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AQUATIC INVASIVE SPECIES NEWS
IN A NUTSHELL

Joan Cabreza, Editor

This newsletter, like its EPA precursor, focuses primarily on regional and aquatic issues, but it also contains terrestrial, national and international news of interest. Contents do not necessarily reflect views of the PSMFC. We welcome any questions, comments, and news items; direct them to the nutshell editor Joan Cabreza <joancabreza@msn.com>. *To access all past Nutshell issues 1-27, go to* [http://www.aquaticnuisance.org/newsletters]. To subscribe or unsubscribe from this newsletter please email <joancabreza@msn.com>.

This Quarter's Unusual News

Snail Slime Drink, Anyone? Charles Stewart of Hialeah, FL, claims that, as part of his religion, he had to illegally import a dangerously invasive species of Giant African Snail *(Achatina sp.)* to protect his followers from illnesses. Stewart maintains that drinking the slime from living snails is a common practice to cure sickness in his religion, Ifa Orisha, a traditional African religion often confused with Santeria. [but…] Drinking snail extract often made his sick followers violently ill, giving them strange lumps in their stomachs

and severe weight loss. *(Ed. comment: Why am I not surprised?)* In the areas of Africa (and elsewhere where it lives), the snail is renowned for its devastation. It eats everything from food crops to grass and (reportedly) even plaster and stucco. The snails are hermaphrodites, and can lay up to 1200 eggs a year. You can see how a few of these critters, which Stewart kept in his backyard in a box and fed lettuce, need to be kept under controls tighter than a 3×2 wooden crate. *(From an article by Ron Hogan, March 12 [http://www.popfi.com/2010/03/12/worship-with-a-cup-of-snail-snot/]*

Live Underwear. Kurt Kubus, 58, was caught at the airport in Christchurch, New Zealand, in December, about to board an overseas flight with 44 small lizards stuffed into his underwear. The hand-sewn package concealed in his underwear contained 24 geckos (5 different species) and 20 skinks (2 different species). He has been sentenced to 14 weeks behind bars in New Zealand and fined $5,000 NZ ($3,540 USD) before being deported to Germany. He admitted trading in exploited species without a permit and hunting absolutely protected wildlife without authority, pleading guilty to two charges under the Wildlife Act and five under the Trade in Endangered Species Act. A black market trade in geckos exists in Europe, and those taken by Kubus would have had a street value of around $50,000. Prosecutor Mike Bodie said it was "the most serious case of its kind detected in New Zealand for a decade or more. Kubus set about poaching the animals in a premeditated way which would have had an impact on particular colonies". *[Ed Comment: First bombs, now lizards. Is underwear now the new smuggling mechanism of choice?? How uncomfortable is that - and don't you hope he got bit?] (Excerpted from articles in the San Francisco Chronicle, January 26, and from AsiaOne Relax, December 8.*
[Http://www.relax.com.sg/relax/news/288120/Tourist_caught_smuggling_lizards_in_pants.html]

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, AZ, UT, OK, KS and TX. For a map go to:
http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/

Arrest Warrant and Federal Charges Sought in Zebra Mussel Case. In January, WA issued an arrest warrant for a commercial trucker charged with transporting invasive zebra mussels aboard a 50-foot cabin cruiser from Lake Michigan. David Derderian was charged last November with unlawful transportation of a deleterious exotic species and making false statements to law enforcement officers. The WA State Patrol stopped Derderian on November 14 at the Cle Elum truck scale on Interstate 90. The State Patrol alerted the WA Department of Fish and Wildlife (WDFW), which has special equipment to decontaminate boats carrying zebra mussels, but Derderian left with the boat before WDFW officers could arrive at the scene. WDFW officers later intercepted him in Blaine, WA, and stopped him from launching the boat. Based on Derderian's statements and actions, they then asked the Kittitas County Prosecutor's Office to press charges. When he failed to appear for his arraignment on January 13, the court issued a warrant for Derderian's arrest. WDFW Enforcement Chief Bjork said "We are pressing for federal charges in this case", and has referred the case to the USFWS and NMFS for

consideration of federal charges and Lacey Act violations. *(Excerpted from the Columbia Basin Fish and Wildlife Bulletin, January 29) [http://www.cbbulletin.com/374815.aspx] (Thanks to Eric Anderson)*

Columbia Water Mussel Study. Zebra and Quagga mussels have not yet infested the Pacific Northwest; perhaps it's because Columbia River water has much lower levels of dissolved calcium than Lake Mead, and calcium is very important in producing mussel shells. Researcher Brian Adair at Portland State University (PSU) is growing Quagga mussels from Lake Mead in Columbia River water, to see how well they survive. Mussels may perform poorly in low calcium waters if the muscle that holds their shell shut does not function as well, because if they can't hold their shell closed, they are vulnerable to all sorts of parasites. The inability to close their shells could also make them weaker in cold water. A PSMFC study suggests it would cost more than $20 million just to purchase the first stages of defense against the mussels, not including the ecological cost to salmon stock. The mussels are a big concern for the Bonneville Power Administration (BPA) which operates more than a dozen dams throughout the Columbia River Basin. Because mussels clog pipes and obstruct the flow of water through parts of the dams, BPA is spending $183,000 to fund Adair's Columbia River water research. *(Excerpted from 'Why Aren't Quagga Mussels Flourishing In Northwest Waters?' in OPB News, By Ryan Knudson, January 22.) [http://news.opb.org/article/6584-why-arent-quagga-mussels-flourishing-northwest-waters/] (Thanks to the MANY who forwarded this article.)*

New Arizona Regulations for Boaters Now in Effect. Boaters have generally voluntarily practiced "clean, drain and dry" as a part of responsible boating, but now AZ regulations require boaters to follow those practices at lakes that are known to have quagga mussels. There are also new regulations being implemented for long-term users (including moored boats) that have been in the water for more than five days and are at the highest risk of having attached invasive mussels. Quaggas were first discovered in AZ waters in Lake Mead in January, 2007, but waters now officially designated as having quagga/zebra mussels include Lake Pleasant, Lake Mead, Lake Mohave, Lake Havasu, and the Lower Colorado River, below Havasu to the international boundary with Mexico. The new regulations, called "Director's Orders", were authorized by the Aquatic Invasive Species Interdiction Act passed last July by the AZ Legislature. Boaters who don't follow the procedures outlined in the newly-created regulations can be cited by law enforcement officers. To view the Director's Orders, visit the Game and Fish Department's Web site at [www.azgfd.gov/mussels] *(From an ADGF Press release)*

New Wyoming Initiative. The WY state legislature has allocated $1.5 million to implement new programs aimed at preventing the introduction of quagga and zebra mussels to state waters. The legislation gives the WY Game and Fish Commission authority to inspect boats and to prevent the launching of boats suspected of harboring invasive species. It also directs the commission to establish a new aquatic invasive species watercraft decal program to help fund prevention efforts. Under this program, all watercraft using WY waters will be required to display an annual Aquatic Invasive Species decal. Inflatable watercraft 10 feet in length or less, are exempt. Costs for the

decal are $10 for motorized watercraft registered in WY, $30 for motorized watercraft registered in other states, $5 for non-motorized watercraft owned by WY residents and $15 for non-motorized watercraft owned by nonresidents. Decals go on sale on the Game and Fish website on April 15 and at automated license selling agents on May 17. The WY Game and Fish Commission will consider permanent rule-making for this program in June, following a series of public meetings. *(Excerpted from an article by Ron Richter, March 28, in SheridanMedia.com [http://www.sheridanmedia.com/news/new-initiative-will-target-aquatic-invaders9341]*

Idaho Snake River Mussel Scare. On November 5, a microscopy analysis came back positive for unidentified veligers at Bell Rapids and Milner, on the Snake River in ID (PCR tests showed one of four samples "weakly positive" for zebra mussels) . The fear of finding Idaho's first zebra/quagga mussels triggered the activation of the Columbia River Interagency Rapid Response Plan for Quagga/Zebra Mussels. In the end, after additional analysis, **no** dreissenid mussels were confirmed. Although expensive in both time and money, the incident provided an unexpected chance for the state to test the regional rapid response plan under what officials thought was a real emergency. A post-incident analysis identified positive and negative lessons learned, and proved to be very helpful in identifying areas needing revision in the regional rapid response plan. On the positive side, overall, the incident was handled very efficiently by the Idaho Department of Agriculture, and other agencies involved, and the "emergency" engaged the attention of some agencies that were previously "on the fence" about mussels. The notification process and multiagency coordination group functioned quickly and efficiently, sampling and monitoring came together quickly, and several resource deficiencies were promptly identified. Areas found to need additional attention in the future included some parts of the public information and notification process, issues concerning agency coordination structure and process, and sample testing and lab standards.

More Watercraft Inspection Training Offered. The Pacific States Marine Fisheries Commission (PSMFC) and its 100th Meridian Initiative partners will continue to sponsor Level II Watercraft Inspection and Decontamination trainings (WIT) for quagga/zebra mussels at Lake Mead in Fall 2010. This free, two-day intensive hands-on training is provided on a first-come first-served basis. Attendees are responsible for their own travel expenses. The course is designed for individuals who are currently, or soon to become active, in setting-up or implementing watercraft inspection and decontamination programs for their respective agencies, organizations or businesses. The class focuses on actual inspections of various watercraft types and the use of several decontamination systems. The course is certified by 100th Meridian Initiative member agencies, and successful graduates will also be qualified as incident responders and Level One Trainers. For more information on exact dates of the Fall trainings contact Bill Zook at (360)427-7676, <Bjzook2@msn.com>. To learn more about the watercraft inspection program, visit the website at www.aquaticnuisance.org/wit.

Watercraft Decontamination Study (Update). Current decontamination protocols and standards aimed at trailered watercraft rely on hot water and pressure washing equipment to kill and remove all visible mussels and veligers from the watercraft, engine, trailer, and

equipment. But many questions remain about efficiency of these methods. To help answer these questions, the PSMFC, with USFWS funding, released a Request for Proposals in September, 2009, for additional investigation of watercraft decontamination practices (e.g., pressurized hot water wash) to help set minimal thresholds for associated decontamination and inspection parameters. The successful proposal was submitted by University of Nevada Las Vegas (Dr. David Wong, lead). The UNLV team will determine minimal temperature and duration thresholds for 100% quagga mussel mortality and will, among other things, be placing temperature sensors in hard-to-reach portions of the watercraft. *(Thanks to Stephen Phillips)*

Commercial Boat Hauler Outreach. PSMFC in cooperation with the Western Regional Panel on Aquatic Nuisance Species is hoping to develop a set of standards and protocols for the boat hauler industry. The first step is a survey of the 500 commercial boat haulers that will provide insight into haulers' knowledge of ANS, and determine if they are taking any steps to decontaminate their watercraft. PSMFC will then follow-up with haulers to determine attitude and knowledge regarding ANS issues and regulations, offer educational outreach materials and trainings (such as WIT or personal visits) as appropriate, and investigate the feasibility for the development of a best practices manual for commercial hauler transport. For more information on these programs, contact Bill Zook <bjzook2@msn.com>.

