? Where is it? Are there any lookalikes? And what can you do? See this month's calendar online at [http://www.oregon.gov/OISC/]. For more information, contact <lisad@createstrat.com>. (From an OISC press release, Dec. 31; Thanks to Lisa DeBruyckere)

**OR 100 Worst List.** OR is updating its list of the 100 most dangerous invaders threatening to enter OR. These species are not yet established in OR; placing them on the list provides a focus for exclusion, early detection, and eradication. The species on this list can still be eradicated if found in OR. The list does not rank the species, as they are all high priority. Getting off the list is more difficult than getting on, because although new threats emerge each year, only a few are worthy of bumping listed species. The OR

Invasive Species Council will consider and vote on recommendations at their February 2009 council meeting. For more information, contact Lisa DeBruyckere, < lisad@createstrat.com >.

**ID Aquatic Plant Summit.** The Northern Interior Columbia Basin Invasive Aquatic Plant Summit was held in October, in Coeur d'Alene, ID. The meeting was an opportunity to improve communication and cooperation between invasive aquatic plant managers in the region. Program summaries and project highlights were given by WA Department of Ecology, Montana Department of Agriculture, ID Department of Agriculture, and the Coeur d'Alene Tribe. (*Thanks to Tom Woolf, IDA*)

**Whirling Disease Risk Assessments.** Whirling disease (WD) entered the U.S. in 1958, and is now found in 25 U.S. states and 26 countries. In some parts of the US, particularly CO and MT, this disease has decimated fish populations; some river systems have lost 90 percent of their rainbow trout. Because there are no effective ways to control WD once it's introduced, it is important to identify the most vulnerable river systems and take steps to prevent its establishment. WD is caused by the parasite *Myxobolus cerebralis*, which infects juvenile trout and other salmonids, causing them to "whirl" in circles instead of swimming normally. This makes them more vulnerable to starvation and predation, and can result in high mortality levels. The parasite spends part of its life cycle in a worm, *Tubifex tubifex*, which is common in trout streams. In OR, it is endemic only in the northeast, including the Imnaha and Willowa River. But there is concern that it could become more prevalent in the Deschutes and Willamette River basins, and researchers also found that the areas facing the highest risks were the Clackamas and Santiam River sub-basins.

Oregon State University researchers have now developed improved techniques to assess the threat from whirling disease. A new study, *Potential for dissemination of the nonnative salmonid parasite Myxobolus cerebralis in Alaska* (Journal of Aquatic Animal Health, September 2008), examined four potential dissemination routes: human movement of fish, natural dispersal by salmonid predators and straying salmon, recreational activities, and commercial seafood processing. The study indicates the parasite has been detected, and conditions are appropriate for its establishment, in south-central AK, with Ship Creek and some other areas of south-central AK more at risk. Rainbow trout suffered localized extinction in some areas, and recovery efforts have been expensive and slow to show effects. If introduced, conditions are appropriate for the parasite life cycle to proliferate. Researchers recommended strict enforcement of rules controlling the transfer of live salmonids, clear articulation of the rules to anglers and other recreational users, employing measures to identify and remove stray adult salmon, and prohibiting use of fish heads as bait in south-central AK. (*From an OSU 12-1-08 Media Release; thanks to Sam Chan via Kevin Aitkin*).

**WA Coastal 'Hot Spot' For Toxic Harmful Algal Blooms.** A new study funded by NOAA and the National Science Foundation reveals that a part of the Strait of Juan de Fuca, which separates WA from British Columbia, is a potential "hot spot" for toxic harmful algal blooms affecting the WA and BC coasts. Understanding where and how these blooms originate and move is critical for accurate forecasts that could provide early warning to protect human and ecosystem health. See [[http://www.noaanews.noaa.gov/stories2009/20090128\\_hotspot.html](http://www.noaanews.noaa.gov/stories2009/20090128_hotspot.html)]. This eddy was also identified as a retention area in a PSMFC- sponsored alternative ballast water exchange zones symposium in 2006. You can find it at: [[www.psmfc.org/ballast/WEB%20MAPS%20August%202006.pdf](http://www.psmfc.org/ballast/WEB%20MAPS%20August%202006.pdf)]. (*Thanks to Mark Sytsma, PSU*)

**New OR Plant Bill.** A new bill, HB 2212, has been introduced to streamline, reorganize, and update OR plant quarantine and noxious weed laws. Some of the statutes were adopted over 50 years ago and have not been modified since. HB 2212 would eliminate 20 laws that are no longer needed. The State's noxious weed laws are also scattered in three different chapters of ORS (452, 561, 570) in two separate volumes; reorganization would also make them more transparent and easier to understand and use. In a nutshell, HB 2212 would:

