

Introduced Fish Section

American Fisheries Society

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President's Corner

Hello IFS members. I hope your year is busy and going well. I have been thinking about our potential activities for the year.

Annual Meeting

I am requesting feedback on two potential ideas. First, the idea of a workshop as discussed at our business meeting in Monterey. In general, the workshop would focus upon reintroduction and augmentation of native species. I am very familiar with these activities at my own local level, but am interested in what experience others in the Section may have. I am quite sure that I can get one speaker other than myself to participate. I think one or two more would be a great benefit. Additionally, despite this late date, I think there may still be time to put forth a recommendation for a symposium sponsored by our Section. I will contact the Program Chair and offer a proposal. I would suggest a focus on either the effects of non-natives on native species or the effects of non-natives on amphibians. I am more than willing to participate and am looking for others with an interest. What do you think?

Membership

One of our most serious issues is membership. I propose that we use the diversity of interests within the Section to target student membership. I think that very few students are approached by particular Sections and are likely to take an interest in those Sections that take an interest in them. I think if they are ex-

posed to the potential of having a voice they will be willing participants. I recommend that each of us volunteer to target one or two students to attend the business meeting in Hartford. The interests of our members are so diverse (management, conservation, aquaculture, genetics etc.) that I think many of us will be attending very different sessions at the annual meeting. More often than not, a few students speak at each session. I would recommend that we approach these students and invite them to attend the meeting. If their talks are after the meeting, approach them anyway and let them know what the Section is about. At the very least, they will likely take a look at the web page. We could follow up with an email. Please drop me a note and let me know what you think.

Bylaws

We were officially notified that our request to amend our Bylaws to add an affiliate membership category was approved. We will revise our Bylaws to reflect the requested change.

Web-site of interest

As you cruise through the internet take a look at what the Desert Fishes Council has to offer. For those of you unfamiliar with the society, it focuses on aquatic desert species but the information obtained through the homepage and its links includes species of fish from all over. This group focuses heavily on conservation and is useful to anyone interested in either fish or conservation.



#1860

Exotic Seaweed,

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else disappears. There are no more sea

anemones, starfish, crabs, shrimps and very few fishes."

Biologists in Nice are prepared to send out an army of Caribbean Snails. The theory is that they would gobble up the seaweed, then die from cold in winter. But French officials aren't convinced.

As some would say in California, 'Well duh!'

Reprinted from the *San Francisco Chronicle*, 10/97

FAO DATABASE ON INTRODUCTIONS OF AQUATIC SPECIES

The FAO Database on Introductions of Aquatic Species (DIAS) is available to Web users at:

[http://www.fao.org/waicent/
faoinfo/fishery/statist/fisoft/
dias/index.htm](http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/index.htm)

The database can be searched through the Search Form and users can send new data not already included in the database by filling in the Input Form. Other Web pages on "Highlights on Introductions", statistics on the database and a glossary are linked to the Home page. It is located through the FAO Fisheries Home page selecting "Databases and Statistics" where DIAS is listed with other "on-line Databases."

This Web site is expected to grow as users provide new records of introductions and as new information and relevant publications become available. In light of the international interest in introduced species by groups such as the Convention on Biological Diversity, NGO's and the private aquaculture sector, this site represents an important source of information on both the benefits and risks of species introductions.

Details are in preparation to explain the data structure for those who need the complete database on disk. Feedback from Internet users of DIAS, or

Organizations interested in access to the complete database, or Organizations without full Internet access should address inquiries to devin.bartley@fao.org

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TEXAS SHRIMP ESCAPE

In early October, 1997, the Texas Department of Parks and Wildlife confirmed the presence of non-native Pacific white shrimp in Matagorda Bay. This species is cultivated by Texas shrimp aquaculture operations and are believed to have escaped from or been released by one or more of the four shrimp farms located in the vicinity of Matagorda Bay. [Wall Street Journal]

SURVIVAL STRATEGIES FOR AGE-OLD SHASTA CRAYFISH

Strategies for recovering California's last remaining crayfish are spelled out in a draft plan now available for review from the U.S. Fish and Wildlife Service. The endangered Shasta crayfish is protected by both the Federal and California endangered species acts.

