



Introduced Fish Section NEWSLETTER

Editor: Tye Jurgensen

USGS Upper Midwest Environmental Sciences Ctr., 2630 Fanta Reed Road, La Crosse, WI 54603

tajurg03@smumn.edu

Vol. 21 No. 1
June 2004

INSIDE

President's Message	1
Introduced Fish Section at AFS 2004	1
Exotic Species in Lake Champlain.....	2
Asian Carp Research In Process	2
Snakeheads found in Maryland and Wisconsin.....	2
Chicago Sanitary and Ship Canal Dispersal Barrier	2
Introduction Updates.....	3
Introduced Species in Chile's Freshwaters – The Need for Research.....	3

INTRODUCED FISH SECTION

President:

Phil Moy
University of Wisconsin - Manitowoc
705 Viebahn St, Manitowoc, WI 54220
(920) 683-4697
pmoy@uwc.edu

Secretary- Treasurer:

Pam Fuller
USGS Florida Caribbean Science Ctr.
7920 NW 71st St, Gainesville, FL 32653
(352) 378-8181, ext. 312
Pam_Fuller@usgs.gov

Past-President:

Cindy Kolar
USGS Upper Midwest Environ. Sci. Cntr.
2630 Fanta Reed Rd, La Crosse, WI 54603
(608)-783-7550, ext. 34
ckolar@usgs.gov
Jacqueline_Savino@usgs.gov

Nominations Sought for Officers

The office of vice president is currently vacant and our treasurer Pam Fuller, would like to step down. If you are interested in either of these positions or wish to nominate someone, please contact Phil Moy at pmoy@uwc.edu.

President's Message

By Phil Moy

During the last 9 months I attended the governing board meeting at the August AFS meeting in Quebec City for Cindy Kolar who was trapped in a flight fiasco on her way to the meeting. There were not enough IFS members at the Quebec City section meeting to make a quorum. In fact only three people came to the meeting, probably because the social and other Quebec City options were more attractive than attending a dreary business meeting.

I also attended the midyear governing board meeting in Maryland. The bylaws revision as circulated to the Section members in December was approved by the AFS Governing Board at the March meeting in Rockville, Maryland. We worked with Dirk Miller, the AFS constitutional consultant to assure that the format of the bylaws more closely match those of other AFS sections.

The membership of the Introduced Fish Section has fallen below 200. The 200 member number is important because below this "critical mass" the section loses voting privileges on the governing board. Please renew your memberships and encourage others to join the section.

Introduced Fish Section at AFS 2004

The Introduced Fish Section Asian Carp Symposium for the 2004 AFS meeting in Madison came together very nicely. We will have 21 presentations in a full-day session on Wednesday, August 25th. The Introduced Fish Section meeting will be Sunday afternoon August 22nd from 1 to 3 PM at Monona Terrace in meeting room C.

Overall the 2004 meeting planning activities are going well. We will have an excellent program with 24 symposia with more than 400 oral presentation, over 300 contributed papers and 107 posters. Online registration and the program for the 2004 AFS meeting are now available at www.afs2004madison.org. The Hilton hotel, the closest to Monona Terrace is almost fully booked. The Concourse and Best Western are within easy walking distance. The Sheraton Hotel is a good hike and shuttle buses will be available.

Introduced Fish Position Statement

Two years ago in Baltimore, we discussed updating the AFS Introduced Fish Position Statement. Though a handful of people at that meeting expressed interest in moving forward with that effort, nothing has since transpired. At our section meeting in August Phil Moy would like to take the issue up again and move forward in a better coordinated effort.

Exotic Species in Lake Champlain

J. Ellen Marsden, University of Vermont

Mark Malchoff, Lake Champlain Sea Grant

Michael Hauser, Vermont Department of Environmental Conservation

Lake Champlain lies in the St. Lawrence drainage basin, yet is sufficiently isolated geographically from the Great Lakes and commercial waterborne traffic that it has not received the same barrage of exotics species as the upper lakes; the lake is estimate to contain only 44 exotics. Nevertheless, 60% of the 25 invaders for which invasion routes can be guessed at entered the lake via the Champlain or Chambly canals that link the lake to the Hudson River and Erie Canal to the south, and the St. Lawrence River to the north. These species include white perch, gizzard shad, blue-black herring, zebra mussels, faucet snails, and water chestnut. The most recent invader to possibly use this route is the brook silverside, discovered throughout the lake in 1998. Exotic species have also invaded by 'traditional' routes such as stocking (brown trout, rainbow trout), bait buckets (probably the source of European rudd and rusty crayfish), accidental release from culture (goldfish, tench, big-ear radix), use of ornamental plants (purple loosestrife), and unauthorized deliberate introduction by fishermen (alewife, introduced into the Lake Champlain basin in 1997). While several of these species have had minimal or poorly understood impacts on the lake ecosystem, others (such as sea lamprey, water chestnut, and zebra mussels) have had severe ecological, economic, and nuisance effects. To prevent future invasions, use of bait has been addressed with new legislation, and accidental and unauthorized releases may be reduced by public education programs. Future introductions via the Champlain Canal could be reduced or eliminated by placing a biological barrier on the canal. A survey of possible technologies, coupled with stake-