- Reorganize and update plant quarantine and noxious weed laws, align statutes with the National Model Plant Pest Law, and delete obsolete statutes.
- Consolidate noxious weed laws. Clarify that noxious weeds officially listed by the State Weed Board, (not just tansy ragwort), are a public nuisance, and that preventing new infestations is the first priority.
- Require the Department to use rule-making process for adoption of plant quarantines, and align duration of emergency quarantines with the duration of Department temporary rules.
- Authorize ODA to conduct pre-clearance programs, research control of plant pests, release biological control agents, and regulate economically important non-quarantine pests. It also prohibits possession or movement of plant pests except in compliance with federal or state permit, and
- Clarify that no compensation is made for destruction of plants infested with a pest/disease deemed to be a public nuisance. (*From a fact sheet, thanks to Shannon Brubaker*)

**OR Sponsors International Marine Bioinvasions Conference.** The Sixth International Conference on Marine Bioinvasions, *Marine Bioinvaders: Agents of Change in a Changing World*, will be held at Portland State University (Oregon, USA) on August 24-27, 2009. Conference organizers are now soliciting abstracts for papers on the following general themes: 1) Ecological and evolutionary impacts; 2) How changing global conditions, including climate, will influence bioinvasions; 3) Predicting the scale and diversity of invasions; 4) Measuring and/or predicting spread on regional and global scales; 5) Invasion patterns over time and space: does the past predict the future?; 6) Detection, identification, and tracking-to-origin capabilities; 7) Management, rapid response, eradication, and restoration; 8) Recreational vessels as vectors of invasive species; and 9) Education and outreach: is the message reaching the right audience? Abstracts can be submitted until March 31, 2009 on the conference website at [<http://www.clr.pdx.edu/mbic/>]. If you are an early-career participant (graduate student nearing completion or post-doctoral researcher) and would like your abstract to be considered for a travel award, please indicate so on your abstract submission form. At present, we can offer partial support of approximately \$500 USD. Because some awards are region-specific, don't forget to indicate the country in which you work. Learn more about the conference at [[www.clr.pdx.edu/mbic/](http://www.clr.pdx.edu/mbic/)]. (*Thanks to Mark Sytsma and Stephen Phillips.*)

## **National & International Activity**

**Free Online Journal: Aquatic Invasions.** *Aquatic Invasions* is an open access, peer-reviewed online journal focusing on biological invasions in inland and coastal waters of Europe, North America and other regions. The journal provides the opportunity for timely publication of first records of aquatic invaders, and other relevant information needed for risk assessments and early warning systems. Relevant technical reports and conference proceedings can also be considered for publication. You can check the contents of the issues of *Aquatic Invasions* online: [<http://www.aquaticinvasions.ru/>]. This is really an online journal, open access, so click on an issue, see table of contents, and just click on the pdf link to any article you want to read. No cost! (*Thanks to Gretchen Lambert for passing on this great resource!*)

**First Ship Accepted In The USCG STEP Program.** Princess Cruises' Coral Princess, fitted with the Hyde Guardian ballast water treatment system, is the first ship accepted into the U.S. Coast Guard's Ship Technology Evaluation Program (STEP). STEP's purpose is to facilitate the development of effective ballast water management technologies, thus creating more options for vessel owners seeking alternatives to ballast water exchange. The STEP acceptance means that the Coral Princess will be allowed to discharge properly treated ballast water anywhere along its route in the U.S. for the life of the ship. The Hyde Guardian was selected in competition with all available treatment technologies, because it uses no chemicals or other active substances, is proven reliable, compact, and has a fully automated design. The Hyde Guardian meets the pending IMO ballast water management convention requirements, and includes an auto-backflushing filter that removes sediment and larger plankton, and a UV disinfection system that kills or inactivates the smaller organisms and bacteria. Hyde says the combination of these technologies has proven both cost effective and compliant with the IMO D2 standards. Hyde Marine anticipates IMO Type Approval in early 2009, through the U.K. Maritime & Coastguard Agency (MCA) in cooperation with Lloyd's Register. The Hyde Guardian is fully automated and can be integrated into the ship's ballast control system. It can be skid mounted for new construction, or modular for easy installation in crowded machinery spaces on existing vessels. Hyde claims the system is a perfect ballast water management solution for cruise ships, cargo, container ships, and military vessels because of its small footprint, low energy requirement, and proven reliability. (*Thanks to Mike Moore, <MMoore@pmsaship.com>*)

**A Fix For Lacey Act Problems.** The U.S does not currently require that imported animal species first be evaluated for invasiveness, diseases, or possible risks to human or wildlife health. On January 28, H.R. 669, the Nonnative Wildlife Invasion Prevention Act [<http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.669>], was introduced into the House of Representatives. H.R. 669 would modernize existing law. Current federal law, the Lacey Act, merely lists species as "injurious," usually after they have been imported to the U.S., and often after the damage has already been done. The Lacey Act is old (enacted in 1900); slow (listing a damaging species averages about 4 years); reactive; and incomplete (only about 20 taxa of live organisms are listed). HR 669 would fix all of these problems. For more information, contact Peter T. Jenkins, Defenders of Wildlife (202) 772-0293. (*Thanks to Kevin Aitkin, USFWS*)

