

Introduced Fish Section

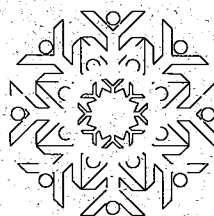
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American Fisheries Society

President's Message

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One of my jobs as newsletter editor for the past several years has been to harass the president into writing a "president's message". Now that it's my turn, I am beginning to realize the occasional reluctance of the president to conform. One reason is that there is so much going on with the IFS and the field of nonindigenous fishes as a whole that it's a struggle to keep up. So here is my best shot on IFS business for now!

IFS recently nominated **Peter Moyle** from the University of California Davis and past IFS president to the Invasive Species Advisory Committee (ISAC). AFS Executive Director Gus Rassam submitted the nomination package on behalf of AFS as a whole. The ISAC will provide advice to the Invasive Species Council as authorized by Executive Order 13112. Members of the ISAC will work in cooperation with stakeholders and existing organizations addressing invasive species. Good luck Peter!

Anyone interested in serving as an officer of the section is encouraged to submit their name as a candidate for either President-Elect or Secretary/Treasurer. The IFS will conduct its election with the next newsletter in March. Interested individuals can contact John Cassani at jcassani@peganet.com.

IFS together with the American Institute of Fishery Research Biologists will be proposing a symposium for the 2000 AFS annual meeting in St. Louis entitled "Aquatic Invaders: Entry, Impact and Control."

Dora Passino-Reader and **John Cassani** have agreed to be co-chairs. The objective of the symposium is to present current research on freshwater and marine aquatic invaders, both animals and plants. To examine modes of entry of invaders to aquatic systems, analyze their impact on native and established species, develop strategies for control, and evaluate control measures implemented to date.

Congratulations to **Charlie Brown** and **Don Baltz** for organizing the symposium "Nuisance Species: Are We Spectators, War



1999 Symposium organizers
Charlie Brown and Don Baltz

riors or Facilitators" at this year's AFS annual meeting in Charlotte. The symposium was well attended and the round table discussion afterwards generated new ideas for the Section and Society involvement. IFS President **Don Baltz** presented a plaque on behalf of IFS to the USFWS for their financial support of the symposium.

Congratulations to **Douglas Novinger** for winning the first IFS student paper contest. The contest was held in conjunction with the above mentioned symposium. Douglas hails from the University of Wyoming. His winning presentation was entitled "Exploring Competitive Mechanisms that Allow Nonnative Brook Trout to Displace Native Cutthroat Trout in a Rocky Mountain Stream". Douglas received a cash prize and certificate for his winning presentation. Also, thanks to the other student participants for their excellent presentations resulting in an extremely close final outcome. Kudos to students **Amanda Rosenberger**, **Cindy Kolar**, **David M. Warner** and **J. Jas-**

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**Student paper Contest Winner
Douglas Novinger**

per Lament. The IFS also thanks Hiram Li, Peter Moyle and Bruce Vondracek for serving as student contest judges.

Charlie Brown, Eric Hallerman, Pam Fuller and Don Baltz, have been asked to review a draft of the CALFED Nonnative Invasive Species Program on behalf of IFS. CALFED is the organization of state and federal agencies that have come together to work at rehabilitation of the San Francisco Bay-Delta. For more information on the CALFED Program, contact Kim Webb (USFWS) at kwebb@delta.dfg.ca.gov. Charlie Brown (isn't he wonderful) has also agreed to participate in the Ballast Water Management Value-Added through Partnerships Forum on behalf of IFS.

John Cassani



**IFS Round Table discussion at the
1999 AFS Annual Meeting**



Earlier this year, the office of the Great Lakes, Michigan Department of Environmental Quality, commissioned a report on exotic species laws and policies. The report, entitled Analysis of Laws and Policies Concerning Exotic Invasions of the Great Lakes, and authored by retired U.S. Coast Guard Commander Eric Reeves, is now available electronically for public comment at: <http://www.deg.state.mi.us/ogl>.

