ANS
Aquatic Nuisance Species
DIGEST

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FRESHWATER SOCIETY

Providing current information on monitoring and controlling the spread of harmful nonindigenous species.

Pomacea canaliculata: Channeled Apple Snail

Releases Threaten U.S. Agriculture and Aquatic Environments

By Robert G. Howells

One telephone call in 1999 revealed many questions about an introduced exotic species that would become problematic only a few months later. Dr. David Robinson, a malacologist from U.S. Department of Agriculture (USDA) with the Philadelphia Academy of Natural Sciences phoned Texas Parks and Wildlife Department's (TPWD) Heart of the Hills Research Station (HOH). Robinson's initial concerns related to a report by Neck and Schultz (1992) of a population of South American channeled apple snails (*Pomacea canaliculata*) found in the Buffalo Bayou drainage, Houston, in 1989 that over-wintered into 1990. The HOH staff had not encountered these baseball-size snails during freshwater mussel surveys in the area. So, it did not appear the original population had spread from its introduction site. However, in July 2000, a reproducing population of channeled apple snails was discovered in the American Canal located between Houston and Galveston in southeastern Texas. The threat this species represents suddenly became very real.

Apple Snail *continued on page 3*

Figure 1. Channeled Apple Snail (*Pomacea canaliculata)*
Photo by R.G. Howells

Whirling Disease: Invasion of a Microscopic Fish Pathogen

By Jerri L. Bartholomew and Susan H. Higgins

Investigations of aquatic nuisance species have understandably concentrated on macroscopic organisms, but it is also recognized that movements of aquatic species may transport microscopic hitchhikers with impacts just as devastating. One such tiny hitchhiker is the parasite causing whirling disease in trout and salmon. *Myxobolus cerebralis* has evolved to take advantage of a unique niche, as it possesses a life cycle well adapted to the natural environments where *__salmonids__ are found.

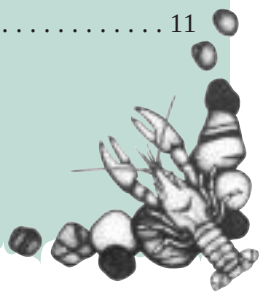
*__Words in bold type are defined in the Glossary on page 8.__

What Do Fish with Whirling Disease Look Like?

The report of the first outbreak of whirling disease in California was especially vivid. The behavior of the fish was described as "an extremely nervous twisting action as though the fish were hooked in the mouth. They spiral around and around as though they were tied by the nose. This becomes so violent at times that some of them come out onto the bank."

Whirling Disease *continued on page 6*

In This Issue:



Aquatic Nuisance Species Digest

Direct questions and comments about *ANS Digest* to: Jeanne Prok, Freshwater Society, Gray Freshwater Center, 2500 Shadywood Road, Excelsior, MN 55331; (888) 471-9773; e-mail: Jeanne@freshwater.org.

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ANS Task Force

National Aquatic Invasive Species Act Introduced

The National Aquatic Invasive Species Act (NAISA) of 2002, now before Congress, offers much-needed federal authority and funding to aggressively advance prevention and control of aquatic invasive species on a national scale. The legislation, which would reauthorize the National Invasive Species Act (NISA) of 1996, has the potential to yield major benefits for U.S. waterways.

The Great Lakes Commission and the Great Lakes Panel on Aquatic Nuisance Species have been vocal advocates for NISA reauthorization and have called for new provisions to address gaps and unmet needs in the existing legislation. Among the many recommendations is the urgent need to enhance the Chicago Ship and Sanitary Canal dispersal barrier and to accelerate and expand research into ballast water treatment, both of which would help prevent the introduction of new invasive species into Great Lakes waters.

Once established, aquatic invasive populations can cause severe, irreversible ecological and economic damage. To address introductions resulting from ballast water discharges, a leading vector, NAISA strengthens requirements for the shipping industry to implement ballast water exchange practices. These practices, presently limited to the Great Lakes, would be required nationwide under NAISA. The legislation calls for nationwide regulatory standards for ballast water discharge as well.

NAISA also requires a process for identifying those vectors that pose the highest risk of introduction, nationally and regionally. This would pave the way for the development of tools to minimize introductions from known commercial and recreational vectors, such as aquaculture, aquarium releases and horticultural practices. The legislation also outlines a screening process for planned importations of live aquatic organisms.