**European Invaders Website.** Europe has about 11,000 recognized invaders, and many of these species are problems in the US as well. This website provides a 'one-stop-shop' for information on biological invasions in Europe. You can search by species, by region, or by species expert. Check out DAISIE (Delivering Invasive Species Inventories for Europe) at [<http://www.europe-aliens.org>]. Also consider the new, *Handbook of alien species in Europe*, (DAISIE, 2009) Springer, Dordrecht, ISBN 978-1-4020-8279-5. (*From Science Daily, Nov. 20, 2008; Thanks to Julian Olden*)

**New Education Video.** A new well-done video is now available that is specifically aimed at encouraging the hunting/fishing community to reduce the spread of invasive species. *Defending Favorite Places- How Hunters and Anglers Can Stop the Spread of Invasive Species* can be downloaded or heard at [<http://www.fs.fed.us/invasivespecies/prevention/defending.shtml>]. There is a short version, a longer version, and a bonus portion. (For more information, contact <Michael\_Lusk@fws.gov>.

**New USDA Methods Development Laboratory.** USDA APHIS plans to open a new Agriculture Quarantine and Inspection and Port Technology Methods Development Laboratory in South Miami, FL later this year. Scientists at this new facility will work to develop and validate state-of-the-art commodity

treatments and port inspection technologies used by APHIS and the Customs and Border Protection, to ensure that agriculture imports are free of invasive species. The focus at this facility includes developing alternatives to methyl bromide for fumigation; treatment methods and pest detection technologies for use in the ports, including chemical sensors and acoustic devices; work on controlled temperature and atmosphere treatments for commodities; and methods to trace a commodities origin. This new methods development laboratory consolidates similar work conducted at several APHIS laboratories across the country. *(Excerpted from an APHIS Press release Jan. 14, 2009)*

**Phragmites Work.** *Phragmites* biocontrol work has been slowly ongoing since 1998, largely funded by the USFWS. There are 4 promising potential biocontrol agents, all moth species in the genera *Archanara* and *Arenostola*. These species have severe impacts on *Phragmites* growth and are known to be host-specific in Europe. All species are currently undergoing host specificity work in Europe and at the University of RI (in quarantine). The focus in Europe is on crop species and discrimination between native and introduced North American *Phragmites* genotypes. The focus in RI is on native and related wetland species. Initial indications are that the herbivores are specific to *Phragmites* and show a strong preference for the introduced genotypes, however it also appears that some attack may occur on the native genotypes. European test results still need to be fine-tuned with additional work in Europe. A program currently funded by the NY DOT and USFWS is incorporating ecological and economic analyses, but any potential introduction of agents is years away, and will require weighing risks and benefits of introducing agents that may not be 100% specific to the introduced genotypes. The Cornell website has a diagnostic service to determine whether a genotype is native or an introduced genotype, as well as much additional information on *Phragmites*. See it at [<http://invasiveplants.net/PhragHost.asp>] *(From Bernd Blossey <bb22@cornell.edu>.)*

**WI Invasive Species Awareness Survey.** An October 21-28 UW-Madison survey showed that the education efforts of last two decades efforts have paid off, with a higher proportion of boaters and anglers now taking some preventive steps. The survey found that 86.3% of 538 randomly-surveyed residents consider preventing the spread of invasives "extremely" or "quite" important. Over 90 percent reported inspecting their boats and trailers and removing all plants and animals before leaving a landing, and 84 percent said they followed statewide bait rules to stop the spread of VHS. But there is still a lot of room for improvement. Only 56.8 percent said they rinse off the boat hull after taking their boat out of the water, a step advocated for the last two decades, and only 58 percent said they followed a 2008 statewide rule that prohibits, with a few exceptions, moving live fish away from a water body. *[Ed comment: but at least they have some baseline data! WA and other states need to conduct similar surveys to take the public pulse on this issue, as well as to create their own baselines and evaluate effectiveness of their outreach efforts.]* *(Excerpted from University of Wisconsin-Madison News, December 9.)*

**EPA Vessel General Permit ("Ballast Water" Permit).** After years of prolonged legal maneuvers, the EPA has released its 165-page Vessel General Permit (VGP), plus a 125-page Fact Sheet and a 179-page Economic Analysis. The documents are now posted at: [[www.epa.gov/npdes/vessels](http://www.epa.gov/npdes/vessels)]. The EPA issued a notice announcing the VGP program as part of the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act. A federal court previously ruled that a long-standing exemption from the NPDES permitting requirement was invalid, and directed that the exemption be vacated as of December 19, 2008 (later changed to February 6, 2009). The VGP program has been developed in response to that ruling. The new program addresses 26 separate discharges from ships including, but not limited to, ballast water discharges, deck washdown and runoff, bilge water, gray water, seawater cooling overboard discharge, controllable pitch propeller hydraulic fluid, and hull husbandry. Covered vessels

(basically commercial vessels, foreign and domestic, of 79 feet in length and greater) operating on navigable waters of the U.S. have to adopt best management practices for each of these waste streams. In addition, covered vessels of 300 gross tons and greater will have to submit Notices of Intent relating to these discharges. Finally, to further complicate an already difficult situation, EPA released the State and Tribal Certifications related to the VGP program. In addition to the permit, States are allowed to add conditions that reflect their own laws and regulations under their section 401 Water Quality Certification programs. In some instances, notably in CA and NY, these state certifications add significant conditions to the EPA permit, particularly concerning the discharge of ballast water, and at least 3 states are being sued over their conditions.