Prioritizing Mussel Monitoring Sites in the Columbia River Basin (Update). PSU and the USGS have now completed a draft study prioritizing waterbodies for Dreissenid mussel monitoring. The risk of introduction and risk of establishment of mussels were determined for individual waterbodies, resulting in a prioritized list of Dreissenid monitoring locations in the Columbia River Basin (CRB) and the Greater Northwest region (OR, WA, CA, NV, ID, UT, WY, and Eastern MT). Although a number of criteria were used in the analysis, the most important factor in mussel introduction appears to be the amount of use by anglers and boaters, and the most important factor in establishment appears to be the amount of calcium in the waters. The information generated from this report will improve and expand states' ability to identify water bodies likely to support Dreissenid mussels, and help target future early detection monitoring efforts. A map was generated showing water bodies having high, medium, low, and very low, risks of establishment. Preliminary results indicate the risk of introduction is greater in the upper reaches of the Snake and Columbia basins, and decreases downstream toward the ocean. The study concludes with recommendations for more education in the higher use areas; collection of data in additional areas where it is currently lacking (including Canada); and validating/updating the model. For more information on the project, contact Steve Wells at < sww@pdx.edu > or Tim Counihan at <tcounihan@usgs.gov>.

Integrated Columbia River Research and Monitoring Project. Developing programs for the Columbia River Basin (CRB) is complicated by the size of the basin and the number of jurisdictions involved. The CRB covers an area the size of France, and includes seven states and British Columbia, so a species introduction into any part of the Columbia River system can affect a huge area. WA State University and the USGS have

now formed a partnership to develop a comprehensive integrated research and monitoring program for invasive mussels and other non-native species in the CRB. This will allow all states in the Basin to have up-to-date knowledge of where species of concern are located, and where monitoring activity is being conducted. The database will be created and initially populated by the national USGS NAS website, and at least at first, probably accessed via the PSMFC website. Additional physical parameters will also be added that can be used to predict climate change impacts. The Great Lakes GLANSIS database is being considered as a model for the new website, and 2010 funding is being used to plan and build capacity for developing the information system. Future funding will build on the current efforts by adding additional monitoring, entering new information into the database, identifying areas of risk in order to focus prevention or control efforts, and enabling analysis of impact of climate change on native and non-native species. For more information on the project, contact Scott Smith at <sssmith@usgs.gov>.

Online Mussel Monitoring Map (Update). Portland State University's Dreissenid monitoring map "went live" at the end of March, although a number of small changes are still planned to make it even easier to use. So far the data input is basically PSU data, but agencies are now able to enter additional information. This data compilation will also help to identify areas where there are information gaps. For more information, check out the monitoring map at [http://www.clr.pdx.edu/projects/volunteer/zebra.php] and, to add additional data, go to [http://mussels.research.pdx.edu/adddata.php]. For more information, contact Steve Wells <sww@pdx.edu>.

Utah 2009 Dreissenid Report. A final statewide report on Utah's efforts to combat the Dreissenid mussel invasion during the 2009 boating season is now available. The report contains a statewide summary, followed by individual summaries of the state's five regions (northern, central, southern, northeastern, and southeastern) and water-by-water reports alphabetically for each region. The report is available on the state website at [www.wildlife.utah.gov/mussels]. Click on "Learn." *(Thanks to Erin Williams)*

Utah Launches Mussel Awareness Program and Certification for Boaters. The goal of Utah's Mussel Aware Boater Program is to educate boaters, helping them better understand the threats associated with aquatic invasive species to lessen the chance for spread. A focus of the education effort is to stimulate boaters to "Clean, Drain & Dry" their wetted equipment at the conclusion of every boating excursion. For more information on the online Mussel-Aware Boater Program and Decontamination Certification Form go to http://wildlife.utah.gov/mussels/form_options.php. For further information contact Larry Dalton < larrydalton@utah.gov>.

New Article on Spread of AIS by Boaters. A new article, *Aquatic Invasive Species Transport via Trailered Boats*, by John D. Rothlisberger, et al. appeared in the March 2010 issue of Fisheries. Abbreviated abstract: Trailered boats have been implicated in the spread of aquatic invasive species, but there has been little research on the type and quantity of species being transported, or on the efficacy of management interventions (e.g., inspection crews, boat washing). A mail survey of 944 registered boaters (11% response rate) and an in-person survey of 459 boaters in the field (90% response rate)

both indicated that more than two thirds of boaters do not always take steps to clean their boats. A controlled experiment showed that visual inspection and hand removal can reduce macrophytes on boats by 88% ± 5% , with high-pressure washing equally as effective (83% ± 4%), and low-pressure washing less so (62% ± 3% removal rate). For removing small-bodied organisms, high-pressure washing was most effective (91% ± 2% removal rate); low-pressure washing and hand removal were less effective (74% ± 6% and 65% ± 4% removal rates, respectively). This research supports the widespread belief that trailered boats are an important vector in the spread of aquatic invasive species, and suggests that many boaters have not yet adopted consistent and effective boat cleaning habits. Therefore, additional management efforts may be appropriate. To see the article, go to [http://www.fisheries.org/afs/docs/fisheries/fisheries_3503.pdf]. *(Thanks to Mike Ielmini)*

Final QZAP (Update). The final version of the *Quagga-Zebra Mussel Action Plan for the Western U.S.* (QZAP) was conditionally approved at the November 2009 Aquatic Nuisance Species Taskforce (ANSTF) meeting. Find the updated document provided to the ANSTF this March at [http://www.anstaskforce.gov/QZAP/QZAP_FINAL_Feb2010.pdf].

Control of Zebra Mussels Using Sparker Pressure Pulses. Sparker technology represents an effective non-chemical, non-mechanical means for controlling zebra mussels and other bio-fouling species. The sparker, or electrical discharge between electrodes in water, produces a shock wave and vapor cavity bubble that disrupts the zebra mussel lifecycle. Though experiments had shown that sparker pressure pulses can be used to control zebra mussels, there were no quantitative data on the pressure levels needed. A study was undertaken to begin the process of understanding and quantifying the effects of pressure pulses on zebra mussels at different developmental stages. Field tests showed sparker pressure pulses can both eradicate existing adult zebra mussels and prevent larval settlement. Water utility managers can use the quantitative data on pressure levels to design sparker systems for sites with different geometries and flow conditions. *(Excerpted from an article by Raymond Schaefer, Renata Claudi, and Michael Grapperhaus, in the AWWA e-journal, Volume 102 issue 4, April, 2010. See it at: [http://www.awwa.org/publications/AWWAJournalArticle.cfm?itemnumber=54286&showLogin=N])*

Boat Inspection Program for the Lower Truckee River, NV. The hunt for quagga and zebra mussels will extend beyond Lake Tahoe to other regional lakes and reservoirs. A program will be established for the lower Truckee River watershed in the Sierra Nevada. The Tahoe Resource Conservation District is expanding a boat inspection effort to include Donner and Independence lakes, and Boca, Stampede and Prosser Creek reservoirs. The new program is being funded with more than $231,000 from the Truckee Meadows Water Authority's Truckee River Fund. *(Excerpted from: Invasive mussel hunt extends into lakes, reservoirs beyond Tahoe, MercuryNews.com AP January 4, 2010)*

Idaho Opens Inspection Stations. The Idaho State Department of Agriculture (ISDA) recently announced that mandatory watercraft inspection stations will begin opening in

Idaho on Tuesday, April 27. The first stations to open in the state will be near the intersection of Hwy. 51 and Hwy. 78 near Bruneau and on Hwy. 95 near Marsing. A station at U.S. 93, just north of the Nevada state line, will open on Saturday, May 1. Additional stations will be opening statewide throughout the boating season. The stations will be open from 7 a.m.-7 p.m., seven days a week. For more information contact Amy Ferriter < amy.ferriter@agri.idaho.gov>. To see the press release, go to [http://www.aquaticnuisance.org/wordpress/wp-content/uploads/2009/01/Invasive-species-boat-inspection-locations-open-4-26-10.pdf].

Idaho Uses Twitter. Idaho will be using Twitter to announce inspection station locations, openings, and hours of operation through the boating season. For the latest on ID Invasive Species news, follow them on Twitter: [http://twitter.com/IdahoInvasiveSp]

Economists Work On Invasion Cost Of Zebra/Quagga Mussel In Columbia River Basin: The potential biological and economic impacts of a zebra or quagga mussel invasion of the Columbia River basin could vary considerably depending on a number of factors, many of which have yet to be quantified, according to a draft summary of an investigation being carried out by the Northwest Power and Conservation Council's Independent Economic Advisory Board. Their full report is due out in June. To see the full article on the IEAB's draft summary given to the NWPCC on April 13, go to http://www.cbbulletin.com/383961.aspx.

Other West Coast Activity

New Zealand Mudsnails Reach The Puget Sound Region. An Olympia, WA, resident discovered the New Zealand mudsnail *(Potamopyrgus antipodarum)* in Olympia's Capitol Lake in October, 2009. Previously they were known from OR and near the mouth of the Columbia River, but this was the first such infestation in the Puget Sound region. Fearful the tiny snails would spread and take over other local lakes and streams, the state closed the Capitol Lake water to boating and swimming. In December, when a cold snap was expected, the lake was lowered in an attempt to freeze out the invaders. Unfortunately, there were three inches of ice on the lake by the time it was lowered, and this appeared to insulate the lakebed. However, test plots where the ice was removed for study showed an estimated 98% mortality. Additional similar actions were planned for later in the winter, with a drawdown before ice formed, but more cold snaps never came. On March 1, in an additional control action, saltwater was back-flushed into Capitol Lake for the first time in a decade. Biologists did not expect a complete die-off of the snails because more freshwater was present in Capitol Lake than was desirable, and salinity level in the water probably wouldn't climb high enough. Since late November, the lake has been closed to boating and other uses by humans, including walking on the shoreline or allowing dogs to wade in the lake. It will remain closed indefinitely, and a section of shoreline is now cordoned off with yellow tape. For more information, contact <allen.pleus@dfw.wa.gov>. *(Excerpted from The Olympian, March 1,* by *Christian Hill.)*

WA Aquatic Invasive Species Permit (Update). The Washington State Department of Ecology (Ecology) is proposing a new Aquatic Invasive Species Management General Permit. It will regulate the use of chemicals or control products for the management of aquatic invasive marine and freshwater animals and nonnative invasive marine algae in WA surface waters. After May 5, you can download copies of the draft permit, environmental impact statement, and fact sheet from: [http://www.ecy.wa.gov/programs/wq/pesticides/invasive.html]. You may also request copies of the documents from Julie Robertson at 360-407-6575 or by email at: <julie.robertson@ecy.wa.gov>. Written comments on these documents will be accepted until 5 pm, June 11, 2010. Ecology prefers comments be submitted by email. Emailed comments must contain the commenter's name and postal address and reference specific permit text when possible. Submit emailed comments to: <kathy.hamel@ecy.wa.gov>. Submit written comments to: Kathy Hamel, Washington State Department of Ecology, P.O. Box 47600, Olympia, WA 98504-7600.