Please address any comments to Mark Coscarelli, Office of the Great Lakes, P.O. Box 30473, Lansing, MI 48909-7973; coscarem@state.mi.us; 517-335-4227; Fax 517-335-4053

INVASIVE SPECIES AFFECT LAKE ECOSYSTEMS

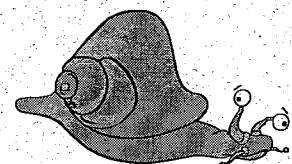
McGill University scientists have documented profound changes in lake ecosystems following the introduction of two exotic species, smallmouth bass and rock bass, into Canadian lakes. What's more, these changes may threaten native fish populations, particularly lake trout. In an upcoming article to be published in the prestigious journal *Nature*, Jake Vander Zanden and Joseph Rasmussen, together with a colleague from the Ontario Ministry of Natural Resources, John Casselman, reports that when bass are introduced into lakes, they prey aggressively on smaller fish, forcing lake trout to shift to energetically-poor foods such as invertebrates. "Bass consume many of the food organisms that the lake trout depend on and greatly reduce their abundance," explains Rasmussen.

"Human dominance over the Earth's ecosystems has been accompanied by the widespread introduction of

exotic species, which has led to the extinction of native species, the collapse of native fisheries and the loss of ecological integrity and ecosystem functioning," write the authors in *Nature*. "Ecologists are far from being able to predict, detect or measure the ecological impacts of species invasions. This is not surprising because natural food webs are variable and complex."

Whether the bass are introduced intentionally to stimulate the local economy by enhancing fish stocks or whether they are introduced inadvertently by dumping unused live bait, the consequences on the "food-web dynamic" i.e. the relationship between plants, animals and fish life around Canadian lakes, may be dramatic. "We have to be much more sensitive to the potential impact of invasive predators," say Vander Zanden and Rasmussen. "Predicting the impact of species invasions and other perturbations in natural food webs presents a formidable challenge to ecology. If we want to understand and measure what happens to the environment when we tamper with it, we need more broad-scale, systemwide ecological approaches."

The biologists describe traditional methods for examining the impact of species invasions as laborious, difficult and costly, and it has been a priority of the Rasmussen Lab at McGill to develop and apply stable isotope techniques to the study of environmental problems. These techniques are based on naturally occurring tracers and can identify pathways of energy flow efficiently and inexpensively. In this study, such techniques were applied to quantify the food-web consequences of recent invasions of bass in Canadian lakes. In their field sampling, Rasmussen and his colleagues believe they've developed a very sensitive indicator of environmental change.



NEW ZEBRA MUSSEL LOCATIONS

Although zebra mussels' spread in the US has slowed significantly, they are still being found in various areas of the country. It is important to report each of these findings to state officials and to the USGS national NIS database in Gainesville, FL (<http://nas.er.usgs.gov/zebramussel>). A sighting does not necessarily represent infestation, but it does indicate that this NIS is present and it is a reminder to monitor for colonization. Infestation is possible as long as some of the species are alive, but it isn't a certainty. Conditions may not be right for survival, reproduction and settlement. Sometimes conditions change after the zebra mussel settles; sometimes a new juvenile settles because the conditions are right. Sometimes a few zebra mussels are living in an area but their population density is so low that no one knows they are present. The point is that invasions happen and control depends upon monitoring. The following new locations were recently reported.

Wisconsin: Zebra mussels have been sighted in many Wisconsin lakes this year. In July, 1999, zebra mussels were confirmed at Lake Winnebago, in September at Lac LaBelle and Oconomowoc Lake, in October at Little Muskego Lake and Beulah Lake. Note that veligers were found in Beulah Lake in June 1995, but adults were not found until this year. In early November, a group of students in Appleton, Outagamie County, Wisconsin, found zebra mussels on the Fox River. Although the Fox River flows into Lake Winnebago at Appleton, the lake's zebra mussel population is not believed to have come from the river. In addition, zebra mussels established in the Fox River were introduced from the Great Lakes at its mouth at Green Bay and the mussels have not previously been found at Appleton, which is far downriver from Green Bay. Ron Martin, Wisconsin Department of Natural Re-

sources and Phil Moy, Wisconsin Sea Grant, 920-683-4697, pmoy@uwc.edu.

California: Although the number of annual sightings reported by the Department of Food and Agriculture in California has declined from a high in 1996 of seven to only 3 as of November, 1999, it is significant because it demonstrates possible dispersal vectors. The first sighting this year was in January on a boat being shipped out of Oakland to an unknown location overseas. Then, in October, live mussels were found on a boat trailer that originated in Michigan and dead zebra mussels were found on a sailboat that originated in Quebec. California continues to have no infestations although some zebra mussel sightings have been recorded every year since 1993. Jeffrey Janik, Department of Water Resources, 916-653-5688, jjanik@water.ca.gov, Marsha Gear, California Sea Grant, mgear@seamail.ucsd.edu.