Now, ten years after asking EPA to regulate the discharge of pollution from ships, environmental groups filed a lawsuit challenging the Clean Water Act permit they fought so hard to obtain. They have appealed the VGP because they believe it does not bring the CWA fully to bear on ballast water and merely provides a slightly enhanced version of USCG requirements. They say EPA's permit fails to meet federal requirements because it allows ships to discharge untreated ballast water containing invasive species. The plaintiffs in the new case are Northwest Environmental Advocates, People for Puget Sound, and the Center for Biological Diversity, and the case was filed in the Ninth Circuit Court of Appeals. The plaintiffs are represented by the Environmental Law Clinic at Stanford Law School and the Pacific Environmental Advocacy Center (PEAC) at Lewis and Clark Law School in Portland, OR (*Compiled from a variety of sources, including Navigating the Regulatory Seas, Holland and Knight, 1/7/09, and a NW Environmental Advocates release January 12, and Randy Marshall, Ecology*).

**Ballast Water Decision.** The 6th U.S. Circuit Court of Appeals in Cincinnati has affirmed the right of MI and other states, to regulate ballast water by upholding a 2005 MI law designed to prevent oceangoing freight ships from bringing invasive species into the Great Lakes in their ballast water. The court rejected a challenge to the statute filed by nine shipping companies and associations, who claimed the measure interferes with interstate commerce and is pre-empted by federal law. MI requires saltwater ships to obtain a permit before calling at the state's ports, and to certify they either will not discharge ballast water or have onboard technology to kill live organisms in the water before it is dumped. Most of the 185 invasives detected in the Great Lakes are believed to have arrived in ballast water. The EPA issued a ballast water NPDES permit in December, but the Great Lakes states are considering setting tougher standards. (*Excerpted from a Chicago Tribune article by John Flesher, November 21, 2008*)

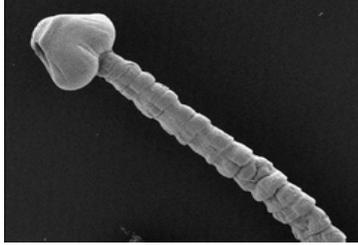
**New ABC TV-Show Highlights Invasive Pests.** In 2008, CADFA Border Protection Stations inspected more than 22.1 million vehicles and 7.3 million commercial vehicles, rejecting over 43,000 lots of fruit, vegetables and plants that were in violation of quarantine laws. With the help of CADFA's Plant Pest Diagnostics Lab, inspectors intercepted over 2,500 confirmed exotic invasive species capable of causing damage to California's agricultural and urban environments. Now, a new television program, "Homeland Security USA," highlights the threat to homeland security posed by invasive species. The program premiered January 6, on ABC. The first episode "This is Your Car on Drugs," featured international entry points to the U.S. such as the Los Angeles International Airport. The episode also takes you behind the scenes with U.S. Customs and Border Protection officers, to see some unusual illegal items intercepted at the International Mail Center in Carson, CA (where officers discovered barbecued bats). Additional episodes will feature CA airports and the measures taken by Customs and Border Protection officials to protect the state's agriculture and commerce from invasive pests and diseases. For more information on invasive pests and diseases, visit the website at [[www.cdfa.ca.gov/invasives](http://www.cdfa.ca.gov/invasives)]. (*From Freshplaza.com, January 6, thanks to USDA Invasive Species News*)

**Cane Toad (Addendum)**. The last issue of Nutshell (#22) mentioned that poison glands on the backs of cane toads are potent enough to kill potential predators, including alligators. Now reader Paul Zajieck, University of FL, sends the following additional information: A fairly recent book describing exotic amphibians and reptiles in FL noted that the American crow and red-shouldered hawk roll the cane toad over on its back and eviscerate it, thereby avoiding the parotoid glands containing the toxin. [*Ed comment: how clever is that!*] It also lists several snakes that eat the toad (eastern hognose, southern water, common garter, and eastern indigo snakes), as well as several other birds (blue jays and northern mockingbirds). The book: *The exotic amphibians and reptiles of Florida*, by Walter Meshaka et al, 2004, Krieger Publishing Company, Malabar, Florida.(\$35 through Amazon.com). To hear the cane toad's call, go to: [[http://www.wec.ufl.edu/extension/wildlife\\_info/frogstoads/bufo\\_marinus.php](http://www.wec.ufl.edu/extension/wildlife_info/frogstoads/bufo_marinus.php)].