Ecology will also hold a public workshop and hearing on the draft general permit at the Lacey Timberland Library on June 7. The workshop's purpose is to explain the general permit, in order to facilitate meaningful testimony during the hearing. The hearing will provide an opportunity for formal oral testimony and comments on the proposed permit. The public workshop and hearing will begin at 1 p.m. and conclude when public testimony is complete. *(Thanks to Kathy Hamel)*

OR Invasive Weed Awareness Week. Oregon has designated May 16-22 as the 6th annual Oregon Invasive Weed Awareness Week.

Mute Swans in Washington. Only two states, WA and OR, say it is illegal to import, sell or possess mute swans. Since 1991, WDFW has classified mute swans *(Cygnus olor)* as "deleterious exotic wildlife", although birds present before the law was enacted in WA 19 years ago have been allowed to remain. But the swans live in pairs that mate for life, and homeowners on Sylvia Lake now have only a single swan, that was "widowed" in 2007. Concerned for the remaining swan, residents have asked state lawmakers to remove the "deleterious exotic" designation. They are not interested in breeding the birds; they say they just want a pair. They also say the swans act as a natural repellent for Canada geese, which they argue are much more harmful to natural resources. Now House Bill 2476 would allow privately owned lakes of up to 20 acres to acquire two mute swans if they have been sexually altered so they cannot reproduce, and their wings have been clipped. WDFW worries the swans will have an adverse effect on native habitat and wildlife, and feels regulating the population would be a logistical nightmare. Eastern states, where there are roughly 7,000 free-flying mute swans on the Atlantic Flyway, warn "if you don't have them, don't get them." One thing is sure: if a law is enacted, neighboring OR will not be happy: Mute Swans are on Oregon's 100 Worst list, and are the featured February species of the month on the Oregon Invasive Species Council's calendar [http://www.oregon.gov/OISC/] *(Excerpted from a Seattle Times article, January 17) (Thanks to Lisa Debruyckere)*

"Container Frog" Finally Identified. The species of toad found in the Portland shipping container (August 2008) has been confirmed as *Bufo gargarizans*, a species that covers nearly all of China, and actually represents a species complex. The morph that came in the container appeared to be from southern China, and goes by the official standard English name, Chinese Toad (*How original!!)* Although not on the WA "prohibited" list, it appears to be an adaptable species with a broad ecosystem range. *[Ed Comment: for the complete story on the bureaucratic nightmare this toad caused, see Nutshell #21, July-August 2008] (Thanks to Marc Hayes via Allen Pleus)*

New Crayfish Database. Recently WA, OR, MT, ID, and the province of British Columbia have witnessed a number of non-native crayfish in their fresh waters, including red swamp crayfish (*Procambarus clarkii*), northern crayfish (*Orconectes virilis*) and rusty crayfish (*Orconectes rusticus*). Julian Olden's laboratory at the University of Washington is now seeking assistance in creating a new database of known crayfish occurrences in the Pacific Northwest. The lab has been documenting the occurrence of these crayfish species and others, including the native signal crayfish, (*Pacifastacus leniusculus*) for the past 3 years. Many state agencies, NGOs and tribes have recorded the occurrence of crayfish species over the years, but much of this information remains in personal computers, field data books, or unpublished reports. The lab is asking for help to compile all that is known about the distribution of non-native crayfish in streams, rivers, lakes and wetlands of the Pacific Northwest. Please take the time to complete a short 5 minute survey, or do so when documenting a new crayfish occurrence or population. At a minimum, the lab is requesting information on the species, location (lat/long) and date of species capture. Additional information is requested, but optional. Information compiled will be deposited in the USGS Non-indigenous Aquatic Species Database and on the Olden laboratory website. The survey is available at: [http://www.surveymonkey.com/s/YVKNSXL]. For a brief identification guide for non-native and native crayfish species in the Pacific Northwest, or other publications, go to: [http://www.fish.washington.edu/research/oldenlab/outreach.html]. *(Thanks to Julian Olden and Eric Larson)*

OR Noxious Weed Quarantine Additions. Oregon amended its Noxious Weed Quarantine list (OAR 603-52-1200) on February 4, 2010. The changes impact regulations on butterfly bush *(Buddleja davidii/varabilis)*, English ivy (*Hedera helix/hibernica)*, and Scotch broom *(Cytissus scoparious)*, and add a number of A and B-rated species to the list. A-rated additions include common reed (*Phragmites australis*), flowering rush (*Butomus umbellatus*), Japanese dodder (*Cuscuta japonica*), oblong spurge (*Euphorbia oblongata*), taurian thistle (*Onopordum tauricum*), yellowtuft (*Alyssum murale* & *A. corsicum*), and white bryonia (*Bryonia alba*). B-rated additions include herb Robert (*Geranium robertianum*), lesser celandine (*Ranunculus ficaria*), shiny leaf geranium (*Geranium lucidum*), and spurge laurel (*Daphne laureola*). Information for these species can be found at [http://oregon.gov/ODA/PLANT/WEEDS/] and a complete copy of the amended quarantine can be found at [http://www.oregon.gov/ODA/PLANT/603_052_1200.shtml] *(Thanks to Shannon Brubaker)*

California Sea Grant Announces 2010 Research Grant Recipients. California Sea Grant and the Ocean Protection Council have awarded more than $1 million to support nine new marine-related projects that began in February. Projects and their lead investigators include:

* *Developing a Biological Control for the New Zealand Mud Snail* **(**Tom Dudley, Ryan Hechinger and Armand Kuris, UC Santa Barbara) Researchers will investigate the degree to which castrating trematode parasites have curbed mud snails in rivers and streams in Australia, where both the mud snail *(Potamopyrgus antipodarum)* and its parasites were accidently introduced. Follow-up laboratory experiments will test whether the parasites could inadvertently infect non-targeted native North American mollusks. Findings will validate or invalidate the merits of using the parasite for biological control.

***** *Is C/N Decoupling Caused by Harmful Algal Blooms in Santa Monica Bay?* (Anita Leinweber and Rebecca Shipe, UCLA) Researchers test the hypothesis that dinoflagellates migrating vertically in the water column affect and link dissolved inorganic carbon and nitrogen cycles. They will test the theory that algae living in nitrogen-depleted sunlit surface waters descend below the mixed layer at night to obtain needed nitrogen and re-ascend by day to photosynthesize. Findings may offer an explanation for the causes of harmful algal blooms in low-nitrate surface waters.

***** *High-Throughput Molecular Identification of Fish Eggs and Larvae* (Ron Burton, UC San Diego). The project will develop a sea-going instrument for rapid identification of fish eggs and larvae collected by a continuous fish-egg sampler. Methods will include DNA bar-coding, coupled with a bead array technology capable of simultaneously identifying multiple specimens of marine microbes. The first application of the new tool, if it can be developed, will be to identify species of fish eggs in a 12-year archive of samples collected during CalCOFI cruises, in collaboration with NOAA Southwest Fisheries Science Center.

***** *Competing Bacterial Endosymbionts in Abalone Health, Management and Restoration.* (Carolyn Friedman and Glenn VanBlaricom, U WA, and Peter Raimondi, UC Santa Cruz). Researchers will determine the geographic distribution of a newly discovered rickettsial bacterium in wild and cultured abalone and seawater. The bacterium appears to reduce the lethality of Withering Syndrome. It is also hypothesized that warmer water facilitates disease transmission, but susceptibility to infection varies among different abalone species. Findings have relevance to endangered species recovery efforts and abalone mariculture.

* *Sustainability and Fine-Scale Management of a California Sea Urchin Fishery and the Ecology of Exploitation***.** (Paul Dayton and Ed Parnell, UC San Diego; Stephen Schroeter, UC Santa Barbara). This project will study the fine-scale dynamics of red sea urchins and their ecological role within the Point Loma kelp forest in San Diego, to further development of community-based co-management of the urchin fishery and ecosystem-based management of the kelp forest. Scientific and commercial urchin divers will collect data for estimating sea urchin recruitment and growth, movement, fishing mortality and foraging behavior. Among other things, this information will be used to determine ecologically relevant spatial scales for local urchin populations.

* *Adaptive Management: Predicting Responses to Marine Protected Areas for Comparison to Monitoring Data* (Louis Botsford, Marissa Baskett and Alan Hastings, UC Davis). This project will develop computer models for evaluating the performance of

Central Coast Marine Protected Areas (MPAs) for key exploited species, including blue rockfish, black rockfish, lingcod and cabezon. The spatial population models will incorporate what is known about larval dispersal, adult movement, and key species interactions. Model output may provide managers with some insights on how to use monitoring data to evaluate whether and how the MPAs are meeting the goals of the Marine Life Protection Act.

* *Climate Change and the Phenology of Plankton and Fish Production in the California Current* (David Checkley, UC San Diego). This project examines effects of warming surface waters on timing of the spring plankton bloom and subsequent spawning of Northern anchovy, Pacific sardine and jack mackerel. The project explores the theory that global warming has altered the timing of the spring bloom and hence available spawning habitat. Four types of satellite data will be used to monitor seasonal fluctuations in oceanographic conditions and primary productivity in the California Current and how they relate to yearly fish recruitment success.

* *Exploiting Marine Actinomycete Diversity for Natural Product Discovery* (Paul Jensen and Bradley Moore, UC San Diego). Molecular techniques will be used to screen a large collection of marine bacteria for their potential to produce new hybrid isoprenoid antibiotics and for the presence of prenyltransferase genes, which are associated with hybrid isoprenoid biosynthesis. Specific objectives include experimentally characterizing gene clusters associated with isoprenoid biosynthesis, and cloning and heterologous expression of prenyltransferases. *(Ed Comment: did you all get that?)*

***** *The Future of the California Chinook Salmon Fishery: Roles of Climate Variation, Habitat Restoration, Hatchery Practices and Biocomplexity***.** (Brian Wells, NOAA Fisheries Southwest Fishery Science Center; David Hankin, Humboldt State University; Louis Botsford, UC Davis) This project seeks to provide managers with tools for weighing pros and cons of various restoration options for Central Valley and Klamath run Chinook salmon. The project's first phase will involve a retrospective analysis of the links between climate variation, human activities and salmon numbers. The second phase will be a prospective analysis to determine critical stages in the life history of salmon impacting fish production. An overarching question to be explored: Might restoring genetic diversity within and among salmon populations reduce swings in salmon survival rates? *(Thanks to Christina Johnson, CA Sea Grant)*

Green Alder Sawfly. The Forest Service has released a pest alert on the green alder sawfly (*Monsoma pulveratum*), the same sawfly newly found near the Columbia River. Initial reports (awaiting confirmation) are that adults of these sawflies have been collected from Clark County and across the Columbia River, in Portland, and also south of Olympia, WA. The sawfly was first found in North America in Newfoundland, 10-15 years ago, and then again a few years ago in AK, where is has become quite a serious alder pest. The presence of this species in WA would mark the first record of it in the contiguous US. The sawfly has been indentified via a submitted photograph taken in Vancouver, Clark County. Ideally, taxonomists want physical specimens to confirm such a find. Individuals who find sawflies feeding on alder may want to send specimens to the WA or OR Departments of Agriculture for identification. Note there is already a skeletonizing insect on alders (the alder flea beetle, *Altica ambiens*), so check damaged trees for the presence of adult thick-waisted wasps or the sawfly's green caterpillar-like

larvae (vs the black flea beetle larvae). The links below include the image of the submitted specimen from Vancouver and also a link to the Western Plant Diagnostic Newsletter, which has information and images of the sawfly from AK. [http://oregonstate.edu/dept/nurspest/MonsomaPestAlert_March_31_2010.pdf], [https://www.wpdn.org/common/newsletters/wpdn/WPDN%20Newsletter%202009-07.pdf] and [http://bugguide.net/node/view/381754/bgimage] (*Thanks to Robin Rosetta)*

OR Proposed Rulemaking. On April 21, Salem, OR, held a hearing on a proposed rule that would establish a protocol for releasing funds from the OR Invasive Species Control Account. The Council may release funds only after declaring an Invasive Species Emergency, and the account will be used for eradicating or controlling new invasive species infestations in OR. Requests for funds must be in writing, and include a response plan with a risk assessment, budget, timeline, and evaluation of success. The Council may enter an agreement with a person, state or local government, Indian tribe or federal government that will be responsible for implementing a portion, or all, of the response plan. The Agency requests public comment on whether other options should be considered for achieving the rule's substantive goals, while reducing the negative economic impact of the rule on business. Send public comments on the rule to Sue Gooch at < sgooch@oda.state.or.us > or FAX to 503-986-4750.