Primary threats to this animal include the introduction of non-native crayfish and fishes and water diversion projects. Shasta crayfish are believed to have remained relatively unchanged during the period of recorded time. They live primarily in cool, clear, spring-fed headwaters with clean volcanic cobbles and boulders on top of sand or gravel. A

number of conservation efforts exist with potential to benefit Shasta crayfish. Since 1981, the midsections of the Pit River have been closed to crayfishing and the use of crayfish as bait, although some areas are now open for crayfishing where introduced species have become abundant.

Non-native signal crayfish invaded the Sucker Springs Creek population in 1996. Actions needed to prevent the crayfish's extinction include protecting populations by eradicating or preventing invasions by non-native crayfish, restoring habitat, eliminating impacts from land management practices. All comments and requests for plans should be addressed to the Field Supervisor, Sacramento Fish and Wildlife Office, 3310 El Camino Avenue, Suite 130, Sacramento, CA 95821-6340. Comments must be received by December 29, 1997.

Reprinted from *USFWS News Release*

CALIFORNIA FISH KILL MOUNTS AFTER POISONING BY STATE

PORTOLA, Calif., October 16. Thousands of dead and dying fish were scooped from the surface of picturesque Lake Davis today, poisoned by California Wildlife officials in an effort to stop the voracious Northern pike from wiping out the state's trout and salmon fisheries.

The poisoning of this reservoir in the eastern foothills of the Sierra Nevada triggered an angry confrontation Wednesday between law enforcement officials and local residents, who depend upon the lake as their principal drinking supply. The state is providing an alternative source of drinking water to residents that will last for several months.

But today, only a handful of local residents from this nearby community of 2,500 watched glumly as state workers, in boats, began to skim dead pike, trout and other fish from the lake and load them into plastic bags. Officials

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California Fish Kill,

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said the cleanup process will take about 10 days.

State officials said the poisoning was necessary to prevent the pike from getting into nearby rivers and the mammoth Oroville Reservoir, which is a principal storage site for California's waterways. If this happened, they said, the pike would quickly destroy native species of rainbow trout and salmon. Pike are not native to the West and officials speculate they may have been introduced into the lake by a pike-loving fisherman who didn't realize they would destroy the trout for which this lake is famed. Dead pike easily outnumbered trout floating on the surface of the lake today.

"It's like the Alamo," said Tim Tyson, a California highway patrolman, who was guarding Grizzly Dam, behind which the waters of the man-made Lake Davis are stored. "If the Northern pike get out of here, it's all over for the California fishery."

But opponents of the project, including local residents who for two years tried to block the state from poisoning the lake, saw a different kind of precedent.

"It's a disgrace for the state of California to put a known cancer-causing agent in the drinking water," said Fran Roudebush, who represents the Portola area on the Plumas County Board of Supervisors. Roudebush said that while most local residents support the effort to rid the lake of the steel-jawed pike, they wanted to do so by using a pesticide that does not contain a known carcinogen. The state Fish and Game Department is using an older, powder form of the pesticide rotenone, which contains the cancer-causing ingredient trichloroethylene, or TCE.

The Environmental Protection Agency prohibits TCE from being used in pesticides manufactured today, but old supplies of rotenone that contain TCE may still be used. The poison causes all organisms that breathe through gills to suffocate.

Even if the pike in Lake Davis are totally wiped out, it is by no means certain that the problem will be stopped.

Curtis said the department was "worried" about the recent discovery of a Northern pike in the Truckee River near Reno, 50 miles from here, and was conferring with Nevada officials about the possibility of a pike invasion.

The controversy has caused considerable anguish in the Fish and Game Department, which usually is seen as a protector -- not destroyer -- of wildlife. Patrick Foy, a department biologist, acknowledged that officials did not like to be cast in the role of poisoners but said that stopping the pike in Lake Davis was a "necessary act of biological preservation."