**Approved Ballast Water Technologies**. The IMO has issued its list of approved ballast water management technologies. The list is divided into three sections: (1) systems which have received type approval certification; (2) systems that make use of active substances which have received basic approval; and (3) systems that make use of active substances which have received final approval. View the list at [[http://www.hklaw.com/content/maritime/mardocs/BWM\\_Technologies.pdf](http://www.hklaw.com/content/maritime/mardocs/BWM_Technologies.pdf)]. (Source: Holland & Knight; Thanks to Kevin Anderson)

**Bringing Back The Missing Bees**. Bee pollination is annually responsible for \$15 billion in crop value. Honeybees, a non-native species from Europe, are the pollinators of choice because they are easier to manage and a single colony can contain 20,000 workers. By comparison, a bumblebee colony may have only a couple of hundred worker bees. Honeybees have taken a hit over the years from mites and, most recently, from Colony Collapse Disorder (CCD), first officially reported in PA. In 2006, the National Academy of Sciences found declining populations of several bee species, along with other native pollinators like butterflies, hummingbirds and bats, and beekeepers began reporting losing 30- 90% of their hives. Since then, the annual loss rate has been roughly 33 percent. Some research focuses on whether pesticides and other chemicals might affect honeybees, bumblebees and other insect pollinators, but other research is focusing on building pollinator-friendly habitat, by planting trees, shrubs and flowers that pollinators prefer. At the Eastern KY University Environmental Research Institute, an experiment in "apiforestation", a term described by the school as a "new form of reclamation focused on planting pollinator-friendly flowers and trees," is in its first year. The idea is drawing interest in other parts of the country, including CA and PA. Ohio State University is also trying to find the right mix of plants and trees to build native bee populations. Their project is housed at The Wilds, a private, nonprofit conservation center located on nearly 10,000 acres of reclaimed mine land in rural southeastern OH. For more information on pollinator-friendly planting guides and other information, visit the Pollinator Partnership at [<http://www.pollinator.org/>]. (*Excerpted from "Researchers focus on bringing missing bees back", by Genaro Armas, SeattlePI.com January 5.*)

**New Tapeworm Found in Great Lakes Fish**. Asian tapeworms are showing up in Lake Huron walleye.



Asian Fish tapeworm, *Bothriocephalus acheilognathi* (www.sci.sdsu.eduAsian)

In the most recent issue of the Journal of Great Lakes Research, David Marcogliese, a research scientist at Environment Canada's Montreal research station, reported the discovery of Asian tapeworms in Lake Huron walleye. Fish from some inland MI lakes are also infected with tapeworms, according to the DNR. The tapeworm is the 186th invasive species documented in the Great Lakes, and is believed to have been brought in with infected bait fish. Asian fish tapeworms were carried into the U.S. in the 1960s by Asian carp imported to control algae in AR fish ponds. Researchers indicate the Asian fish tapeworm, one of the world's most pernicious invaders, will likely spread across the Great Lakes region. It is known to cause weight loss, anemia and mortality in young fishes, and can grow to one-foot-long in large fish such as carp. The incidence of the parasites infecting fish has surged in the past two years, and state officials feel the problem may be due to changes at the base of the Great Lakes food chain caused by invasive zebra and quagga mussels.

Tapeworms enter the food chain when zooplankton ingest the creatures and become hosts for the parasite. The tapeworms move up the food chain as zooplankton are eaten by small fish, and once in the intestinal tracts of walleye and other fish species, they mature and produce eggs that the fish excrete in their feces. The eggs settle on lake bottoms, where zooplankton eat them and give rise to a new generation of the pests. DNR officials say it is safe to eat fish that have tapeworms, provided the fish are thoroughly cooked, smoked or pickled. But they worms are known to slither out of the mouths and gills of dead fish, and the sight of tapeworms “can tarnish a fishing trip”. (*Ed Comment: That sounds like an understatement!*) To avoid finding a tapeworm in your fish cooler, DNR officials recommend gutting fish immediately after catching them, and disposing of the entrails after returning to land. (It is illegal to discard fish guts in MI waters.) (*Excerpted from a Jeff Alexander article in the Muskegon Chronicle, December 22.*)

**New Florida Insect Pests.** The combination of wet spells and extended dry periods during the summer made perfect environmental conditions for many insects, and several new insect pests were recently discovered in FL. They are thought to have arrived in shipments of military material from war zones, imported vegetative produce, and ornamentals from various foreign areas. They include:

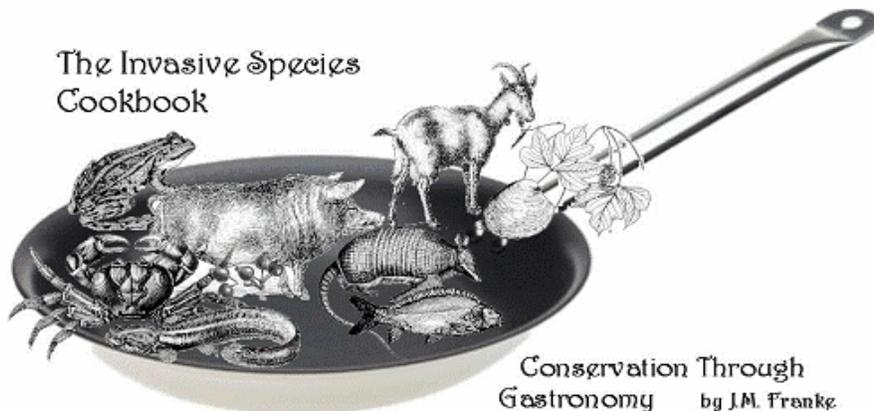
- Croton soft scale (*Philephedra crescentiae* – tentative) – A new species of soft scale, this was discovered on April 9 at a nursery in Marathon. It was found on croton plants, thus its tentative name and classification. Scales suck juices from host plants, and large numbers can often kill the host. It has been found on guava, gumbo limbo, lignum vitae, *Ficus* species, mango and several native FL trees and shrubs. It has serious economic pest potential.

- Pink hibiscus mealybug (PHM) (*Maconellicoccus hirsutus*) – PHM attacks many crops and ornamentals, feeding on soft tissues of its hosts, and inject toxic saliva that causes leaf curling and distortion, and growth retardation. Large populations of this scale can kill the plants.

- Chilli thrips (*Scirtothrips dorsalis*) – On Oct. 14, 2005, chilli thrips were discovered on rose shrubs in Palm Beach County. Many important food, herb and ornamental plants are potential victims, such as citrus in Japan, strawberries in Australia, tea in Taiwan, peanuts, chilies and castor beans in India, and cotton in the Ivory Coast. Chilli thrips cause leaves to curl and shed, and new buds drop, thus severely limiting the size of the crop.

- Fig whitefly (*Singhiella simplex*) – On Aug. 3, 2007, fig whitefly was found on weeping figs (*Ficus benjamina*) in Miami-Dade County. This whitefly is believed to produce three generations per year, and originates in Burma, China and India. So far, *Ficus* species appear to be the only host plants. Whiteflies suck juices from host plants, causing wilting, yellowing, stunting, leaf drop, or even death. All of these new pests have the potential to increase their range and devastate food crops and ornamentals. Many readily available pesticides will control them and research is under way to discover natural predators. There is a lengthy list of current FL Pest Alerts at: [<http://pestalert.ifas.ufl.edu/>.] (*Excerpted from a Terry Wolfley online article, News-press.com, December 31; Thanks to Kevin Aitkin*)

**If You Can't Beat 'Em, Eat 'Em.** As holidays and dreary winter days arrive, people's thoughts apparently drift toward food. Vacys Saulys (EPA R5 Chicago, land of the silver carp invasion), volunteered some recipes for Asian carp [ <http://www.lib.niu.edu/2002/oi020509.html> ]. Then, Susan Cocking (Miami Herald) stated that bullseye snakeheads, which are slowly spreading in south FL, are considered very good eating [ <http://www.newsobserver.com/sports/story/1319821.html> ]. Since the chance of exterminating either of these species may be small, maybe that's one way to help control them! Then Mary Tutwiler said "... in these difficult times maybe it's time for Louisiana to give nutria another try. And we can kill two or three invasive exotics with one dish. Imagine a roast of nutria, stuffed with zebra mussels and apple snails,...smoked over a fire of tree-smothering kudzu and served on a bed of wilted hydrilla, to evoke our weed-choked lakes. (*From "a squirrel in every pot", Independent Weekly*). So, since there seems to be so much interest in this subject, and we have a lot of new readers, here is a repeat paragraph from Nutshell #16 (February-April 2007) about an invasive species cookbook:



"...Perhaps it's time to put all of those grumbling stomachs and gnashing teeth to work in a way that benefits, rather than hinders, biodiversity conservation. To this end we've provided gourmet recipes from some of the world's finest chefs .... Get out there and catch yourself a mess of nutria, the scourge of our southern wetlands, using one of the great recipes provided to us by noted Louisiana chef Philippe Parola . . . .Serve it with a side of pasta slathered in a pesto based on the ecologically noxious but wonderfully edible garlic mustard. Wash it down with some homemade kudzu blossom wine, and top it off with a slice of Japanese knotweed pie." The cookbook is printed on heavyweight stock and spiral bound for convenient use in the kitchen. [*Ed note: I*

*ordered it last year, and while you may not want to experiment for a holiday dinner, it has some fun recipes! It's still available on the website at [www.bradfordstreetpress.com].*