The legislation authorizes funding for a variety of purposes in the Great Lakes-St. Lawrence region. Among the most important is $30 million for state management plans across the nation, coupled with $3 million for regional panels and their coordination, orchestrated by the national ANS Task Force. Since invasive species wreak havoc regardless of political boundaries, these regional panels, as demonstrated by the Great Lakes Panel on Aquatic Nuisance Species, help fill an urgent need for inter-jurisdictional approaches to manage these problems at regional, national and bi-national scales. Other Great Lakes Panel priorities addressed in NAISA include more prominent information, education and outreach programs, and a provision for a rapid response program.

NAISA also calls for $12.75 million in appropriations for the Chicago River and Sanitary Canal dispersal barrier project, mentioned above. This includes appropriations to complete the existing barrier and construct a second, more permanent barrier, as well as for a monitoring program.

Sen. Carl Levin (MI) and Rep. Wayne Gilchrest (MD) are the lead sponsors of the legislation and Rep. Vernon Ehlers (MI) has introduced separate legislation on research, the National Aquatic Invasive Species Research Act. Co-sponsors of the NAISA legislation include 13 members of the Congressional Great Lakes Task Force.

For a copy of the legislation or the Great Lakes Panel recommendations, contact Kathe Glassner-Shwayder at shwayder@glc.org.

Apple Snail continued from page 1

Origin, Use, and Impacts

From the early days of aquarium culture, the concept of a "balanced aquarium" included both living plants and snails as well as fish. Historically, native and non-native snails, including mystery snails from the U.S. (*Viviparus*) and eastern Asia (*Cipangopaludina*), have been used in aquaria to control aquatic plant and **periphyton** growth. However, aquarium hobbyists often found that these snails were not tolerant of warm water temperatures required for tropical fishes. In the 1950s and 1960s, heat tolerant apple snails of the genus *Pomacea* (family Ampullariidae) began to replace true mystery snails in aquarium shops. Channeled and spiketop (*P. bridgesii*) apple snails from South America and native Florida apple snail (*P. paludosa*) were among the species most frequently marketed in the pet trade as "mystery snails." In time, spiketop apple snails became the most popular large snail purchased. This species is preferred by aquarium hobbyists because it feeds on **epiphytic** growth and soft rotting plants (Howells 2002) and generally avoids damaging aquarium flora.

Between 1979 and 1981, channeled apple snails were first cultured in Taiwan and then the Philippines and elsewhere in Southeast Asia (Cowie, in press) as escargot for human consumption under the name "golden apple snail" or "golden snail". The term reflected not its color, but how much snail farmers earned raising them. However, the Asian escargot market never materialized and through escapes and releases, channeled apple snails spread throughout the region (see summary in Cowie, in press). In 1989, it was first introduced into Hawaii for human consumption (Cowie 1999).

Across the Indo-Pacific, the snail has devastated rice (*Oryza sativa*) fields. As it spread in Hawaii, it also damaged taro or elephant ear (*Colocasia esculenta*). Other introductions occurred in Central America and the Caribbean with similar damage to vegetation. Impacts in the Philippines and the Dominican Republic were devastating. Once major exporters of rice, both countries must now import the crop because rice production fell 70% within three years after channeled apple snails invaded (Dr. David Robinson, USDA; pers. comm.).

U.S. Populations

Both channeled and spiketop apple snails were intentionally released and established in Florida. In California, channeled apple snails are present at two sites in San Diego County that are not in agricultural areas and another in Riverside County near cultivated areas not subject to apple snail damage. Channeled apple snails released in North Carolina did not survive. Because channeled apple snails found in Texas in 2000 were in a rice irrigation canal located in the center of the Texas rice belt, there were immediate federal and state concerns. In November 2000, USDA brought together authorities from state and federal agencies with apple snail populations to discuss plans to control and eradicate the species.