Foy said that a similar poisoning in 1991 at Frenchman Reservoir, some 15 miles to the southwest, had been successful and that reports of Northern pike being seen recently there were mistaken. Anglers had caught another, less troublesome fish known as a squaw fish. Frenchman Reservoir, unlike Lake Davis, is not used as a drinking supply. Foy also said the lake will be restocked with rainbow trout as soon as tests show that it is safe to do so, probably early in December.

Reprinted from *GREENline*

ZEBRA MUSSELS

In early September 1997, the U.S. Geological Survey released a new status report on zebra mussels, indicating that they have been detected in 19 states, with zebra mussels found in 13 additional inland lakes during the last year. [Assoc. Press]

ESCAPED BLUE SHRIMP

In mid-September 1997, South Carolina Natural Resources Department biologists reported that nearly two dozen Venezuelan blue shrimp had been caught in Charleston County, South Carolina, waters in the past week. These shrimp were thought to have escaped from shrimp farms and raise concern that they may carry non-native virus that could infect native shrimp. [Assoc. Press]

NEW PUBLICATIONS FOCUS ON AQUATIC NUISANCE SPECIES RESEARCH AND INFORMATION/ EDUCATION

ANN ARBOR, Mich. The Great Lakes Panel on Aquatic Nuisance Species has released four new publications addressing aquatic nuisance species and their effects on the Great Lakes and other inland and coastal waters.

Inventories are now available listing research and information/education materials on aquatic nuisance species in the Great lakes region. Both reports also include detailed, panel-approved recommendations for strengthening regional ANS research and public education efforts.

The panel's highly popular Biological Invasions brochure has been updated and reprinted. This full-color publication provides a comprehensive overview of the ANS issue and is ideal for communicating with both policymakers and the general public.

In addition, the panel has released its 1996 annual report, which summarizes panel initiatives as well as the ANS-related activities of federal, state, and provincial agencies and organizations in the Great lakes Basin.

Aquatic nuisance species pose a serious and growing threat to the Great Lakes Basin ecosystem. Exotic animals and plants, such as the zebra mussel, ruffe and purple loosestrife, have widespread effects on native species as well as documented economic impacts.

According to a Panel Chair Mark Coscarelli of Michigan's Department of Environmental Quality, Great lakes jurisdictions have been at the forefront of efforts to control aquatic nuisance species and minimize their effects. "These publica-

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Aquatic Nuisance Species

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tions highlight our accomplishments and the challenges we face," he says. "As other regions confront the ANS threat, I urge them to learn from the Great Lakes experience and take advantage of the resources available to address this critical issue."

Please see complete descriptions of the publications, cost, and ordering information below.

****Aquatic Nuisance Species Research Relevant to the Great Lakes Basin: Research Guidance and Descriptive Inventory.** A descriptive listing of 250 ANS-related research projects and a series of detailed findings and recommendations concerning research gaps and needs related to the collective, regional research effort. Intended for agencies and institutions that conduct, manage, fund or apply aquatic nuisance species research. 125 pages, plus appendices. Cost: \$15 U.S. / \$20 Can.

****Aquatic Nuisance Species Information and Education Materials Relevant to the Great Lakes Basin: Recommendations and Descriptive Inventory.** Descriptive listing of 292 publications, including brochures, fact sheets, posters, signs, reports, classroom/audio-visual materials, newsletters and public service announcements. Topics addressed include the major aquatic nuisance species in the Great Lakes, as well as ANS policies and regulations, ballast water management, monitoring, and prevention and control. The report is intended for agencies, organizations and other entities involved in ANS public information and outreach. 69 pages, plus appendices. Cost: \$15 U.S. / \$20 Can.

****Biological Invasions.** Provides a comprehensive overview of how aquatic nuisance species are entering North American waters, their environmental and economic impacts, and recommendations for strengthening prevention and control efforts. Originally published in 1996, this eight-page, full-color brochure has been updated and reprinted to reflect the passage of the national Invasive Species Act and other recent developments. Cost: First copy free,

additional copies \$1 with a 10 percent discount on orders of 10 or more.