**Earthworm Invasion Threatens Forest Sustainability** Prior to colonization, the glaciated areas of North America were devoid of native earthworms. European earthworms were first introduced to U.S. soils when immigrants brought crops harboring earthworm cocoons, from their native lands. Recent studies have shown that glaciated forests in North America, which evolved without native earthworms, now face an invasion of European earthworms from agriculture and fishing. These glaciated areas are also pocked with small lakes, and fishermen often dispose of unwanted live bait, infesting new areas. Unpaved logging roads through these regions also assisted the spread of non-native earthworms, as compacted soil on tires disperses cocoons and live earthworms. This underground invasion has compounding impacts on the capacity of the soil to provide nutrients and sequester carbon—an important role as the world faces global climate change. About 10 to 20 years ago, hikers in MN forests noticed the leaf litter layer was rapidly disappearing over the years. Non-native earthworms were slowly eating their way into the forest, mixing the litter layer into the mineral soils in the process. The leaf litter is essential to the survival of native trees' seedlings, and provides protection for temperature changes and deer browse. This relationship has been singled out as one of the most important factors impacting the future sustainability of forests in the glaciated areas in the U.S. Recent studies have shown that with earthworm invasion, forest composition can change in as little as 30-40 years. The USDA National Research Initiative recently awarded a three-year, \$397,500 grant to study the quantitative coupling of the ecology of European earthworm invasion (in Canada, New England and the Great Lakes region), with mineral chemical weathering and carbon cycling. See [<http://www.sciencedaily.com/releases/2008/11/081122083747.htm>] for the whole article. (*Excerpted from Science Daily, Nov. 24, 2008, adapted from materials provided by University of Delaware, via Newswise.*)

**Wisconsin Retreats On Ballast Treatment.** WI has backed off a dispute with the EPA over ballast water regulation, and is allowing Great Lakes ships to enter WI ports after December 19. State officials felt EPA rules did not go far enough to protect WI waters from invasive species carried in ships' ballast. The disagreement would have put any Great Lakes ships entering WI waters at risk of federal legal action or lawsuits by private parties if they released any ballast or engine cooling water. The issue could also have stopped coal and iron ore shipments out of Superior for three weeks until the shipping season end. On December 15, DNR officials conceded to the federal permit rules (for now) to ensure that shipping will continue on the Great Lakes in WI, but the state will begin drafting its own permit for Great Lakes vessels that would provide "strong state protections against the spread of aquatic invasive species. In recent weeks, WI developed new guidelines that require all ship owners to treat ballast to kill invasive species by 2016. (*Excerpted from a Duluth News Tribune article by John Myers, 12/16/08*)

**Non Native Oysters.** A report on non-native oysters in Chesapeake Bay was released October 17, 2008, after five years of research. The report outlines the effects of introducing a species of non-native oyster into the Chesapeake Bay to restore the ecological role of the filter-feeders and the once thriving commercial oyster fishery. For a full copy of the draft environmental impact statement and list of public meeting times and locations, go to [<http://www.nao.usace.army.mil/OysterEIS/> ]

**Food For Thought: How Long Before An Invader Is Considered Indigenous?** *This comment shows how complex and values-driven the invasive species issue truly is.* Fossil pollen shows that six plant species that were to be exterminated as invasives on the Galapagos Islands, have been on the islands for several thousand years. Of course this begs the question: "How long does it take an invasive species to

become indigenous?" At island formation, there were no species of any kind. The islands were 'invaded' and colonized over time by many species, and 'invasion' is part of natural selection, whether aided by man or not. Many waters in Yellowstone were devoid of fish before park managers and other well meaning individuals imported them. There were no fish in the Firehole or Gibbon rivers above their waterfalls, until invaders were planted. The acceptance of these non-native species has taken less than 100 years, and an industry based on their presence is thriving. "Invasive species" are often welcomed if they prove to be of economic or recreational benefit to a few, and indigenous species are being wiped out by acceptable invaders. It's a problem that the "green" fly fisher, park manager, and the general public are loath to address. We sacrifice restoration for recreation, and ecological correctness for economic gain. Such is the state of our mindset and science. We see at least a double standard at work here. We introduced wolves because they were part of the "natural" environment. We continue to protect invasive Brown Trout because they provide an economic component to the park. We value and protect Rainbow Trout because they can be caught and released. We admire and protect Brook Trout because they provide easy catching for recreational endeavors. We spend millions trying to eradicate the Lake Trout because it's busy exterminating the indigenous Cutthroat in Yellowstone Lake, but we encourage the Rainbow Trout that are doing the same in Slough Creek. On the other hand, we were all invaders once...

(Paraphrased/excerpted from 'yellowstoner' [<http://flyfishyellowstone.blogspot.com/>] Thanks to a post in Protect Your Waters ("Stop Aquatic Hitchhikers") website, via Joe Starinchak, USFWS)