*Reprinted from
Zebra Mussel Newsletter
November 1999*

ESCAPED ATLANTIC SALMON

On September 14, 1999, employees at salmon aquaculture operation near Port McNeil, BC, lost about 30,000 Atlantic salmon when strong currents ripped a hole in their net while harvesting the fish. Salmon farmers blamed the BC government for the accident, as the government had not acted on recommendations that would have allowed the fish farm to move to a safer site. The lost fish were valued at about \$1 million. BC's Fisheries Minister Dennis Streifel ordered an investigation of the accident. On Sept. 16, 1999, the WA. Senate scheduled a public hearing on escaped Atlantic salmon and whether they threaten native salmon.

(Assoc. Press.)

AQUATIC NON-NATIVE SPECIES UPDATE

(A monthly report for
Oregon Sea Grant Extension Faculty)

GREEN CRAB UPDATE

The National Shellfisheries Association, Pacific Coast Section and the Pacific Coast Shellfish Growers Association recently held a joint annual meeting in Vancouver, WA. Here's some interesting information from several papers presented on green crab:

Laura L. Hauck and Sylvia Yamada, OSU, reported on sampling techniques in Oregon bays. Use of a tethered snail predation line (reported in a previous ANS Update) gives the best natural estimation of predation rate at a given location, and allows comparison of predation from site to site. Crab species hitting the line are identified by their shell cracking technique when the lines are checked. Trapping followed the first method to verify the identity and presence of crab species. Rock turning was the third method used which yielded information on shore crab species. The last method used was to search for molts of a new year class at the high tide line.

Chris Hunt, OSU, discussed his findings on green crab distribution. It appears that green crab coexists in areas with the native Dungeness crab but appears to be absent, or limited, in areas suitable for another native crab, the Red Rock crab, *Cancer productus*. Although green crab appears to be abundant in areas with fewer of these larger crabs, it appears dense populations of adult red rock crab may be the primary limiting factor in the lower estuary for this new species.

Alex Kalin and Sylvia Yamada, OSU, presented information on the growth rate of Oregon coast green crab relative to other areas. Carapace width data collected from Oregon bays suggest that green crab is growing faster in Oregon than in the North Sea or Maine. Data support the theory that this species reaches sexual maturity within one year in Oregon, while in the North Sea and Maine sexual maturation may take two or three years. Molt increment data, however, suggests that growth per molt is constant in green crab populations regardless of geographic location. The molt increment statistical analyses lead to an inference that green crab molts more frequently in

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Oregon than in the North Sea or Maine.

Liz Carr and Brett Dumbauld, Washington State Department of Fish and Wildlife, reported that the two year classes first discovered last year in Washington's coastal bays are still present. Although mating couples and females with viable eggs have been found, little new recruitment has been noted. Catch per unit effort has declined as the population has apparently spread out in both estuaries making control efforts potentially more difficult. Trapping methods continue to be refined as the primary control technique.

Anita Cook and Sandra Hanson, Washington Department of Fish and Wildlife, described a large-scale Puget Sound green crab monitoring program established in 1999. The primary aim of this initial phase was thorough geographical sampling coverage of Puget Sound (including the Strait of Juan de Fuca and the San Juan Islands). This was accomplished by enlisting and training over 15 volunteer groups to set crayfish traps at more than 50 monitoring sites spread throughout the Puget Sound. Participants included non-profit volunteer organizations, shellfish growers, tribes, marine science centers, government agencies, schools, and the general public. In addition to providing information about the potential presence of green crab in Puget Sound, the trapping supplied some general baseline data about populations of small native crab in the sampling areas. In the year 2000 WDFW will focus on increasing the number of sample sites (for higher potential of discovering green crab presence), identifying sites with the highest likelihood for introductions, and examining other green crab detection techniques.

SPECIES PROFILE: ASIAN COPEPOD

Not all invasive species reveal themselves through clogged waterways, fouled nets, or other obvious visual impacts. By virtue of their hidden potential, microscopic ANS may even be more of an invasion threat. Of equal concern is the lack of information

regarding the impact these species may be having. *Pseudodiaptomus inopinus*, one of many species referred to as the Asian copepod, is a local case-in-point.

In 1990, University of Washington biologist Jeff Cordell discovered *Pseudodiaptomus inopinus* in the Columbia River estuary. This species is widespread through Northeast Asia, where it inhabits freshwater lakes, rivers, and certain estuaries. Cordell estimates that the non-native copepod entered the Columbia River at some point in the 1980's -- ballast water from ships is a very likely introduction source.