To gain a better perspective on the species distribution in Texas, in December 2000, HOH launched a survey of the area between Houston and Galveston (Howells 2001a). Volunteers continued field surveys throughout that winter and early spring. Ultimately channeled apple snails were found in nine water bodies in Harris, Galveston, and Brazoria counties in southeastern Texas, as well as at an additional site near Fort Worth, Tarrant County, Texas (Howells 2001b, c). The Fort Worth population was particularly troubling because it had successfully over-wintered in northern Texas, with a climate previously thought to be too cold. In mid-2001, another population was located in a small, backyard pond in Wichita Falls, Wichita County, Texas, but was destroyed by manually collecting snails and egg masses. An additional site in Galveston County in Armand Bayou at Clear Lake was found in late 2001.

Figure 2. U.S. Distribution of *Pomacea canaliculata*

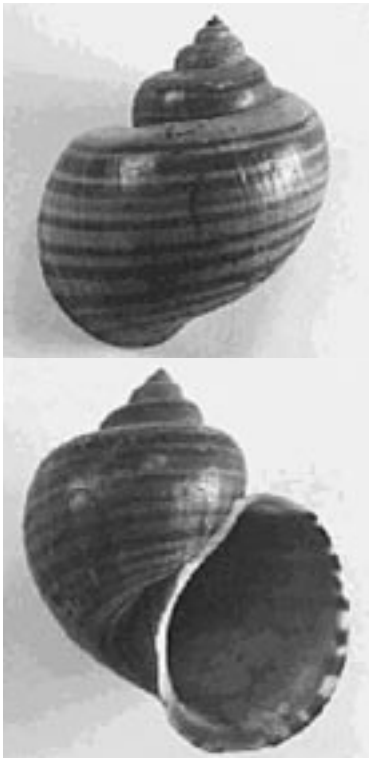
Interestingly, as artificial plants became more realistic looking and more prevalent in the trade, the market for snails that could control live aquarium plants declined. The availability of the channeled apple snails increased and gold, albino, and other color variants of both spiketop and channeled apple snails were developed to help retain their marketability in the aquarium trade. Two individuals in Texas were already reported collecting specimens from the American Canal area for subsequent distribution and sale in the pet trade when that population was discovered.

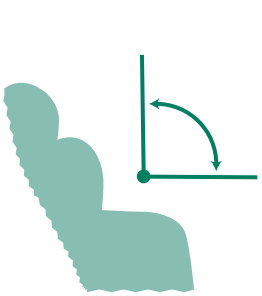
Apple Snail *continued on page 4*

Apple Snail continued from page 3

IDENTIFICATION OF APPLESNAILS (*POMACEA*) IN U.S. WATERS

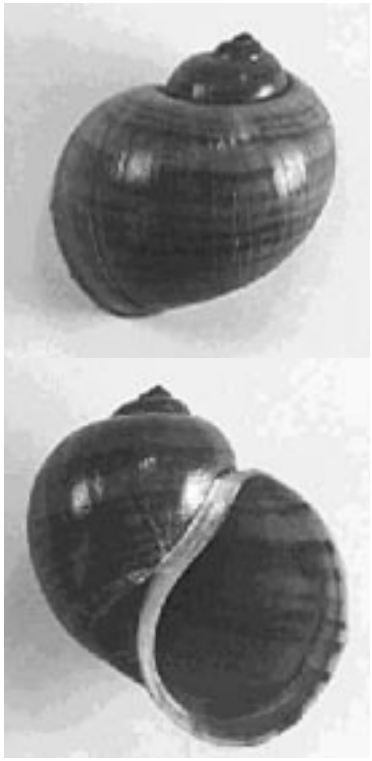
IDENTIFICATION TRAITS: Shape of whorls, size, spire elevation; but not color.