Alaska To Ban Felt Waders. On March 19, the AK Board of Fisheries unanimously passed a ban on felt-soled waders. They anticipate the Lt. Governor will sign this regulation, which will, on January 1, 2012, make AK the first state in the nation to ban felt-soled waders! However, the ban applies only to sport anglers, and the ADF&G Invasive Species Program and partners acknowledge there is still a great deal of education needed to inform and educate hunters, recreationists and others who wear waders, about the potential for transferring organisms on boots and other outdoor gear. *(Thanks to Tammy Davis)*

Flowering Rush Video. Flowering rush, (*Botomus umbellatus)* has been showing up in a variety of widespread locations around WA and elsewhere. Now a new DVD, funded by the Western Regional Panel, *Flowering rush: Invasion of the Columbia River System,* has been produced by the University of Montana. The flowering rush video is now set up for streaming from the CIPM website: [http://www.weedcenter.org/research/Flowering_Rush_Video.html]. They have also posted other flowering rush documents on the flowering rush main projects page: [http://www.weedcenter.org/research/projects-spatial.html]. *(Thanks to Peter Rice)*

New Mudsnail and Garden Publications. Two publications are now available from Oregon Sea Grant: a revised and updated version of the *New Zealand Mudsnail Prevention Guide,* and a new publication, the *Oregon Rain Garden Guide* which is *a step-by-step guide to landscaping for clean water and healthy streams* (2010. ORESU-H-10-001). (Note: pdf is 14MB; the HTML version, lacking illustrations, is much smaller and will load faster). Find both at [http://seagrant.oregonstate.edu/sgpubs/onlinepubs.html]. *(Thanks to Sam Chan)*

A New Blog on Oregon Invasive Species is available at:
[http://www.oregoninvasivespecies.blogspot.com/]

New Wyoming Legislation. On March 10, the WY Governor signed two bills related to aquatic invasive species. The first bill (SF0078) increases the penalty for illegal fish stocking to a high misdemeanor, with up to lifetime revocation of hunting/fishing privileges. The second bill (HB0018) is the Wyoming AIS bill, which provides for species prohibition, interdiction authority, inspection fees (a sticker program), penalties, and a $1.5 million appropriation. *(Thanks to Beth Bear)*

New Species Sightings: *Radix auricularia* (European ear snail) was found for the first time in Thurston County, WA, at Capitol Lake in Olympia.
For more information on this specimen, go to:
[http://nas.er.usgs.gov/queries/specimenviewer.asp?SpecimenID=268458] and
For more information on this species go to:
[http://nas.er.usgs.gov/queries/SpResults.asp?SpeciesID=1012]

Didemnum vexillum (a colonial sea squirt) was found for the first time in OR, in Winchester Bay (Douglas County). For more information on this specimen go to:
[http://nas.er.usgs.gov/queries/specimenviewer.asp?SpecimenID=267222] and
For more information on this species, go to:
[http://nas.er.usgs.gov/queries/SpResults.asp?SpeciesID=2776]

Portland Invasive Species Report. The FY 08-09 annual report from the City of Portland, OR, Invasive Species Management Program is available at:
[http://www.portlandonline.com/bes/invasivesreport].

Invasive Species Legislation Introduced. In early March, bills H.R. 4782, and S.3063, the Invasive Species Emergency Response Fund Act, were introduced into the House and Senate. The legislation would direct the Secretary of the Interior to provide loans to certain organizations in certain states to address and prevent invasive species. Eligible States include AK, AZ, CA, CO, HA, ID, MT, OR, NV, NM, UT, WA and WY. *(Thanks to many sources.)*

Elsewhere Around the U.S.

Camelscaping. Camels may be known for their surly dispositions, but they are more than happy to eat tamarisk (*Tamarix ramosissima*), one the American West's most destructive and invasive plants. Since first introduced from Eurasia to the U.S. in the 1800s, tamarisk has spread through the West like wildfire, and efforts to eradicate it by burning, cutting, or herbicides have all failed. Wherever tamarisk grows, it draws down the local water table and increases the soil salinity, forcing out many native plants. But camels and dromedaries enjoy salty vegetation, and now ranchers in CO have enlisted them to eat their way through the tamarisk. Maggie Repp, a camel rancher in Loma, CO, says 10 camels can destroy half an acre of tamarisk in two days. That's not necessarily a

solution for clearing tamarisk from the whole expanse of the Great Plains, but it may be the perfect remedy for removing the odd tamarisk patch from your pasture. Currently the only other solution to tamarisk is a leaf-eating beetle that has been released across the West. But for the bug-a-phobic small-scale farmer, renting a few camels may be a more practical solution. *(Excerpted from 'Camels enlisted to battle an invasive species', a Mother Nature Network article by Bryan Nelson, January 22.)* [http://www.mnn.com/lifestyle/pets-animals/stories/camels-enlisted-to-battle-an-invasive-species]

Snow in Florida: An Unexpected Ally Against Invasives. During extended cold January temperatures in FL (in the 30s), frozen iguanas were falling out of trees, shallow water fish were dying in droves, and a record number of rare sea turtles faced hypothermia in St. Joseph Bay and the Mosquito Lagoon area. In Riviera Beach north of Miami, and Apollo Beach near Tampa, manatees and rays used outflows from nuclear power plants as hot tubs (picture below), and turtle rescuers gathered over 700 passed-out turtles, reviving them in heated tanks at zoos and wildlife centers around the region. But

the cold also gave officials backup in their fight against invasive species. Besides the direct temperature impact, it is easier to locate pythons and other snakes in cold weather, because snakes seek out open sunny areas like road surfaces. Although the cold has not eliminated any species, it has reduced their numbers; officials believe over half of the invasive pythons and green iguanas may have been killed. Most of the impacts in the Everglades National Park freshwater wetlands were on non-native fish, such as the Mayan cichlid; fish native to Everglades appear to have fared much better than the exotic species. *(Excerpted from articles in the Christian Science Monitor [http://www.csmonitor.com/USA/2010/0109/Snow-in-Florida-Big-chill-culling-unwanted-iguanas-and-pythons], the National Parks Traveler, Jan 23, and the Seattle Times, February 11 [http://www.nationalparkstraveler.com/2010/01/cold-snap-kills-fish-and-raises-big-stink-everglades-national-park5261]).*

Court Upholds New York Ballast Water Rules. A state appeals court dismissed a challenge brought by shipping interests against NY's new ballast water requirements that are intended to keep invasive species out of the Great Lakes. In a February ruling, the court upheld the authority of states to adopt ballast water rules that are more protective than federal standards. New York requires that ships perform a ballast water exchange or a saltwater flush at least 50 nautical miles from shore, in water at least 200 meters deep. The state also requires existing vessels to install ballast water treatment systems to comply with those standards before January 1, 2012. A third condition sets more rigid standards for discharges from vessels constructed on or after January 1, 2013. The shipping industry argued the conditions are "arbitrary and capricious and not legally permissible." An earlier ruling of the federal appeals court in Cincinnati upheld Michigan's ballast water rules against a similar shipping industry challenge. (Excerpted from Environmental News Service, February 5)

New Whirling Disease Publication. A new whirling disease publication *Whirling Disease in the United States: A Summary of Progress in Research and Management, 2009, by* Steinbach Elwell, L.C., K.E. Stromberg, E.K.N. Ryce, and J.L. Bartholomew. was just released by Trout Unlimited (TU). This report is an update to previous TU publications on the subject in 1996 and 1999, and it summarizes and synthesizes the incredible amount of research and lessons learned about this complicated environmental issue. Researchers have sought to explain the causes of the disease, the variability in observed effects, and to provide recommendations for detection of the parasite and prevention of disease. Over the years, much has been learned that can also be applied to a number of other aquatic invasive species and fish health issues. The research has been well documented in thousands of scientific publications. In producing the summary document, authors hoped to provide very practical information for working biologists, managers, and concerned anglers in a usable format. The publication is available for download online from the TU website: [http://www.tu.org/science-team-publications]. *(Thanks to Kajsa Eagle Stromberg)*

Coconut Palms Cause Ecological Change. Much as we all love the iconic coconut palm, a new study suggests the coconut palm actually has deleterious effects on ecosystems where it becomes dominant. Stanford researchers on Palmyra Atoll, in the South Pacific, found that a variety of seabirds prefer to nest in the native trees, and avoid the palms as nesting sites. They are likely bypassing the palms for structural reasons; the palms have relatively small canopies with spiky, sharp leaves that do not make particularly good nesting habitat, and the long branchless trunks of the palms also lack the crooks and crannies crucial to accommodating nests and abundant on most branching native trees. Red-footed boobies, black and brown noddy terns, and frigate birds, all nest in the atoll's forests. Most of these birds are also colonial species that prefer to nest in large groups, and the coconut palm only has space for one or two nests. Without the birds, the amount of guano normally contributed to the ground beneath is decreased,


Photo: Hillary Young/Stanford

causing the soil around the palms to become nutritionally deficient. This, in turn, is lowering the nutritional content of plant species growing around the palms, and causing the organisms that feed on those plants, such as crabs and grasshoppers, to forage elsewhere. "We found that you can get a five to twelve-fold decline in important soil nutrients such as nitrate and phosphate when coconut palms are present, mainly because the birds aren't there depositing nutrients to that system," said researcher Hillary Young.