During 1991 and 1992, Cordell and others sampled the tidal reaches of 18 Pacific Northwest rivers. Sampling occurred during autumn, when this species was most abundant in the Columbia River and native habitats. All five Oregon estuaries sampled - the Coos, Umpqua, Yaquina, Tillamook, and Youngs in Oregon - contained *P. inopinus* populations. No evidence of the species was found north of the Snohomish River estuary in Washington. *P. opinus* comprised over 65% of zooplankton collected in the water column by net in the Yaquina estuary, and nearly 100% of the zooplankton collected in Washington's Chehalis River. This species was less represented in other Oregon estuaries, ranging from 3-10% of the zooplankton gathered by net. Asian copepods were less abundant overall in samples collected by near-bottom pumps. At all Oregon locations, samples included juvenile and adult *P. opinus*, as well as ovigerous females (actually or capable of carrying eggs). Temperature and salinity appear to most affect distribution of this copepod. Rivers bearing *P. opinus* during Cordell's survey had an average autumn temperature of 19.3 degrees C and salinity intrusion zone over 1 km. in length; rivers without this species had shorter salinity intrusion zones and an average temperature of 12.4 degrees. Although *P. opinus* were found in high densities (over 1000/cubic meter) among a range of salinities, highest numbers (nearly 1 million/cubic meter) occurred near the upriver limit of salinity intrusion.

So - why worry? The presence of *P. inopinus* in Oregon waters lacking commercial ship traffic indicates that

ballast water is not the only means by which they can spread their range. Again, one can only speculate about impacts at this point. Where *P. inopinus* have become dominant members of the plankton community, they therefore are likely important prey items for fish such as juvenile salmon. What has happened to native plankton? As a non-native species that is less adapted to Pacific Northwest conditions, what might happen if *P. opinus* populations suddenly crash due to an extreme disease, weather, or other event? A recent failure in recruitment of striped bass (admittedly, another non-native species) in the Sacramento-San Joaquin estuary points the finger in part to the displacement of native copepods by two other introduced species of Asian copepod species. Studies have found that behavioral differences between these introduced species and native copepods lead to feeding inefficiencies by larval striped bass. Invasions by other non-native zooplankton species in the Great Lakes have also led to fishery impacts. What other ANS may be lurking among estuarine plankton, undetected unless passing by the view of a microscope lens? Bacteria? Viruses? The case of *P. inopinus* illustrates the need for ANS prevention and detection efforts to also deal with the minutia of life.

Oregon Sea Grant Newsletter

MEETINGS

The 10th International ANS and Zebra Mussel conference takes place from February 13-17 in Toronto, Ontario. Conference information and the preliminary program can be found at <http://www.zebraconf.org>

An ANS session is on the agenda for the National Shellfisheries Association meeting scheduled for March 19-23, 2000 in Seattle. Note that an associated Green Crab Forum may be scheduled during or immediately after the NSA meeting.

Planning continues for the 61st Annual OSU Biology Colloquium, scheduled for April 12, 2000 in Corvallis and focused on biological invasions (terrestrial and aquatic)