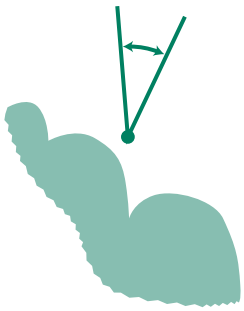




Spiketop Applesnail
Pomacea bridgesii

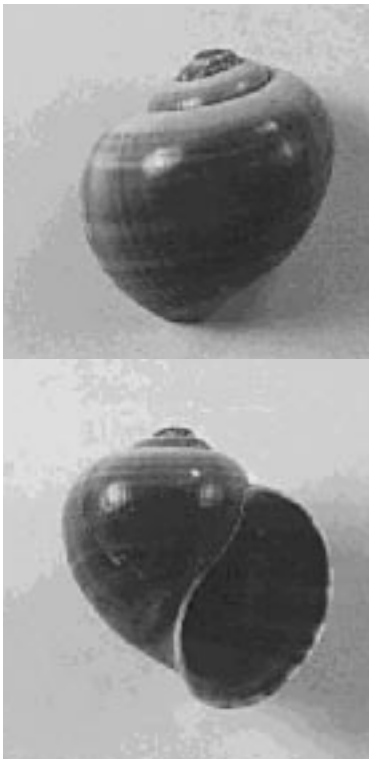
Whorls have rather square shoulders that are flat on top; usually less than 50 mm shell height; spire pointed and elevated.

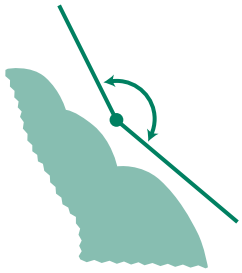




Channeled Applesnail
Pomacea canaliculata

Whorls rounded or with weak shoulders, channeled between whorls, occasionally with a ridge along the outer channel edge; very large, to more than 80 mm shell height; spire moderately elevated.





Florida Applesnail
Pomacea paludosa

Whorls with rounded or very weak shoulders; to 60 mm shell height or more; spire depressed, not elevated.

Prepared by Robert G. Howells

Apple Snail *continued on next page*

Apple Snail *continued from previous page*

Methods of Disbursement

In response to the threat associated with increased availability, in April 2001, channeled apple snails were added to the list of prohibited harmful or potentially harmful shellfish in Texas. Their sale, possession, culture, and transport became illegal. However, ignorance of existing regulations, confusion over common names (mystery snail and apple snail; gold-colored apple snail or gold-valued apple snail, etc.), and difficulty identifying apple snail juveniles has resulted in limited impact on the channeled apple snail trade.

Other federal and state agencies also initiated policy actions to address the channeled apple snail problem. In 2001-2002, USDA began efforts to develop a surveillance program to identify prohibited species being sold over the Internet. In June 2001, USDA and California Department of Food and Agriculture (CDFA) organized a meeting in Sacramento focused on channeled apple snail and other invasive exotic gastropods. The state of Mississippi moved to ban all Ampullariidae in August 2001, including a quarantine of plants from Hawaii, Florida, California, Texas, and North Carolina. Since then, the USDA has moved to prohibit importation of all species of Ampullariidae (except spiketop apple snail) and also has drafted a channeled apple snail risk analysis that is now under review.

As awareness of the channeled apple snail problem increased, additional introductions were reported. These included a channeled apple snail population found near the Salton Sea in southern California (Dr. Alan Hardy, CDFA; pers. comm.) and a reported collection of the species in New England (Dr. David Robinson, USDA; pers. comm.) in 2001.

To exacerbate the problem, Tropical Storm Allison caused extensive flooding in the Houston-Galveston area in June 2001. Flooding flushed channeled apple snails from irrigation canals into rice fields. Fortunately, most rice in Texas is harvested in mid-to late-July and the 2001 crop was nearly mature when snails arrived, with little or no damage reported. To help reduce impacts on the 2002 rice crop, much of the American Canal was drained during winter 2001-2002 and some growers reportedly planned to apply pesticides like Karate (lambda-cyhalothrin) to their fields. As of early August 2002, no reports of major apple snail damage to rice in Texas have been reported to HOH.

Thus far, most Texas channeled apple snail infestations remain in coastal streams with limited drainage basins or in irrigation canals. No ecologically sensitive habitat or waters with important sport or commercial fisheries have been impacted to date, but future damage to such areas is likely. In the 1980s, another Ampullariidae, giant rams-horn snail (*Marisa cornuarietis*) was introduced into the headwaters of the San Marcos and Comal rivers with reported negative impacts on rare flora and fauna (Horne et al. 1992; Howells 1999). Compared to the giant rams-horn snail, the channeled apple snails are larger, more tolerant of cold, and consume greater amounts of aquatic and emergent vegetation. If released at these sites, the channeled apple snail would likely be far more destructive. Pet stores continue to illegally sell this species within a few miles of these springs.