Young and her colleagues compared the nutrient content of coconut palms and several species of native trees favored by the seabirds. “All the tree species analyzed showed nutrient changes [but] whenever coconuts are present, the nutrient levels decline in the leaves of each species," Young said. Soil nutrient level changes were even more dramatic. To determine how much effect even a small difference in leaf nutrients might have on the herbivores that consume them, researchers conducted taste tests with strawberry hermit crabs and long-horned grasshoppers, two species widely distributed across the atoll. Despite no noticeable difference in the leaves, there was “dramatically higher” consumption of leaves that came from plants in native forests, even though they were the same species from the same atoll. Both field and taste tests showed that leaf consumption by herbivores is reduced in coconut-dominated forests, and that nutrient depletion driven by the spread of coconut palms ripples through the ecosystem's food chain. The broader implication from the study is that changes in plant communities will change connections among ecosystems. A paper describing the study was reportedly published online in early January in the *Proceedings of the National Academy of Sciences (Excerpted from the Stanford University News, January 20, 2010 ‘Coconut palms bring ecological change to tropics, Stanford researchers say’, by Louis Bergeron*)

Zebra Mussels, Gobies, PCBs and Dredging. University of Michigan fishery biologist David Jude is lead author of a paper published online April 9 in the *Journal of Great Lakes Research*, showing that two notorious Great Lakes invaders, the zebra mussel and the round goby *(Neogobius melanostomus)*, play a central role in transferring PCBs up the food chain and into Saginaw Bay walleyes *(Sander vitreus).* The walleye is the top predator in the Saginaw Bay ecosystem, and the bay's world-class walleye fishery is a key part of the $7 billion-a-year Great Lakes fishery. Each zebra mussel filters up to a liter of water a day, taking in toxics present in the water and incorporating some of those contaminants into its shell and tissues. Round gobies eat the mussels shell and all. Then walleyes prey on the gobies. "This zebra mussel-to-goby link is one of the main conduits

of PCB transfer to top aquatic predators such as the walleye, and it plays a substantial role in PCB transfer to birds, mammals and reptiles in the region as well," said Jude. *(Ed Comment: Readers may remember a similar situation documented a few years ago in the Great Lakes, when mussels and gobies concentrated Clostridium bacteria which produce botulinum toxin, resulting in large fish and bird kills.)*

Between 2005 and 2007, Jude's team collected walleyes, gobies and other fish species, as well as zebra mussels and zooplankton, in the Tittabawassee and Saginaw rivers and Lake Huron's Saginaw Bay, and measured levels of PCBs in all those organisms. The largest walleyes contained an average of 1,900 nanograms of PCBs per gram, just under the 2,000 EPA threshold for mandatory fish-consumption advisories (1 nanogram = a billionth of a gram). In 2000-01, the mouth of the Saginaw River was dredged to remove sediments contaminated with PCBs, metals and other hazardous compounds, so the team compared its new results to the findings of a similar 1990 study conducted prior to the dredging project. They found the average concentration of PCBs in Saginaw River walleyes dropped 65 percent between 1990 and 2007. *(Excerpted from an April 9 Science Daily article: [http://www.sciencedaily.com/releases/2010/04/100409162726.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+invasivenews+%28Invasive+Species+News%29])*

Springtime Sheep Grazing Helps Control Leafy Spurge. According to an Agricultural Research Service (ARS) study, using sheep to control leafy spurge (*Euphorbia esula*), works best if done in the spring every year. After a few years, desirable forage grasses gain the upper hand as leafy spurge declines. Researchers say prescribed grazing with sheep is inexpensive, compared to applying herbicides and replanting pastures. Rangeland ecologist Matt Rinella at Fort Keogh, and graduate student Ben Hileman (Montana State) found that even a little grazing in the spring for a few years can trigger positive plant community changes in leafy spurge-infested areas. The researchers used clipping treatments that mimicked light sheep grazing, so that they could control all variables, and isolate the effects of the seasonal timing of grazing. A possible reason that light spring grazing is so devastating to leafy spurge, and maybe to other non-grassy weeds, is that the defoliation stress triggers tannin production at the expense of plant growth. Tannins often repel grazers, so there is a selective advantage to this kind of response, but an extensive loss of foliage is more of a detrimental offset. In the first year of being grazed, the spurge plants use carbohydrates stored in the roots, but these become depleted, and the carbohydrates devoted to tannins are not available for new growth. Of course, the sheep eat desirable grasses as well. But grasses, unlike broadleaf plants such as spurge, are less appetizing to sheep because grasses accumulate silica, and silica uptake and storage probably take less energy than tannin production. This research was reported recently in the *Journal of Applied Ecology. (Excerpted From Science Daily December 31. [http://www.sciencedaily.com/releases/2009/10/091002100714.htm])*

VHS Now Found in All Five Great Lakes. Viral hemorrhagic septicemia (VHS), which causes fatal anemia and hemorrhaging in many fish species, was first discovered in the Northeast in 2005. Cornell researchers say it has now been found for the first time in fish from Lake Superior, so the virus has now been documented in all of the Great Lakes.

VHS poses no threat to humans. But the virus**,** which has been identified in 28 freshwater fish species in the Great Lakes watershed, has reached epidemic proportions in the Great Lakes and threatens New York's $1.4 billion sport-fishing industry. On a worldwide basis, VHS is considered one of the most serious fish pathogens, because it kills so many fish, is not treatable, and infects a broad range of fish species. While no significant fish mortality due to VHS was observed in 2008 and 2009, "It is important to note that there are still fish harboring VHS; essentially the infection proceeds even though no mortalities are being observed," said Paul Bowser, of Cornell's College of Veterinary Medicine. "This is important because it suggests that these infected fish may serve as a reservoir for the virus in the Great Lakes ecosystem. While we don't fully understand the lack of recent mortality, the potential presence or absence of stressors on the fish may be playing a role." *(Excerpted from Physorg.com, January 27, 2010)*
[http://www.physorg.com/news183813479.html]

Risk Assessment of Florida Exotic Reptile Imports. The recent explosive growth in the FL exotic reptile trade has raised serious concerns about species establishing in the wild. To understand which species pose the greatest threat, researchers identified physical, social, and biological risk factors that make certain species more likely to invade. They evaluated 68 reptiles and developed a model to see what common factors best explained establishment outcomes. Then using these risk factors, they conducted a formal risk assessment of 35 of the most commonly imported exotic reptiles, which have yet to establish in the wild. The assessment identified 8 species of lizards and 4 species of snakes as potentially successfully invaders. They further assessed those twelve species based on their potential threat to the ecosystem, human safety, and their ability to spread quickly, and found that 6 species posed a significant risk based on those criteria. These high-risk species include: African rock python (*Python sebae*), puff adder (*Bitis arietans*), anaconda (*Eunectes murinus*), scrub python (*Morelia amethistina*), Asian grass lizard (*Takydromus sexlineatus*), and the Senegal chameleon (*Chamaeleo senegalensis*). The authors recommend that future research efforts extend their risk assessment to all reptile species imported to the state; "Applying this risk assessment model to screen imported species would allow us to develop a list of ''risky reptiles'' for which trade would be restricted to eliminate risk of establishment…" This work is particularly timely as Congress is currently considering a bill that would ban the importation of nine species of snakes including Burmese pythons (*Python molurus bivittatus*) due to public concerns about their invasion threat. (See the article: *Risk assessment of potential invasiveness of exotic reptiles imported to south Florida*, 2009, by Fujisaki, I., Hart, K., Mazzotti, F.,

Rice, K., Snow, S., and Rochford, M, in *Biological Invasions* DOI: 10.1007/s10530-009-9667-1) *(Excerpted from Conservation Maven Research Briefs, January 4, 2010, The risk of exotic reptile imports invading Florida, Reviewed by Rob Goldstein)*

FWS Proposes Banning Importation and Interstate Commerce of Nine Snakes. On March 11, the USFWS proposed listing nine constrictor snakes as "injurious wildlife" under the Lacey Act, thus prohibiting the importation and interstate trade of the invasive species. The nine species proposed for listing are: the Indian python (*Python molurus*), including the Burmese python (*P. molurus bivittatus*), northern African python (*P. sebae*), southern African python (*P. natalensis*), reticulated python, (*P. reticulatus*), green anaconda (*Eunectes murinus*), yellow anaconda (*E. notaeus*), Beni or Bolivian anaconda (*E. beniensis*), DeSchauensee's anaconda *(E. deschauenseei*), and boa constrictor (*Boa constrictor*). The Burmese python (Indian python) is currently established across thousands of square miles in south Florida, and a population of boa constrictors is established south of Miami. In addition, evidence strongly suggests that a population of northern African pythons is reproducing on the western edges of Miami. None of the nine species of snakes is native to the United States. The proposed rule, a draft economic analysis, and an environmental assessment are available for public review and comment for 60 days. These documents are available at: *http://www.regulations.gov* under Docket No. FWS-R9-FHC-2008-0015. *(Excerpted from a USFWS press release, March 11)*

FL legislation has also been introduced seeking to restrict the importation and interstate sale and transportation of these snakes. Many of the targeted snakes are popular pets and are associated with a large domestic and international trade. Over the past 30 years, about one million of these nine species have been imported into the U.S., and current domestic production of some species likely exceeds import levels, according to the USDOI. Some members of the pet trade have raised concerns about adding a species to the injurious wildlife list through legislative action, as opposed to the science-based risk analysis as established under the Lacey Act. They have also raised concerns about the possibility of a federal ban pushing the trade underground and potentially causing those already in possession of the snakes to euthanize the animals or release them into the wild. To address the issue of invasive species on a broader scale, Salazar has directed the FWS to conduct a comprehensive review of existing and legal regulatory authorities. *(Excerpted from Pet Product News, January 21, 2010.*
[http://www.petproductnews.com/headlines/2010/01/21/fws-to-propose-banning-importation-and-interstate-commerce-of-nine-snakes.aspx])

USDA Awards $4.6 Million in Research Grants. USDA's National Institute of Food and Agriculture (NIFA) awarded $4.6 million to 13 universities for research to develop ecologically and economically rational strategies for management, control or elimination of weedy or invasive species. The awards are administered through the NIFA Agriculture and Food Research Initiative (AFRI) competitive grants program. Funded projects include: research to develop economical and environmentally sound strategies for managing invasive weeds, and prevent the spread of invasive weeds in agro-ecosystems that provide tree fruits and nuts as well as wine, table, and raisin grapes; research into ecologically-based, invasive species management programs; minimizing negative impacts

of the European crane fly in perennial grass-based agro-ecosystems; testing the efficiency of activated carbon on large scale soil to restore native species; and mitigating impacts of the invasion of earthworms as an invasive species.

Fiscal Year 2009 grants are being awarded to: Auburn (AL) University. ($494,000), U AK Fairbanks ($494,000 and $149,911), UC Berkeley, ($494,000), UC Davis, ($495,000), CO State University ($124,962), ID State University, ($199,704); U MN ($493,000 and $491,000), Cornell (NY) University ($454,000); OH State University ($494,000 and $91,423), and OR State University ($125,000). For more information on other NIFA grants, see [http://www.nifa.usda.gov/]. *(Excerpt from a news release, January 21.)*

Brown Tree Snake Economic Analysis for Hawaii. The Brown Tree Snake *(Boiga irregularis)* arrived on Guam shortly after World War II, probably as a stowaway on U.S. military cargo ships from New Guinea. Without natural predators or parasites and abundant prey, the snakes increased in number dramatically, causing human health concerns, power outages, and the extirpation of 10 of the 3 native bird species on Guam. Hawaii, like Guam, has no endemic terrestrial snakes - and it does not want any. But despite intensive cargo-screening measures, eight brown tree snakes have been found on Oahu since 1981, transported on commercial and military aircraft from Guam. Using actual damage levels on Guam as benchmarks, a new, seemingly well-researched study, *Potential Economic Damage from Introduction of Brown Tree Snakes, Boiga irregularis (Reptilia: Colubridae), to the Islands of Hawai'i,* (Stephanie A Gebhardt et al, University Press of Hawaii, January 2010) seeks to conservatively estimate the economic damages associated with a hypothetical establishment of the Brown Tree Snake in Hawaii, by analyzing costs from medical impacts, power outrages, and impacts to tourism.