holder surveys and a cost-benefit comparison of barrier options, is currently underway.

Asian Carp Research In Process

By Walter R. Courtenay

U.S. Geological Survey biologists Cindy Kolar, Walt Courtenay, and Jim Williams are currently preparing a biological synopsis and risk assessment on bigheaded carps (genus *Hypophthalmichthys*) for the U.S. Fish and Wildlife Service. All three species (*H. harmandi* [largescale silver carp], *H. molitrix* [silver carp], and *H. nobilis* [bighead carp]) are included.

Snakeheads found in Maryland and Wisconsin

Three northern snakehead fish were found in the Potomac River in Maryland this month. You may recall the same species was found in a pond in 2002, prompting the Maryland Department of Natural Resources to drain and poison the pond. Using toxins to eradicate the fish from the river using is not an option. Officials and local anglers fear the worst for the resident fish population.

A giant snakehead fish was captured by Wisconsin DNR staff during regular monitoring last fall on the Wisconsin River. The fish was mistakenly identified as a bowfin and released. An intensified effort to recapture the fish produced no results.

Chicago Sanitary and Ship Canal Dispersal Barrier

By Phil Moy

The electric dispersal barrier in the Chicago Sanitary and Ship Canal appears to be operating well, however the electrodes are expected to wear out sometime after April 2005. Of 106 radio tagged common carp in the canal only one has passed through the electric barrier. This occurred during passage of a barge. Subsequent field tests indicted barges do affect the integrity of the electric field which extends to the surface from electrodes at the bottom of the canal. Small-scale tests conducted at the Illinois Department of Natural Resources Jake Wolf Fish Hatchery demonstrated that small silver carp can move through the field created by the existing electric array. A second, larger and more powerful electric barrier is slated for construction this summer. The second array as designed will address problems created by barges and will better deter passage of small fish (<x12 cm).

Three species of Asian carp that escaped from culture ponds are causing concerns in the upper Mississippi River and Great Lakes region. The bighead carp (*Hypophthalmichthys nobilis*), silver carp (*Hypophthalmichthys molitrix*) and black carp (*Mylopharyngodon piceus*) are expanding their range in the Midwest. Well adapted to life in the river, they grow quickly and their populations and rapidly expand. These planktivorous fish may compete with native species for forage and interfere with traditional commercial fisheries. The tendency for silver carp to jump in response to boat motors makes them a hazard to navigation.

An Asian Carp Rapid Response committee has developed a plan that could be implemented if these fish are found in the Lockport Pool on the Chicago Sanitary and Ship Canal to prevent these fish from becoming established in the Great Lakes. The

plan involves application of rotenone to a 5.5 mile section of the canal which would eliminate essentially all fish from that reach of the canal.

The U.S. Army Corps of Engineers Chicago District is moving as quickly as possible to construct the second electric barrier array before the existing demonstration array wears out. The electrodes in the first barrier are expected to corrode through about April of 2005.

Minnesota is leading an effort to investigate the feasibility of placing a dispersal barrier on the Mississippi River to prevent the spread of Asian carp into the upper Mississippi River. So far bighead carp have been caught in pools 19, 18 and 4 on the Mississippi.

Introduction Updates

By Pam Fuller

Another Snakehead in Maryland (4/28/2004)

A 19" northern snakehead (*Channa argus*), the same species found in 2002 in Crofton, was caught in Wheaton Lake, Anne Arundel County, Maryland.

Zebra Mussel veligers in South Dakota (4/12/2004)

Found below two Missouri River dams in South Dakota. This is the farthest location upstream in the Missouri River; no known zebra mussel colonies upstream of this location – yet. But they must be up there somewhere...

Black carp captured in the Lower Red River, Louisiana (4/19/2004)

A 1.1 meter black carp was captured by a commercial fisherman in the Upper Atchafalaya/Lower Red River, Louisiana. The fisherman reported catching "strange-looking grass carp" in this area for the past 8 years. This location is probably too far removed from the one known escape in the

Osage River in Missouri to be the same source.