Although aquarium and pet stores are the primary source of importation and distribution of channeled apple snails in the U.S., there are other sources as well. Ornamental water garden outlets have also been found to market apple snails. Generally, securely-held aquarium specimens are not a problem. The problem is the snails are released, intentionally and accidentally, via import as live food or use in unsecured aquaria or outdoor water gardens. If allowed to escape or are released, apple snails are capable of crawling over land. Biological supply houses offer live educational specimens, which can be released by teachers or students once studies have been completed. Accidental transfer of snails from existing sites to uninfected waters may occur, especially when small juveniles go unnoticed in mud or on aquatic plants, not to mention deliberate collection and release. At least one Texas introduction of channeled apple snails was an intentional release by a pond owner attempting to control noxious growths of aquatic macrophytes.

Channeled apple snails have reportedly been sold for human consumption in Hawaii (Perera and Walls 1996) and Florida apple snails have been found in ethnic food markets in Houston, Texas.

Control Efforts

In general, there is minimal demand for the species as human food and certainly not enough to provide population control. Additionally, although channeled apple snails can be eaten, they can carry rat lung worm and other parasites that are potentially harmful to people.

Biological Control

Thus far, no significant native predators have been found to provide effective biological control of introduced channeled apple snail populations. Native birds such as limpkin (*Aramus guarauna*) and glossy ibis (*Plegadis falcinellus*) feed on apple snails, but they do not significantly reduce their numbers. In Florida, endangered Everglades or snail kites (*Rostrhamus sociabilis*) prey on native Florida apple snails, but have difficulty extracting meat from exotic apple snails with shells shaped differently than the Florida apple snails (McCann et al. 1996). Other mollusk predators occasional consume channeled apple snails as well, but only to limited extents.

Physical and Chemical Control

The most effective control efforts include mechanical collection of egg masses and larger snails, but with only some degree of success. Various molluscicides have been used for control in Asia and the Philippines, but have had limited success, even in countries without stringent regulations on the use of such chemicals. Florida apple snails can sometimes be effectively trapped, but this technique has not been applied thus far to channeled apple snail populations in the U.S. Draw-down of canals and fields is an effective control by causing desiccation and cold-kills. In Texas, the agriculture community has effectively controlled snail infestations by combining mid-winter draw-down of

Apple Snail *continued on page 9*

Whirling Disease *continued from page 1*

These signs are the result of the parasite infecting and destroying cartilage tissue in young fish (Hedrick et al. 1998; Hedrick and El-Matbouli 2002). If parasite dosages are high enough, this disease will eventually cause death. The clinical signs include:

- frenetic tail chasing ("whirling") in young fish when feeding or alarmed, often to the point of exhaustion;
- darkening of the tail in fish ("blacktail"), a condition that dissipates in older fish;
- permanent skeletal deformities such as misshapen cranium, shortened operculum, misaligned jaws, and spinal curvature.

Figure 3. Infected fish with spinal deformities
Courtesy of R.P. Hedrick, P.Walker, and M. El-Matbouli

Origin and Dissemination

Whirling disease was first reported in farm-reared rainbow trout in Germany in the late 1890s. Rainbow trout are not indigenous to Europe, and their eggs were imported from the United States beginning in the late 1870s for culture. Rainbow trout had never encountered this parasite and lacked the resistance already developed in the native brown trout. The increasing popularity of rainbow trout as a food fish, along with the transfer of fish among breeding installations, rapidly led to outbreaks of whirling disease in most European facilities rearing rainbows. This event occurred first in Germany, then throughout Europe by the mid-1950s. The widespread distribution in Europe coupled with the relative resistance to whirling disease observed in brown trout, suggests that the microorganism originated in Europe as a parasite of brown trout (Halliday 1976). Fortunately, whirling disease in Europe generally has been restricted to hatcheries, with negligible effects on wild trout populations.

Establishment of the parasite outside Europe, including the United States, is certain to have occurred through transport of live fish or fish products. The first detection of whirling disease in the United States was in 1956 in brook trout at a public hatchery in Pennsylvania (Hoffman 1970). Imported frozen European table trout were implicated as the vector of infection when samples of these food fish were found to contain parasite spores. Scientists suspect that the infected fish were fed to the hatchery trout (a common practice at the time), or that their viscera were discarded in the stream. Importation of live brown trout from Europe in the 1950s is another possible source of initial infection. Before the problem was recognized, infected fish were stocked throughout Pennsylvania, infecting many hatcheries and natural waters.