If the Brown Tree Snake becomes established in HI, the total estimated potential annual damage from medical damages, power outage costs, and the cost of a decrease in tourism, would range from approximately $593 million to $2.14 billion. At the lowest damage estimates, power outages would compose the majority (approximately 77%) of the total costs. At the highest estimates, however, power outage-related costs (approximately 36%) would fall below damage resulting from a decrease in tourism (approximately 64%). The total annual power outage duration in Hawai'i was projected at 1,209 hr/yr, and ranged in cost from $456 million to $761 million per year. Medical costs made up less than 1% of the total costs. The estimated potential range of annual snakebite-related injuries in Hawaii was between 665 and 1,330 individuals, with a cost ranging from $191,520 to $303,040. At the midrange estimate, it was projected that approximately 997 individuals would receive medical care each year in Hawai'i due to Brown Tree Snake bites. The potential range of total tourism impacts includes hypothetical 1%, 5%, and 10% decreases in the expected number of tourist days spent in Hawai'i due to the presence of the Brown Tree Snake. Summing the direct, indirect, and induced impacts yields an estimate of the total economic damage from a reduction in tourism of between $138 million and $1.38 billion per year. Incorporation of additional costs of the snake invasion (e.g., native bird extirpation and trade impacts) as sources of potential damages to Hawaii undoubtedly would have increased the overall levels of damages. *(Excerpted*

heavily from Pacific Science. January 1, 2010.)
[*http://pacificscience.wordpress.com/bioone-v59/pacific-science-64-2010/]*

EPA Draft Vessel Incidental Discharge Report. On July 31, 2008, Public Law 110–299 was signed into law, providing all commercial fishing vessels and non-recreational vessels less than 79 feet in length with a two-year moratorium from requirements of the National Pollutant Discharge Elimination System (NPDES) permit program. The U.S. EPA was also directed to study the impacts of discharges incidental to the normal operation of those vessels. The draft report, *Study of Discharges Incidental to Normal Operation of Commercial Fishing Vessels and Other Non-Recreational Vessels Less than 79 Feet*, is now completed, and on March 8, EPA requested public comments in the Federal Register. The comment period ended April 7. EPA will now consider the comments received and finalize the report for submission to Congress. The report will provide Congress with information for use in the regulation of incidental discharges. To develop the draft report, EPA sampled wastewater discharges and gathered shipboard process information from 61 vessels in 15 separate cities and towns in nine states across multiple geographic regions. Fishing vessels, tugboats, water taxis, tour boats, towing and salvage vessels, small research vessels, and a fire and supply boat were included in the study. Incidental vessel discharges include deck run-off, gray water, and other discharges that may potentially have negative water quality impacts. The draft report summarizes the primary pollutant concentrations in the discharges sampled, and evaluates their potential environmental impact on large water bodies. To see the Federal Register, go to [http://www.epa.gov/npdes/pubs/vessels_rtc_fr_3_8_2010.pdf]. The draft report can be accessed in its entirety at [*http://www.epa.gov/npdes/vessels]*.

The Ongoing Great Lakes Asian Carp Battle


Glfc.org


Chicagonow.com


news.stv.tv


buffalonews.com

Never a dull day…….

January 1- Ontario Backs U.S. Supreme Court Asian Carp Lawsuit. On December 31, the Canadian province of Ontario filed a motion supporting a U.S. Supreme Court lawsuit aimed at preventing the spread of invasive carp into the Great Lakes. Indiana, Minnesota, Ohio and Wisconsin have already filed in support of an earlier lawsuit launched by Michigan. The suit demands that Illinois immediately shut down several locks on waterways south of Chicago, as a first step toward eventually severing a century-old artificial link between the Great Lakes and the Mississippi River basin. Biologists have warned if the fish get into Lake Michigan, there will be an uncontrollable spread into the other Great Lakes, and DNA evidence has shown the fish are 10 km from the mouth of Lake Michigan. “Because we’re not Americans, we can file a motion in support and that’s what we’ve done. We’re saying we can support their motion because

we can also prove detrimental effects," Attorney General Cansfield said. *(Excerpted from [http://www.thespec.com/News/BreakingNews/article/697385] January 01, 2010 Canadian Press)*

January 4- NY Joins the Carp Lawsuit. New York joined the legal effort to keep Asian carp from entering the Great Lakes, and filed a brief .in the U.S. Supreme Court supporting Michigan's request for an injunction to close a Chicago canal connecting Lake Michigan and the Mississippi water basin. *(Source: AP, January 4).*

January 19- Supreme Court Rejection. The Supreme Court rejected Michigan's December 21 request for an injunction closing two navigation locks in the Chicago area, which the state said was necessary to protect the Great Lakes' $7 billion fishing and tourism industries from the carp threat. The Solicitor General told the U.S. Supreme Court that heeding the states' request would endanger public safety while disrupting cargo and passenger vessel traffic. While acknowledging the carp pose a threat to the lakes and their $7 billion fishery, she said it was unclear that closing the locks immediately was necessary to keep them out. Closing the locks would have disrupted boat traffic between Lake Michigan and the inland waterway system around the city, which links the lake and the Mississippi River. Nearly 7 million tons of cargo, valued at $1.7 billion, passed through one of the locks in 2008.

The Obama administration and the state of Illinois have also opposed Michigan's request, saying that while they were very concerned about the carp issue, it was premature to close the waterway. The U.S. Army Corps of Engineers is studying the Asian carp threat and plans to issue a report on possible remedies by September, 2010. While the Supreme Court rejected Michigan's request for an injunction, it has not yet ruled on whether the state can proceed in the high court with a lawsuit against Illinois, the Army Corps of Engineers, and the Metropolitan Water Reclamation District of Greater Chicago. The Obama administration said Michigan should wait until the Corps of Engineers completes its report before bringing a lawsuit, and if the state does not like the report's conclusions, it can bring a suit through normal court proceedings in front of a federal trial judge instead of seeking to sue directly in the Supreme Court. *(Excerpted from Business Week, January 6, and a January 19 Wall Street journal article by Brent Kendall, 'Supreme Court Rejects Bid to Close Waterway in Carp Case' [http://online.wsj.com/article/SB10001424052748703837004575012951061005766.html?mod=googlenews_wsj])*

January 25- Obama Carp Summit. The Attorneys General from Wisconsin, Michigan, Ohio, Indiana and Pennsylvania sent a letter to President Obama asking for a seat at the table for the Asian carp "summit" that the administration scheduled for early in February. That meeting was requested by Gov. Jim Doyle and Michigan Gov. Jennifer Granholm after news that scientists detected Asian carp DNA in the open waters of Lake Michigan. On the same day the news broke of the apparent breach of the leaky defense system to protect Lake Michigan, the U.S. Supreme Court sided with the Obama administration and decided not to order two lakeside navigation locks slammed shut in a last-ditch attempt to keep out the carp. The administration has agreed to meet with leaders of Great Lakes states to discuss strategies to keep the carp from establishing a breeding population in Lake Michigan, but it apparently has not budged on the push to

shut the locks. (Excerpted from 'States' attorneys general request presence at Obama carp summit' by Dan Egan of the Journal Sentinel, January 25.) [http://www.jsonline.com/news/wisconsin/82628147.html]

January 18- LA Promotes "Silverfin." Based on a Louisiana Department of Wildlife and Fisheries marketing plan, a group of LA-based companies has started a joint venture to market carp as "silverfin". It is organized: food scientists, state biologists and federal agencies partnered to develop ways to clean and process the fish; the state recently approved preliminary rules for harvesting "silverfin"; and chefs developed recipes like silverfin cakes and silverfin almondine. Rivere Foods of Paincortville has signed on as the lead processor, New Orleans Fish House will distribute the frozen products, and Rouses Supermarket is the first official buyer. Taste-wise, the carp is reportedly a cross between scallops and crab meat. "Consumers will love it," Chef Parola said. Parola may be best known as the man who attempted to sell the nation on nutria meat a few years back. But he says "the campaign for silverfin is dramatically different, because the fish doesn't resemble an overgrown rat." *(Excerpt from 'Asian carp will soon invade store shelves', by Spencer Green/AP, January 18.)*

February 9, 2010- Control Strategy Framework. After the White House 'carp summit,' federal and state officials announced a multi-pronged $78.5 million attack to prevent Asian carp from establishing populations in Lake Michigan. An Asian Carp Control Strategy Framework, which they characterized as 'aggressive' and 'unparalleled', features more than 25 short and long-term actions funded by major spending, some of which officials said are already in the pipeline. Key containment measures include constructing and operating a third electric barrier on the Chicago Sanitary and Ship Canal ($10.5 million); awarding a $13.2 million contract to construct concrete and chain-link fencing between the Chicago Sanitary and Ship Canal and the Des Plaines River, to prevent fish passing around electric barriers when flooding occurs; opening Chicago's navigational locks less frequently to block carp movement; studying the feasibility and impact of permanent lock closure; deploying larger field crews to conduct physical and sonar observation, electro-shocking and netting; and testing 120 water samples a week (twice the current number) for eDNA, (environmental DNA) showing trace amounts of carp. The federal strategy also outlined longer-term management techniques to curb the carp. Some $5 million will be spent on additional chemical treatments, and $3 million to expand the commercial market for Asian carp in IL and elsewhere, with some proceeds from carp filets going to ecosystem restoration and invasive species prevention. There is also more than $1.5 million for new research. *(Excerpted from the Chicago Tribune, February 9).*

March 22- Supreme Court Denies Michigan's Second Injunction Request. The Supreme Court denied Michigan's second request for an injunction ordering Chicago to close two navigational locks. This leaves MI and six other states engaged in a continued battle about how to stop the invasion. Michigan has another request pending before the Supreme Court – the so-called "Chicago Diversion" case, which addresses the Chicago Sanitary and Ship Canal, a historic waterway connecting Lake Michigan to the Mississippi River. The Supreme Court was scheduled to review Michigan's request for

hearings on April 16. *(Excerpted from Christian Science Monitor, March 22, article by Mark Guarino.)*