A black carp was caught by a commercial fisherman in the Mississippi River just below Lock and Dam 24 on June 10, 2004. This is the second black carp captured in Illinois waters.

Bighead carp caught in Mississippi Delta (4/2004)

A single fish was caught in Six-mile Lake, near Greenwood, Mississippi. This represents the most southern location in the Mississippi River that we are aware of.

Mayan cichlids spreading northward into estuarine areas in SW Florida (12/2003)

Researchers have been catching Mayan cichlids in Charlotte Harbor since July 2002.

Introduced Species in Chile's Freshwaters – The Need for Research

Evelyn Habit, Aquatic System Unit, EULA Center, University of Concepción, Chile, mailto: ehabit@udec.cl and Amanda Rosenberger, Ecohydraulics Group, Department of Civil Engineering, University of Idaho, mailto: arosenberger@fs.fed.us

The geomorphology and geologic history of Chile have permitted the development of a unique ichthyofauna, which is characterized by a high degree of endemism (Campos et al. 1993; Vila et al. 1999; Dyer 2000; Habit & Victoriano 2003). The Andean range in the West, the Pacific Ocean in the East, and the Atacama Desert in the North of the country biogeographically isolate Chile, resulting in a species-poor and relict fish fauna, with species retaining primitive characteristics and small corporal sizes. Currently, the described native freshwater fish of Chile represent 12 families (2 endemic), 17 genera (6 endemic), and

40 native species (23 endemic), including both exclusively freshwater and diadromous fishes (Dyer 2000). Over the past century, the total number of freshwater fish species in Chile has dramatically increased due to the introduction of 22 species, 20 of which are in families not native to the country. Most were introduced for recreational or aquacultural purposes (Welcomme 1988) but now have uncontrolled, self-sustaining, wild populations. In the oligotrophic Andean lakes of the Biobío river basin (Icalma and Galletué), 96% of the fish biomass is composed of nonnative species (Parra et al. 2003), and in Laja Lake, which may have been fishless prior to human influence, 100% of the fish biomass is nonnative. In eutrophic lentic systems, such as the lakes located in the Coastal Mountain Range, dominant species are also introduced, such as the Argentinean silverside (*Odontesthes bonariensis*) and the common carp (*Cyprinus carpio*) (Parra et al. 2003). In fluvial systems, brown and rainbow trout are the dominant introduced species in the rithral and epirithral zones. (Ruiz et al. 1993; Soto & Arismendi 2003; Habit et al. 2003), where they coexist with native Siluriforms (*Trichomycterus areolatus*, *Diplomystes nahuelbutaensis* and *Nematogenys inermis*), native Perciforms (*Percilia irwini*, *Percilia gillissi*, *Percichthys trucha*) and native Osmeriforms (*Galaxias platei*). In addition, in the lower river reaches, one can frequently find nonnative mosquito fish (*Gambusia holbrooki*) and ornamental tropical fish (*Carassius auratus*, *Cichlasoma facetum*). These species share habitats with the native Characiforms of the genus *Cheirodon*. Introduced brown bullhead (*Ameiurus nebulosus*) can be found throughout the Itata River (36°S), with the exception of the uppermost and lowermost reaches. Among the most recent introductions are two species of sturgeon, *Acipenser baeri* and *A. transmontanus* at the mouth of the Maipo river (Central zone of Chile) (Dyer 2000). Of all of these introduced fish, the most dominant and notable are the introduced salmonids. The most widespread among the 8 species of

Salmoniforms introduced into Chile are rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*), inhabiting almost all rivers and lakes between 22° and 54° S latitude. The establishment of trout populations has allowed the development of a profitable sportfishing industry in Chile, supported mainly by foreign tourists, and has increased local and national interest in water quality issues. To satisfy the demands of anglers, uncontrolled seeding of trout alevins continues throughout the southern zone of Chile (around 40° S), where sportfishing tourism is particularly important for the local economy.