****1996 Annual Report of the Great Lakes Panel and Aquatic Nuisance Species.** Summarizes current initiatives and accomplishments of the Great Lakes panel. Includes policy positions, an information and education strategy, recommendations on funding and program issues, and updates from other entities working on ANS issues. Covers the period September 1995 through August 1996. 33 pages, plus appendices. Cost: \$5 U.S. / \$7 Can.

All publications are available upon request from the Great Lakes Commission, 400 fourth Street, Ann Arbor, MI 48103; phone 313-6659135, fax 313-665-4370, email: mdoss@glc.org.

Reprinted from *Fish Ecology List Server*, 9/25/97

US OYSTER FARMS FEAR GREEN CRAB

AN INVADING European green crab that preys on young shellfish is this summer's big new threat to U.S. west coast oyster farms.

Discovered initially in San Francisco Bay, the green crab has over several seasons multiplied and moved north. In March, the first to be identified in Oregon was found inside a mesh oyster set.

Now a task force in Coos Bay, Oregon's southern oyster centre, is warning farmers of this peril. The state leases 3500 acres of tideland to some 35 growers who produce 40,000 gallons of oyster meat annually.

"We never saw this crab before," said Tim Smith of the Pacific Coast Oyster Growers Association. "It has strong pincers that can crack a young oyster like nothing."

Tolerant of wide temperatures and salinity, *Carcinus maenas* has been spreading north towards Yaquina Bay and Tillamook Bay, where 90% of Oregon's shellfish are produced.

Bay task forces are preparing for the menace. Green crab tops the

growing list of problems faced by farmers. Already they must contend with mud and ghost shrimp infestations, and not infrequent closures.

Despite obstacles, oyster output is increasing. Coos Bay growers have been encouraged by a recent \$12m upgrading of sewage treatment, and water quality has improved. Nonetheless oyster closures due to pollution are on the rise.

This is due to the implementation of a state-wide shellfish sanitation scheme, which the oyster industry helped develop. Through it grows to little more than 3in across, the European green crab may in the long run prove as difficult to combat.

Reprinted from *Fish Farming International*, August 1997

HYBRIDS CONSUMMATE SPECIES INVASION

by Wade Roush

BOULDER, COLORADO -

When biologists think of comings and goings of species they often think of war - of new species invading and pushing out the old. In mid-western lakes, however, love seems to be the driving force. In lake after lake, an invading crayfish species is pushing local crayfish to extinction. But biologists at the University of Notre Dame in Indiana are finding that the local crayfish are having their own effect on the invader, as the two species produce a new population of vigorous hybrids.

The finding is a surprise, researchers say because ecologists often expect animal hybrids to be sterile, unable to play more than a bit part in species invasions. But at the annual evolution and natural history meetings here,* William Perry, a graduate student in the labs of ecologist David Lodge and biologist Jeff Feder, described molecular studies showing that hybrids of Kentucky native *Orconectes rusticus*, or the rusty crayfish, and a native crayfish, *O. propinquus* (the blue crayfish), are indeed fertile.

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Species Invasion

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Other work by Perry, Lodge, and Feder suggests that these hybrids are outcompeting both natives and invaders. The rusty crayfish, it appears, is taking over by assimilation.

That's useful information for conservation, notes Christopher Taylor, a crayfish systematist at the Illinois Natural History Survey, because rusty crayfish and similar intruders are slowly pushing natives to extinction: Of the 340 species of crayfish found in North America, about 30 may soon be completely eliminated by invaders, which usually arrive in new lakes as bait brought by anglers. "If we know how they are doing it," say Taylor, "maybe we can think of a way to slow them down."

Researchers noticed 2 decades ago that some Wisconsin crustaceans are intermediate in color and in the size of various body parts between the larger rusty crayfish - which first appeared in northern lakes in the 1960's - and the blue crayfish. That suggested to Lodge and his colleagues that invading and local species sometimes interbreed. But rusty crayfish themselves vary greatly in form, making it difficult to identify hybrids reliably. So the extent of hybridization remained unclear, and in any case, hybrids were assumed to be less important than other species-replacement mechanisms.