March 30- Doubts About Lake Michigan Carp. New doubts are raised that Asian carp have moved into Lake Michigan, after a 6-week netting operation found no carp where they were most expected. Biologists and commercial fishermen combed a series of canals and rivers where the carp's DNA had been spotted over the past year, but found only 1,000 common carp, 1,000 gizzard shad, and a few other fish varieties. Biologists plan to keep searching for the next 3 months, as part of a $78 million federal effort to keep the carp out of the Great Lakes. Meanwhile, the MI attorney general's office says the netting results mean nothing – and it still wants the Chicago shipping locks closed. *(Source: NewsTalk, March 30.) [http://www.wtaq.com/news/articles/2010/mar/30/new-doubts-about-asian-carp-threat-raised/]*

April 5- Illinois Company Exporting Carp to China. Big River Fish, a company in Pearl, IL, plans to ship 30 million pounds of carp to China this year. "We've had groups in China taste it. They came here and ate it, and say it's the best carp they've ever had," owner Ross Harano said. Apparently the rivers in China are too polluted to grow quality carp, so the IL fish will be sold at a premium to high-end Chinese restaurants. Big River Fish expects to make around $20 million per year exporting the carp, and Harano says he expects his business to increase 10 times over. The company says it will add nearly 200 jobs because of the overseas market, including 140 jobs for commercial fishermen. Right now, there's an estimated 100 million pounds of the fish in the Illinois River. At a small business forum in Chicago, Sen. Dick Durbin said he approved of the company's plans. "It turns out the Chinese were very impressed with the quality of our Asian carp. I hope they're impressed enough to take them all home," Durbin said. The first shipment goes out April 9. *(Excerpted from a James Langton article in NBCChicago, April 5. [http://www.nbcchicago.com/news/local-beat/Asian-Carp-Cant-Beat-Em-Eat-Em-Big-River-Fish-89961152.html#ixzz0lhefzqzl])*

April 16- A Carp Cooperative? Jim Miller of Cecilia, KY wants to establish a $20 million "Carp Catchers Cooperative" and has asked the Northwest Tennessee Riverport Authority to sell or lease to him 10 to 15 acres to build a shipyard and three wooden ships to harvest Asian carp. The basics of Miller's plan:

- Change the name of the Asian carp to "Silverfin" for marketing purposes.
- Lease or buy 10-15 acres from the Authority to build a shipyard.
- Start construction on three barges that would all hook together like a railroad train, and go up the rivers, hauling in carp. "The first boat catches them, the second boat processes them and the third boat is a 'floating hotel' where the crew would live."
- Like other ventures, funding is a challenge. Miller says it will cost roughly $20 million, and he would need government grants. And Miller complains he's not "heard a word" from the Port Authority Board, but the Board says it will give his request due consideration. *(Excerpted from a John Brannon article in NWTN Today, April 16. [http://www.nwtntoday.com/news.php?viewStory=39690])*

April 20- Chicago Promotes "Shanghai Bass". Diners at the Lockwood Restaurant in Chicago's famed Palmer House Hilton Hotel now have the opportunity to try an "Asian Carp Ceviche". Chef Phillip Foss says the Asian Carp doesn't deserve the bad reputation it has gained in the United States, and he hopes to raise awareness about the species by putting it on his menu. He has been offering the Asian Carp dishes free of charge to start out, since otherwise nobody chooses to eat it when they have more familiar fish selections as alternatives. While the feedback has been overwhelmingly positive so far, Foss is considering a name change, from "Asian Carp," to "Shanghai Bass," to appeal to a broader audience. (*Excerpted from: Villified Fish Now a Tasty Dish in Chicago, a foxnews.com article by Peter Doocy, April 19. [http://www.protectyourwaters.net/news/display.php?id=12480])*

Environmental Disruption: a Trigger for New Pandemics? Scientists warn the world is facing a growing threat from new diseases that are jumping the human-animal species barrier as a result of environmental disruption, global warming and the progressive urbanization of the planet. Dramatic changes to the environment are triggering major alterations to human disease patterns on a scale last seen during the industrial revolution. Montira Pongsiri (USEPA in Washington DC), says that previous transitions in human history have had a devastating impact in terms of the spread of disease. "We appear to be undergoing a distinct change in global disease ecology. The recent emergence of infectious diseases appears to be driven by globalization and ecological disruption." He and eight colleagues examined five emerging and re-emerging diseases (malaria, Lyme disease (spread by ticks), Hantavirus (spread by mice and rats), West Nile disease (spread by mosquitoes), and schistosomiasis (spread by freshwater snails). They argue that changes in land use, farming practices and climate lie behind the increasing number of outbreaks.

David Murrell, lecturer in ecology at University College London, said: "Since 1940, over 300 new diseases have been identified, 60 percent of which crossed to humans from animals and 70 percent of these came from contact with wildlife." A key factor has been increasing urbanization, which has resulted in humans moving into previously untouched areas where they have come into closer contact with animals. At the same time, globalization has meant newly emerged diseases are transmitted faster and more widely than in the past. "Before the world became so interconnected, deadly and newly emerged diseases were not capable of spreading widely," Dr. Murrell said. "Now it is very possible that they will spread across countries and continents within days, thereby sustaining the outbreak."

Diseases that have spread from animals to humans include:
- HIV: the best known example of a disease that jumped the animal-human barrier, causing a global pandemic. It is blamed on human incursion into the forests of West Africa, driven by population pressure. Rising demand for food led to the growth of the bush-meat trade, and the slaughter of chimpanzees, thought to be the animal reservoir for the HIV virus. People who ate chimpanzee meat were exposed to novel infectious agents, and provided the ideal breeding ground for the development of the new disease. More than 25 million people worldwide have since died from it.

- Hantavirus: kills four out of five people infected, and also causes hemorrhagic fever, resulting in widespread internal bleeding. There are an estimated 60,000 -150,000 cases worldwide annually.
- Avian flu: devastated flocks of chickens and ducks in the Far East, and poses the greatest potential threat to the human race. Since 2004 it has infected 442 people and claimed 262 lives, a 60 percent death rate.
- Rabies: the most lethal disease known, with a near 100 percent fatality rate. It is associated with dogs, but has begun infecting other animals in recent decades.
- Malaria: transmitted by mosquitoes, and confined largely to the tropical and sub-tropical areas of sub-Saharan Africa, India, Bangladesh, South-east Asia and Central America. Malaria causes at least one million deaths and 300 million cases of fever a year. Ninety percent of deaths occur in Africa, mostly in young children.
- West Nile virus: transmitted by mosquitoes, and caused panic when it appeared in New York in 1999 and 2000, apparently carried by ships bringing exotic birds into the country for collectors. More than 50 people were hospitalized in New York, and at least 10 died. In 2002, more than 3,700 cases were recorded across the US. *(Excerpted from 'Deadly animal diseases poised to infect humans', By Jeremy Laurance, January 4, in The Independent,* [http://www.independent.co.uk/news/science/deadly-animal-diseases-poised-to-infect-humans-1856777.html])

Coqui-Control Program Closes Shop Just as Species Mutates. As it dismantles the last vestiges of its coqui-control program, Hawaii County plans to sell off the equipment some community groups say is essential to their voluntary eradication efforts. The move comes just as scientists say the county's coqui frog *(Eleutherodactylus coqui Thomas)* population is maturing into much larger frogs; where once they were described as the size of quarters, a coqui was recently reported the size of a tennis ball (!), said Mark Munekata of the Hawaii Island Economic Development Board. County and state governments once poured millions into eradication efforts, but the economic downturn has forced governments to prioritize their spending, and the uphill fight against the coqui was among the first to go. Coquis are considered a threat to native wildlife because of their huge appetite for bugs. People also complain about their shrill chirp, which reaches 80-90 decibels, comparable to the loudness of a lawnmower. *(Excerpted from a Nancy Cook Lauer article to West Hawaii Today, in the Honolulu Advertiser March 3.)*

Codium Research. Scientists at the University of NH are performing genetic research on an invasive seaweed species known as the "oyster thief", or "dead-man's fingers" (*Codium fragile ssp. tomentosoides)*, in hopes of tracking its origins. Genes from the seaweed's nucleus are being used to determine the species' origins and to find out whether it's being continuously introduced, or is simply spreading. It is believed to have been introduced to Long Island Sound, NY, from Japan, in 1956. By the 1990s it spread all the way to eastern ME. *Codium* tends to proliferate in shallow, well-lit waters, and it can

Photo: Google images, www.Marlin.ac.uk)

now be found throughout the Gulf of Maine and in Cape Neddick, the Isle of Shoals and the Cape Cod Canal. *Codium* is an opportunist, taking over disturbed habitats knocked out of balance by other species. On the Isle of Shoals, an invasion of sea urchins around 20 years ago reduced the native kelp populations, and before the kelp had a chance to grow back, *Codium* took its place. Unfortunately, the kelp is a favorable environment for juvenile fish, while *Codium* is not. In places, a *Codium* carpet has completely replaced all other algae. It ranges in color from a dark forest green to a bright kelly green and grows to 40 inches or more. It is nicknamed the "oyster thief" because it attaches itself to rocks, oysters, and other shellfish with a holdfast, and as it gets bigger and more buoyant, heavy seas lift it up and carries it away, taking along any attached shellfish. Humans also spread it when it gets caught on boat hulls, rudders or propellers, or when *Codium* is attached to shellfish that are transported to new locations. The UNH research team welcomes reported sightings of the seaweed via their Web site: [http://www.codium.unh.edu/]. *(Excerpted from 'Scientists Target the "Oyster Thief" Invasive species', by Anne Mostue, December 23, 2009.) [http://www.nhpr.org/node/28457].*

(Ed. Comment: Differentiating the subspecies tomentosoides from the native West Coast subspecies, C.F. mucronatum, can be difficult. The only positive west coast tomentosoides sighting was in San Francisco Bay and nearby Tomales Bay, in 1977. Two other sightings in OR and Prince William Sound, AK, turned out to be false positives, but the plants were so close to ssp. tomentosoides that identification required DNA analysis.)

More crayfish Websites International Association of Astacology: http://iz.carnegiemnh.org/crayfish/iaa/index.htm
Ontario Crayfish website and identification guide: http://pinicola.ca/crayfishontario/
Crayfish of Maryland poster: http://www.dnr.state.md.us/streams/pdfs/MDCrayfish.pdf
Maryland Crayfish Key: [http://www.science.marshall.edu/jonest/Crayfish%20web%20page/CrayfishHompage.htm] *(Thanks to Kevin Aitkin)*

NOAA Grants Available. As part of the overall plan to support the development of environmentally and economically sustainable ocean, coastal or Great Lakes aquaculture, NOAA Sea Grant Aquaculture Research Program will make up to $6 million available to fund aquaculture research projects for FY 2010-2011NOAA anticipates funding approximately 15 projects, averaging $400,000. Federal funding will be available for up to a two-year period, and will require matching funds. Some projects selected in this competition may be awarded in FY 2011 and funded with FY 2011 funds. Proposals are due at the California Sea Grant Office by 2pm (PDT), May 25, 2010. For more

information on the RFP and proposal submission guidelines, go to: [http://www.csgc.ucsd.edu/FUNDING/APPLYING/SPEC_COMPET/AQR2010PropInst.html] or contact <sgnsgoproposal@ucsd.edu>.