A similar scenario occurred almost simultaneously in the west. In Nevada, whirling disease was first detected in 1966, but examination of preserved fish showed evidence of the parasite as early as 1957 (Taylor et al. 1973). Because *M. cerebralis* had been present, but undetected, for nearly 10 years, many of the state's waters were stocked with infected fish. In 1965 when whirling disease was diagnosed in California in fish at a private hatchery, imported frozen fish, again, were implicated (Hoffman 1990). Once established in the eastern and western United States, subsequent spread of the whirling disease parasite was then attributed to live fish transfers and stocking (Hoffman 1970, 1990). The parasite is now established in waters of 23 states. Ten states report whirling disease prior to 1970, and most other detections have occurred since the late 1980s (Bartholomew and Reno 2002). New states are being added to the list each year.

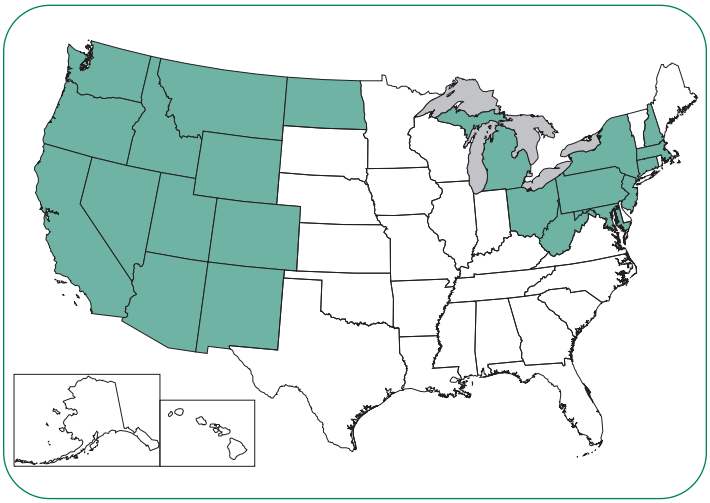


Figure 2. Shaded areas indicate U.S. states in which whirling disease has been detected.

Life Cycle of Myxobolus cerebralis

The life cycle of this parasite was elusive until the mid-1980s (Wolf and Markiw 1984), but its solution explains why this parasite is so difficult to control and, in part, how it is spread. Researchers made an unexpected and exciting discovery: *M. cerebralis* required not just the fish host, but also an aquatic **oligochaete** to complete its life cycle. It is now known that when an infected fish dies or is consumed, myxospores that develop in the fish's cartilage release into the water. These small, dense spores sink to the sediment where they are consumed by the aquatic oligochaete *Tubifex tubifex*. In the worm, the parasite develops into a triactinospore that sheds into the water. This spore is much larger and has appendages, allowing it to float until it contacts and infects a salmon or trout, concluding the infection cycle.