But when Perry collected specimens from some Wisconsin lakes and analyzed enzymes that serve as distinctive species markers, he found that extensive hybridization is under way between rusty and blue crayfish. Further comparisons revealed that backcrosses between hybrids and rusty crayfish were nearly as common as first-generation hybrids, indicating that hybrids are fertile and that they tend to mate with rusty crayfish rather than with each other. Together, the first-generation hybrids and backcrosses accounted for 30% of the crayfish in one lake.

From laboratory observations, Lodge and his colleagues had thought that most of the interspecies matches would be between the large, aggressive

rusty males and the blue females. But when Perry examined the hybrids' mitochondrial DNA - which is inherited only from the mother he found, to his surprise, that 89% were offspring of the opposite match, between rusty females and native blue males. "We were looking for love in all the wrong places," he quips.

The apparent prowess of the hybrids may be speeding the invasion. When Perry put rusty and blue crayfish in tanks with similarly sized hybrids, the hybrids beat both species in competition for food - such as insects and aquatic plants - and for shelter under rock piles. "They are actually more competitive than the invader," says Perry. "They're pretty nasty." The crayfish invasion may start with love, but it ends up in war after all.

*Joint meetings of the Society for the Study of Evolution, the American Society of Naturalists, and the Society of Systematic Biologists, Boulder, Colorado, 14-18 June.

Reprinted from *Science*, Vol. 277, 18 July 1997

CLOSING THE DOOR TO NUISANCE FISH IN CHICAGO

The introduction and spread of aquatic nuisance species across North America has accelerated rapidly in the later half of the twentieth century. Many of these unwanted translocations have been facilitated by increased shipping traffic and interbasin water transfers. The round goby, a fish native to Eurasia, is among the most recent of these opportunistic species to establish expanding populations at distant sites around many portions of the Great Lakes. These small, bottom dwelling fish are aggressive feeders that prey upon vulnerable life stages of native fish species. Populations of mottled sculpin, a species native to the Great Lakes that occupies a niche similar to that of round goby, have already declined at certain goby infested sites.

Dense concentrations of round goby (up to 50 fish/m²) occur along portions of the southwest shore of Lake

Michigan between Chicago, Illinois and Gary, Indiana. The range of this lacustrine population has started to expand into the headwaters of the Illinois Waterway System (IWS) and the Mississippi River drainage basin. This is the same path that was taken by the now infamous zebra mussel, another Eurasian native, earlier this decade. In the wake of the ecologic and economic harm caused by zebra mussels, there is increasing concern for the potential adverse impacts of round goby should their range expand widely to other portions of the Mississippi River Basin. Conversely, fauna and flora native to the Great Lakes may be similarly at risk from populations of other exotic species that now reside in portions of the IWS (e.g., big head carp, grass carp) and have the potential to move upstream into Lake Michigan.

Limited surveillance of round goby distribution in the IWS was started in October 1996 and expanded in June 1997. These cooperative efforts were organized by the U.S. Fish and Wildlife Service and included partners from several local, state, and federal natural resource agencies, as well as members of academia and public interest groups. The results of both surveys indicated the range of round goby extended downstream to river mile 321 of the Little Calumet River, about 12 miles inland from Lake Michigan. Round goby were not captured in connecting channels downstream of this point, as far away as Joliet (river mile 286), nor in upstream portions of the Chicago Ship and Sanitary canal, Chicago River, and North Shore Channel. This information will help guide members of an interagency task force charged with enacting measures to prevent and reduce the spread of round goby and other nonindigenous aquatic nuisance species between the Great Lakes and Mississippi River basin.

Electrical barriers and limited use of fish toxicants have been identified as the most environmentally sound methods of round goby control in the IWS. However, the window of opportunity for successfully implementing these actions is small and diminishing daily. Feasibil-

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