Around The World

Mexico Passes a Comprehensive Invasive Species Law. The Mexican Legislature has passed a new law covering many aspects of the invasive species problem in Mexico. The new law reportedly defines an exotic invasive species; prohibits importation of exotic invasive species or any other wild species that can carry an exotic invasive species; prohibits the release into the wild of exotic invasive species; mandates the creation of a list of exotic invasive species that must be reviewed every 3 years; mandates the creation of a regulation on prevention of entry of these species and management, control and eradication of exotic invasives already established in Mexico; and gives the Economy Ministry the power to control transit of these species inside Mexico. This is a promising development! We often talk about invasive species not paying attention to political boundaries. If Mexico and other nations near us manage invasive species effectively, this will benefit us as well. *(From article in KC Weed News, thanks to Sasha Shaw)*

Canada Funds an Invasive Species Strategy. The Government of Canada recently announced $38 million in funding over a two-year period for federal programs under Canada's Invasive Alien Species Strategy. The funding was announced in Budget 2010. Also included is an investment of $million [sic] over two years for a new Invasive Species Centre. The strategy helps to prevent introductions of invasive alien species from other countries, or movements of a species from one ecosystem to another within Canada. As well as detect and respond rapidly to new invasive alien species, and manage established alien species through eradication, containment, and control. *(Excerpted from an article in The Scope, March 31. [http://www.innisfilscope.com/news/2010-03-31/Police_News/Federal_strategy_targets_invasive_species.html])*

Spider-Smuggling Doesn't Pay. Lee Ardern, 26, a British citizen, will pay close to $1 Million for trying to smuggle 900 Tarantulas out of Brazil in his luggage. He was taken into custody at the Rio de Janeiro Airport in November, after customs randomly checked his luggage and found he was carrying about 900 live spiders of four different species. He told authorities that he had bought the animals for US$5 each, and intended to resell them for US$ 50 apiece in the United Kingdom. *(From Stop Aquatic Hitchhikers, Nov 16.)*

South Africa Invasives. The Working for Water (WfW) Programme, an initiative administered through the Department of Water Affairs and Forestry, says invasive alien species are causing billions of Rands in damage to South Africa's economy every year, and that they are the single biggest threat to the country's biological biodiversity. Of the estimated 9000 plants introduced to South Africa, 198 are currently classified as being invasive. It is estimated that these plants cover about 10% of the country, and the problem is growing at an exponential rate. WfW currently runs over 300 projects in all

nine of South Africa's provinces. Scientists and field workers use a range of methods to control invasive alien plants, including mechanical methods (felling, removing or burning), chemical methods, and biological controls. To date 76 biocontrol agents have been released in South Africa against 40 weed species. (*Ed Comment*: *That's a large number…I hope these agents are being carefully screened for possible unexpected impacts before release!)* The Programme is recognized as one of the most outstanding environmental conservation initiatives on the continent, and enjoys sustained political support for its job creation efforts and the fight against poverty. (For more information visit [www.dwaf.gov.za/wfw/]) *(Excerpted from Water Rhapsody, [http://www.watersense.co.za/2010/01/10/invasive-alien-vegetation-biggest-threat-to-water-and-biodiversity/])*

Rhodo-chop: A New Eradication Technique? Scotland's most invasive foreign invader, *Rhododendron ponticum*, was originally imported by Victorian gardeners. *R. ponticum* is native to China and Mediterranean countries such as Spain and Portugal. In the right locations, the bush can grow up to 15 feet high, smothering habitats and shading other plants. It also poisons nearby soil with chemicals that kill other species; its fallen leaves acidify the soil, reducing earthworm numbers; and it is a host for *Phytophthora*, more commonly known as Sudden Oak Death. Around 11,000 acres of Argyll are now covered in *Rhododendron ponticum* as well as 10,000 acres in the Loch Lomond and the Trossachs National Park. Scotland has spent tens of millions of pounds trying to curtail the spread, with little impact. But two plant control experts have now come up with a new martial arts-style attack that renders it lifeless within minutes. The technique, devised by Gordon French and Donald Kennedy from Morvern Community Woodlands, is described as being a cross between tai chi and karate. The pair carefully examines each rhododendron bush, determine the direction in which its stems are growing, and twist their bodies around the plant, snapping it in exactly the right places. With minimal effort, the rhododendron is reduced to a pile of leafy waste, and within hours, they claim whole swathes of the woodland invader can be destroyed while hardly breaking a sweat. It offers a cheap and effective method of battling the plant, when even using a chainsaw for control was ineffective. Dr James Merryweather is helping to popularize the technique by putting together leaflets, giving talks and creating a website. *(Excerpted from a December 13 article by Jenny Fyall [http://news.scotsman.com/science/Rhodochop-how-martial-arts-will.5907470.jp])*

Whiskers Hold Key To Invasive Mink Distribution. The first American mink *(Mustela vison)* were brought to British fur farms in 1929, and all wild mink in Britain today are descendants of fur farm escapees. The mink is a predator that has a devastating effect on many native UK species, including water voles and other mammals, fish and seabirds. Research on mink whiskers, at the University of Exeter, reveals more about the diet of this invasive species and provides a clue to its whereabouts; the findings can be used to eradicate it from environments where it can be devastating to native species. A study, published in the *Journal of Applied Ecology*, focuses on American mink living in the Outer Hebrides islands of Scotland. Researchers used stable isotope analysis to study the whiskers and claws of mink carcasses collected on the islands. This technique generates a kind of unique chemical fingerprint, providing a record of an animal's diet

over time. Study results show that the mink has been increasingly reliant on seafood, proving that mink have started to move to the coastline around the islands. Having successfully eradicated mink from the islands of Uist and Harris, wildlife biologists from the Food and Environment Research Agency now plan to use the research findings to manage populations across the Outer Hebrides, and focus their future efforts on coastal regions. *(Excerpted from ScienceDaily, December 23, 2009)*

Meat Ants vs. Cane Toads. Australian scientists have discovered a cheap, easy, low-tech combination of weapons effective against Cane toads *(Bufo marinus)*: cat food and meat ants *(Iridomyrmex purpureus)*. Cane toads were introduced to Australia in 1935 from South America, via Hawaii, in an attempt to control cane beetles. The toads have no natural enemies in Australia, so the result was probably predictable: the original 101 toads are spreading across large areas of the country. They pose a major threat to native animals, because every life stage of the toad, from eggs to adults, is poisonous, and their toxin can kill most native animals that normally eat frogs, even large predators. (A University of Sydney study found a "75 percent reduction in the numbers of freshwater crocodiles in the Victoria River District of the Northern Territory after the toads arrived in the river system.") But combating invasives doesn't always have to be complicated, expensive, or hi-tech. Professor Rick Shine and his colleagues from the University of Sydney found that placing a small amount of cat food near the edge of ponds when young frogs were emerging from the water attracted a larger number of meat ants to those locations. Once the ants were drawn to the area, they found the young toads even tastier than cat food. "When cat food was introduced as bait, ant numbers grew and cane toad numbers declined more quickly. The research reveals that meat ants can be used with low risk of collateral damage to native wildlife. Cane toads are easy targets for meat ants because unlike their native counterparts, they don't try to make a quick escape. When faced with an enemy, the young toads are more likely to freeze than flee. The study found 98 percent of metamorph toads were encountered by meat ants, and 84 percent were attacked, within a very brief (two minute) period. Over 50 percent of attacks were immediately fatal, while 88 percent of 'escapee' toads died within 24 hours. Shine's findings were recently published in the British Ecological Society's *Journal of Applied Ecology. (Excerpted from a March 2, National Parks Traveler article, by Jim Burnett.) [http://www.nationalparkstraveler.com/2010/03/unlikely-weapons-against-deadly-exotic-species-cat-food-and-ants5452?page=153])*

IUCN Releases Guidelines on Biofuels and Invasive Species. The risk of biofuel crops becoming invasive and outcompeting native species is increasing as more advanced crops are planted, according to a new IUCN report. The report outlines prevention strategies, arguing that invasive species can be managed to reduce the impact on local livelihoods and the environment. Among the plants on the list: jatropha, elephant grass, and giant reeds. The guidelines were developed in concert with the Roundtable on Sustainable Development (RSB). The report is available for download at [http://www.biomassintel.com/iucn-releases-guildelines-biofuels-invasive-species/]

New Journal on Biological Invasions. The first issue of a new online international Open Access journal devoted to Management of Biological Invasions is now open to

potential contributions. It will deal with environmental, methodological and social aspects of ecological-conservation, and contributions must be oriented to real practice, or show implications for wildlife management. It is expected to launch two issues per year, and articles will be published immediately after acceptance. Anyone interested can check out the scope, current editorial board, and style at: [http://sites.google.com/site/managementbiologicalinvasions/]. For more information, contact the Editor-in-chief Elías Dana <editor@managementofbiologicalinvasions.net> or Juan Luis Rodríguez Luengo <jrodlue@gobiernodecanarias.org>.

ICAIS Proceedings Available. Proceedings of the 16th International Conference on Aquatic Invasive Species, held April 19-23, 2009 in Montreal, Canada, are now available as a Special Issue of the open access international journal Aquatic Invasions (March 2010, Volume 5, Issue 1, Edited by Frances E. Lucy). Go to: [http://www.aquaticinvasions.net/2010/index1.html] *(Thanks to Kevin Aitkin)*

OceanSaver Ballast Water System. The OceanSaver ballast water treatment system uses filtration, cavitation with resulting deoxygenating the water, creation of a disinfectant through electrical charge to create "activated water", and then injection of nitrogen to further deoxygenate the water. Ballast water is treated during ballasting and to a degree at deballasting, including re-oxygenating the water. The system owner's state that the treatment does not add to corrosion, as it is compatible with ballast water tank liners. They have tested the system by retrofitting two ships - a car carrier and a bulker. Retrofit was done partially in dry dock and partially while the ship was in operation. The company is located in Norway, certified by IMO, and claims to meet CA standards. The company now has a contract for three new-build super-tankers. See a full video of the system at [http://www.oceansaver.com/]. [http://www.oceansaver.com/sider/artikkel.asp?NodeID=168&PlaID=0]) *(Thanks to Jerry Joyce)*

Interesting Crayfish Website and Poster From Ontario.
Check out [http://pinicola.ca/crayfishontario/craydentpage.htm] for a crayfish identification poster and information on nine different crayfish species of interest to the folks in Ontario, Canada. The 11"x17" laminated poster can be ordered ($10) or downloaded for free. *(Thanks to Kevin Aitkin)*

Major Upcoming (Invasive) Meetings

May 25-26, 2010: Columbia River Estuary Conference: Adaptive Management of Ecological Restoration. Astoria, Oregon. Call 503/229-0191 or [www.cbfwa.org].

June 10, 2010: Columbia River Basin/100th Meridian Team. Next meeting will be in Spokane, WA.

August 2-6, 2010: European and Mediterranean Plant Protection Organization (EPPO) 2nd International Workshop: Invasive Plants in the Mediterranean Type Regions. Trabzon, Turkey.

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

September 14-17, 2010. 6th European Conference on Biological Invasions NEOBIOTA. Copenhagen, Denmark. [http://cis.danbif.dk/neobiota2010].

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

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

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