## Pathway Studies

**Bait Industry as an Alien Crayfish Pathway (New Paper).** Alien crayfish have caused native biodiversity declines, eliminated fish and invertebrate habitat, altered trophic webs, and collapsed fisheries, severely impacting freshwater ecosystems worldwide. The live bait trade is believed to be the primary vector for the North American introduction. A new paper, *The bait industry as a potential vector for alien crayfish introductions: problem recognition by fisheries agencies and a Missouri evaluation*, by DiStefano et al., 2008, Missouri Department of Conservation, Final Report. Columbia, MO, examines alien crayfish and the bait industry. The study objectives were to: (1) provide a cursory overview of the recognition of alien crayfish problems by U.S. and Canadian fisheries agencies; 2) determine the proportion of MO bait shops that conducted illegal crayfish sales, 3) detect the presence of illegal alien crayfishes in the MO bait industry, 4) determine if legal native crayfish species were sold in locations outside of their known historical range, 5) determine the geographic origins of crayfishes sold, and 6) determine whether bait shop owners/managers knew what crayfish species they sold. In 2002, all known or potential MO bait vendors (N = 370) were surveyed to determine if they sold crayfish. In 2003 and 2004, conservation agents visited 105 bait shops throughout the state and sampled crayfish for species identification. Most MO bait shops conducted legal sales, but three illegal species were detected, including the alien rusty crayfish (*Orconectes rusticus*). Two legal species that were prevalent in samples were also sold at multiple locations outside of their known historical range. A 2008 survey of U.S. and Canadian fisheries administrators showed 49% of respondents were aware that bait-bucket introductions of alien crayfish species were the suspected cause of problems. Current MO management efforts following the study have focused on removing illegal species from bait shops, educating vendors on bait regulations, invasive species, and crayfish taxonomic identification, and consideration of policy changes. (Thanks to Kevin Aitkin, USFWS)

**West Coast Ballast Water Paper.** "Intra-coastal ballast water flux and the potential for secondary spread of non-native species on the US West Coast" is now in press and will be published in the

upcoming issue of Marine Pollution Bulletin. *Abstract:* Ballast water is a dominant mechanism for the dispersal of aquatic nonnative species (ANS), but few studies have addressed ANS transfers via smaller scale vessel movements. Authors used ballast water reporting records and ANS occurrence data from four US West Coast port systems to examine patterns of intra-coastal ballast water transfer, and assess how ballast transfers may have influenced the secondary spread of ANS. In 2005, one third of the vessels arriving to the US West Coast originated at one of four West Coast port systems (intra-coastal traffic). These vessels transported and discharged 27% (5,987,588 MT) of the total ballast water volume discharged at these ports that year. The overlap of ANS (shared species) among port systems varied between 3% and 80%, with the largest overlap occurring between San Francisco Bay and Los Angeles/Long Beach. Results suggest that intra-coastal ballast water needs further consideration as an invasion pathway, especially as efforts to promote short-sea shipping are being developed. For more info on the [article](#), contact Christina Simkanin at <simkanin@uvic.ca>.

**Hawaiian Nursery Study.** Snail and slug specialists in the Hawaii Pacific Biosciences Research Center documented the distribution of snail and slug species associated with the HI horticultural industry for the first time. They surveyed 40 nurseries on the major islands, and found alien snails and slugs in every one of them, ranging from one up to 17 species, per nursery. In total, they found 29 alien species, five of which had never been reported in HI. Many species also were found on islands where they had not been previously spotted. Most worrisome was the possibility they might be hitchhiking aboard native Hawaiian plants that are part of the vegetation restoration program for Kahoolawe and other damaged HI ecosystems. Probably the best thing a nursery can do to prevent snails and slugs from becoming abundant is to keep the area neat and clean, and avoid plastic sheeting as mulch, because slugs love to live under it. (*Excerpted "From UH team warns of invasive pests burrowing in isles" [www.starbulletin.com] December 2.*)

**Schools and Golf Courses: Pathways for Crayfish Invasions?** For the last few years, Oregon Sea Grant has been developing outreach materials for schools, as school curricula appear to be pathways for invasive crayfish and aquatic weeds. Now there is a related article, *Do schools and golf courses represent emerging pathways for crayfish invasions?* by Eric Larson and Julian Olden,. See it in *Aquatic Invasions* (2008, Volume 3, Issue 4: 477-480).

## **[Upcoming Major Meetings In the Western U.S.](#)**

**Feb. 24-25 2009** Bend, OR. Aquatic Invasive Species Identification and Control: How Not to Be a Vector- American Fisheries Society annual meeting. To register, go to the website at [<http://www.orafs.org/meeting2009/Annual09.htm>].

**March 24-26, 2009** Portland, OR. Sixth International IPM Symposium [<http://www.ipmcenters.org/ipmsymposium09/>]

**March 29 - April 1** Honolulu, HI. Western Aquatic Plant Management Society (WAPMS) 2009 Conference will include special sessions on invasive seaweeds and management of Eurasian water milfoil in ID. For more information, contact Tom McNabb <tmcnabb@cleanlake.com>.

**April 19 - 23** Montréal, Canada. The 16th International Conference on Aquatic Invasive Species (ICAIS). [<http://www.icaiss.org/> ]

**May 12-14.** Bozeman, MT. Aquatic Nuisance Species Task Force. <http://www.anstaskforce.gov/default.php>

**August 24-27, 2009** Portland, OR. Sixth International Conference on Marine Bioinvasions

[<http://www.clr.pdx.edu/mbic/>]

**Sept. 8-10, 2009** Seattle, WA. Western Regional Panel Meeting

[<http://www.fws.gov/answest/>]

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