Whirling Disease *continued on next page*

Whirling Disease *continued from previous page*

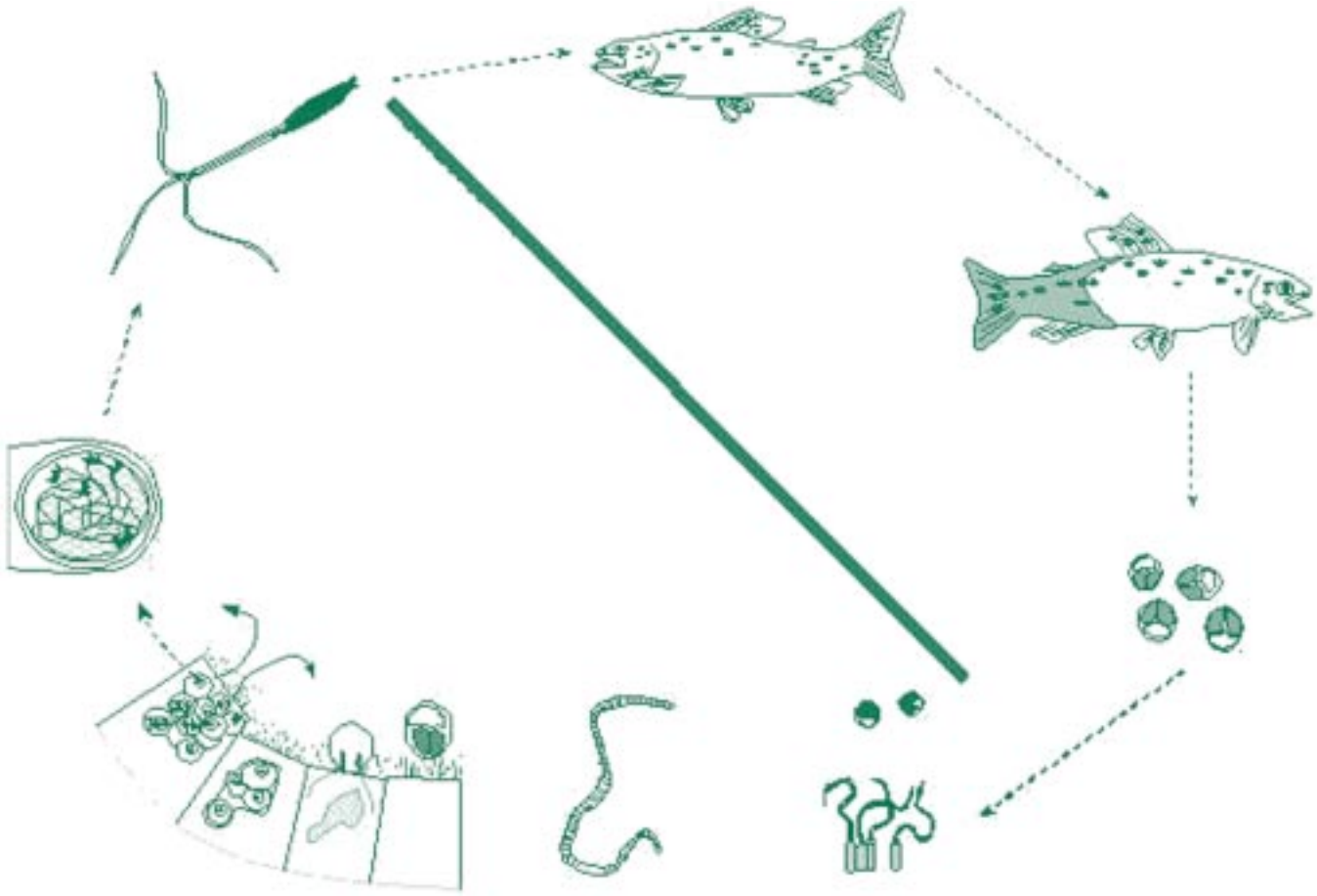


Figure 2. Life Cycle of *Myxobolus cerebralis*, showing infected fish, oligochaete host, and parasite life stages
Courtesy of R.P. Hedrick, P.Walker, and M. El-Matbouli

Is Whirling Disease Considered a Problem?

In the United States, the discovery of *M. cerebralis* was considered a potential resource disaster because of the extreme susceptibility of rainbow trout. This species is indigenous to the western states and was widely dispersed here in the late 19th century for sportfishing and aquaculture. Measures to restrict establishment and movement of the parasite were extreme, requiring destruction of all fish from an infected facility.

Concerns about the effects of *M. cerebralis* and other introduced pathogens led to development of the first national fish disease law in the United States. This legislation, adopted in 1968 (Code of Federal Regulations, Title 50, Section 13.7), requires certification of all imported salmonids and salmonid eggs as free of *M. cerebralis* as well as the virus causing viral hemorrhagic septicemia. For many states these control measures came too late and this nonindigenous parasite had already spread via transfer of infected fish that were not expressing obvious signs of whirling disease. Once *M. cerebralis* is established, its eradication is nearly impossible because the myxospores can persist for long periods in the sediment.

Faced with destroying large numbers of fish and closures of facilities, fishery managers looked for control approaches that were less extreme, with emphasis on avoiding spread of the pathogen while allowing for management in areas where the parasite is now considered **enzootic**. Consequently, in 1988 the Colorado River Wildlife Council, Fish Disease Subcommittee, recommended reclassification of *M. cerebralis* from prohibited to notifiable status. This reclassification continues to require inspection but does not demand depopulation and disinfection of facilities.