Oregon Sea Grant Newsletter

**INTRODUCED FISH SECTION, AMERICAN FISHERIES SOCIETY,
BUSINESS MEETING MINUTES, SEPTEMBER 1, 1999**

1. Convene. Section President Don Baltz convened the meeting at the Adam's Mark Hotel in Charlotte, North Carolina at 5:20 p.m.
2. Introduction of past presidents. Eric Hallerman and Peter Moyle were introduced as past presidents in attendance.
3. Quorum Determination. Thirteen section members were present at the meeting.
4. Business Meeting Agenda was approved.
5. Approval of minutes. Motion to approve minutes from 1998 Business Meeting in Hartford was made by Peter Moyle, motion was seconded by John Epifanio and approved by voice vote.
6. President's Comments.
 - Section membership needs to increase.
 - Recruitment award results have not been tabulated.
 - Section Activities 1998-1999:
 - The section co-sponsored the Virginia AFS Chapter's Introduced Aquatic Species conference in September, 1998;
 - A section election was held; John Cassani is the president-elect and Charlie Brown is the secretary-treasurer.
 - The IFS put together a press release issued by AFS associated with Executive Order 13112 on invasive species.
 - Charlie Brown represented the section on the Recreational Activities Committee of the Aquatic Nuisance Species Task Force.
 - At the 1999 AFS Annual Meeting the section conducted the symposium "Nuisance Species: Are We Spectators, Warriors, or Facilitators?"
7. Treasurer's Report. Charlie Brown submitted the Treasurer's Report and Budget Summary for 1998-1999.
8. Best Student Paper Award. Don Baltz presented the Best Student Paper/Poster Award to Douglas C. Novinger from the Department of Zoology and Physiology at the University of Wyoming. The title of Doug's paper which he co-authored with Frank J. Rahel was "Exploring Competitive Mechanisms That Allow Nonnative Brook Trout to Displace Native Cutthroat Trout in a Rocky Mountain Stream."
9. Recognition of immediate past president. Don Baltz displayed a plaque that will be presented to Anna Toline in recognition of her accomplishments as section president for 1997-1998.
10. Plaque of appreciation. Don Baltz remarked that a plaque was presented earlier that day to Cathy Short of the Aquatic Nuisance Species Task Force and the Fish and Wildlife Service in appreciation for sponsoring the section's symposium at the Annual Meeting.
11. Installation of new officers. Don Baltz installed John Cassani as the section president and Charlie Brown was installed as the secretary-treasurer.
12. New business.
 - Jeff Koppleman made a presentation regarding the Black Bass Symposium at the 2000 AFS Annual Meeting. All AFS sections, chapters, and divisions have been solicited to assist with funding this symposium. Bob Wattendorf motioned that the section provide \$500 to sponsorship of the Black Bass Symposium. The motion was seconded by John Epifanio and passed by voice vote. It was then decided that the letter accompanying the funds stipulate that, if possible, the section's contribution be dedicated to IFS section members who are participating in the symposium. Peter Moyle and John Cassani will help place speakers from the section in the symposium.
 - John Cassani pointed out that there is a backlog of articles at the Transactions of the American Fisheries Society. It is estimated that it will cost \$20,000 to add extra pages so that the backlog can be reduced. A motion was made by Eric Hallerman that the section contribute \$250 toward the Transactions backlog, the motion was seconded by Peter Moyle, and the motion passed by voice vote.
 - John Cassani brought up for discussion the possibility of distributing the section newsletter by e-mail. E-mail addresses of the section members can be obtained from AFS headquarters. Jaci Savino remarked that the Michigan AFS Chapter distributed their newsletter electronically. An Electronic Communications Committee was formed with Eric Hallerman, Bob Wattendorf, and John Cassani the initial members.
 - Ideas for a section symposium at the 2000 AFS Annual Meeting were discussed. Among the ideas were to emphasize the economic effects of introduced species and how to best educate others outside of the section on the benefits/drawbacks of introduced species. John Cassani will take the initial steps in organizing a symposium for the 2000 meeting.
 - It has been several years since the Position of the American Fisheries Society on Introduced Aquatic Species has been reviewed. Charlie Brown suggested that an initial look be taken to see if the position statement remains as relevant as when it was last reviewed. Hiram Li, Peter Moyle, and Charlie Brown will review the statement and develop a recommendation regarding whether or not a revision of the position statement by the section and AFS is warranted.
 - A newsletter editor is needed. John Cassani has filled this role for quite some time, and is also currently the section president. Pam Fuller is willing to assist the new editor in gathering information for the newsletter.

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- Section officer elections need to be held in November, or soon thereafter.
- Peter Moyle suggested that the section's web site be improved. Eric Hallerman is willing to approach Doug King, currently the section's web-master, at Virginia Tech University for his thoughts on continuing to serve the section. Bob Wattendorf is willing to assist with encoding. The need for a Web Site Committee was discussed.
- John Cassani requested that any thoughts regarding a Five Year Strategic Plan be brought to his attention.
- Hiram Li suggested the possibility for a discriminate analysis workshop, perhaps at a future annual meeting.
- John Epifanio mentioned that the National Invasive Species Act will up for reauthorization in the near future, and that the section may want to begin thinking about what the next version of this law should contain.

13. **Adjournment:** The meeting was adjourned at 6:35.

Minutes respectfully submitted

/s/ Charles L. Brown

Secretary/Treasurer

NIS DATABASE IS PROGRESSING

Pam Fuller is continuing her update of the USGS Nonindigenous Species Data Base, <http://nas.er.usgs.gov>. The fish portion of the data base has been the focus of recent attention with significant modification. Pam is seeking missing photos for a number of fish species and would appreciate IFS members getting in touch with her if they have photos they can share. Reviews for map distribution and corrections are welcome. Contact Pam Fuller at (Pam_Fuller@usgs.gov).



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