Considering the uniqueness of the native Chilean fish fauna, the extent of introductions, and the dominance and economic importance of introduced species in aquatic ecosystems throughout the country, there are very few scientific studies that include information on nonnative fishes in Chile. These studies are mostly anecdotal and observational in nature. For example, existing evidence indicates that populations of predominantly pelagic native fishes in the Andean lakes of the Central-South zone of Chile (e.g. *Percichthys trucha*) are diminishing due to the presence of salmonids (Gajardo & Laikre 2002). Anecdotal evidence also suggests that introduced brown bullhead in the Itata River are fragmenting populations of an outwardly similar native Siluriform *Diplomystes nahuelbutaensis*, which is now confined to the uppermost and lowermost reaches where bullhead have not been observed. Although these studies indicate potential for negative impacts by nonnatives, they are only suggestive and limited in their applicability outside of the areas where the studies were completed. The paucity of literature on the impacts of nonnatives in Chilean freshwaters and the ecological and economic importance of both native and nonnative species highlights the need for rigorous, empirical research in Chile focused on the impacts of nonnatives on native species and ecosystem function. Because of the extent, complexity, and urgency of the situation, the most useful studies will be ones that contribute to predictive

theory on invasions and their impacts. Broad-scale study of native and nonnative fish distributional patterns could contribute to an applicable understanding of the nature and extent of invasions by nonnative species and their potential impacts on native species and ecosystems. Smaller scale studies of specific mechanisms through which nonnative fishes may invade and alter ecosystems are also needed, but a focus on broad scales is most likely to yield useful information for identifying management priorities. Lessons from numerous studies of nonnative salmonids invasions in other parts of the world indicate a need for large-scale perspectives (Dunham et al. 2002) and a need to identify key considerations for understanding the impacts of these invasions over several levels of ecological organization (i.e. from individual organisms to ecosystem processes such as trophic dynamics) (Simon and Townsend 2003; Dunham et al. in press). These types of studies can inform current management of nonnative species, regulations concerning new introductions, and prioritization of areas for conservation or exclusion of nonnatives. Finally, because of the economic and social importance of nonnative fish in Chile, particularly nonnative trout, human-dimensions research on the social consequences of management alternatives are clearly needed. These types of studies allow the evaluation of management alternatives in light of their impact on local economic development and potential conflict between multiple users of Chilean freshwater resources. Finally, public education is essential for both appreciation of native species and minimizing additional spread of nonnatives.

References:

Campos, H., V.H. Ruiz, J.F. Gavilán, and F. Alay. 1993. Peces del Río Biobío. Serie Publicaciones de Divulgación EULA 5: 100 pp.
Dunham, J.B., S. B. Adams, R. Schroeter and D. Novinger. 2002. Alien invasions in aquatic ecosystems: Toward an understanding of brook trout invasions and their potential impacts on inland cutthroat trout in

western North America. *Reviews in Fish Biology and Fisheries* 12:373-391
Dunham, J.B., D.S. Pilliod, and M.K. Young. Assessing the consequences of nonnative trout in headwater ecosystems in western North America. *Fisheries in press*.
Dyer, B. 2000. Systematic review and biogeography of the freshwater fishes of Chile. *Estudios Oceanológicos (Chile)* 19: 77-98.
Habit, E. and P. Victoriano. in press. Peces de agua dulce de la Cordillera de la Costa in Smith-Ramírez, C., J. Armesto & C. Valdovinos (eds.) *Biodiversidad y Ecología de la Cordillera de la Costa de Chile*. Editorial Universitaria in press.
Habit, E., P. Victoriano, and A. Rodríguez-Ruiz. 2003. Variaciones espacio-temporales del ensamble de peces de un sistema fluvial de bajo orden del centro sur de Chile. *Revista Chilena de Historia Natural* 76: 3 – 14.
Gajardo, G. and L. Laikre. 2002. Chilean Aquaculture boom is based on exotic Salmon resources: a conservation paradox. *Conservation Biology* 17(4): 1173-1174.
Parra, O., C. Valdovinos, R. Urrutia, M. Cisternas, E. Habit, and M. Mardones. 2003. Caracterización y tendencias tróficas de cinco lagos costeros de Chile central. *Limnetica* (1-2): 51-83.
Ruiz, V.H. 1993. Ictiofauna del río Andalién (Concepción, Chile). *Gayana Zoología* 57: 109 - 278.
Simon, K.S. and C.R. Townsend. 2003. Impacts of freshwater invaders at different levels of ecological organization, with emphasis on salmonids and ecosystem consequences. *Freshwater Biology* 48:982-994.
Soto, D. and I. Arismendi. 2001. Patrones de distribución de peces nativos y especies salmonideas en el sur de Chile: el rol de la condición de cuencas y la colonización. XI Taller de Limnología. Temuco: 56.
Vila, I., L. Fuentes, and M. Contreras. 1999. Peces Límnicos de Chile. *Boletín Museo Historia Natural, Chile* 48: 61 - 75.
Welcomme, R.L. 1988. International introductions of inland aquatic species. *FAO, Fisheries Technical Paper*, 294: 1 - 318.