However, on the heels of accumulating evidence that whirling disease was a hatchery problem and that wild trout can exist with *M. cerebralis*, came the first observations of overt whirling disease in free-ranging populations from the Rocky Mountain region (Walker and Nehring 1995; Vincent 1996). In Colorado, where there is an aggressive program for stocking rainbow trout, placement of subclinically infected hatchery fish was the probable route of dissemination. By contrast, in Montana the Madison River had not been stocked with hatchery fish since the late 1970s and the origin and route of dissemination is less clear. In the Northwest, detection of *M. cerebralis* infections in returning adult salmon illustrates the increased opportunities for parasite dissemination since these fish migrate hundreds of miles or more to and from their natal streams.

Whirling Disease *continued on page 8*

Whirling Disease *continued from page 7*

What is Being Done to Control Whirling Disease?

Events that occurred in Montana and Colorado precipitated a renewed interest in whirling disease with a shift in focus from hatcheries to impacts on wild populations. These reports brought adoption of more aggressive control policies and increased funding for surveys and research in some states. Colorado and many other states initiated programs to clean up contaminated state hatcheries and to discontinue, or severely limit, stocking of infected fish. States also realize the importance of educating the public, and scientists are interested in developing risk assessment tools to predict waters where the parasite is most likely to establish.

There has also been an insurgence of private and public funds for applied and basic research. Entities such as the Bozeman-based Whirling Disease Foundation and Trout Unlimited have raised private funds for national research, leveraged federal funds, and created a forum for scientific exchange. Congress appropriates $750,000 annually for competitive directed research at several national university laboratories, and several states, especially those in the west, have set dedicated funds for tackling local whirling disease management problems. The cadre of whirling disease scientists that meets at its annual scientific symposium to share findings and identify future needs has developed a set of agreed-upon whirling disease research protocols. In short, the dilemma has not gone unattended.

Still, challenges lie ahead to identify routes of parasite dissemination and to control disease. Hatchery activities have been the primary cause of dispersal, but the potential for parasite transmission by birds and even recreational boaters and anglers can not be ignored. Little can be done to control dissemination by birds or migratory fish, but public education can help limit its spread by other routes.

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Susan H. Higgins *is the Director of Special Projects at the Whirling Disease Foundation, whose mission is to raise private funds for national whirling disease research. E-mail: whirling@mcn.net; http://www.whirling-disease.org/*

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Glossary

enzootic:

affecting or peculiar to animals of a specific area or limited district; analogous to the term "endemic" used to describe human diseases

periphyton:

organisms that live attached to underwater surfaces

epiphytic:

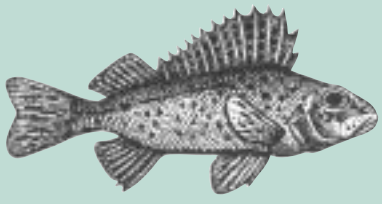
a plant that derives its moisture and nutrients from the air and rain and grows usually on the surface of plants

salmonids:

any of a family Salmonidae of elongate bony fishes that have the last three vertebrae upturned

oligochaete:

any of a class or order Oligochaeta of hermaphroditic terrestrial or aquatic annelids that lack a specialized head



Apple snail *continued from page 5*

irrigation canals, draining and drying rice fields after harvest, coupled with pesticide application. While these methods are effective for control, none are likely to eliminate the species. For example, in early 2002, dewatered canals in Texas killed numerous channeled apple snails, but many snails burrowed into the canal's mud substrate and emerged when temperatures increased. Natural bayous and streams adjacent to rice fields that can not be drained may also be at risk for supporting populations that can re-invade agricultural areas when they are flooded for planting each spring. Two years have passed since channeled apple snails were first discovered in agricultural areas in the U.S. and we are only beginning to confront control methods.

States that have not already moved to prohibit channeled apple snail specifically or all apple snails in general (perhaps with the exception of spiketop apple snail) should consider doing so. Any specimens found in the field should be reported immediately to appropriate state or local authorities. Again, once channeled apple snails have been established, there are no quick solutions to remove them.

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Upcoming ANS Meetings and Events

4th Annual National Invasive Weed Awareness Week
February 24-28, 2003
Washington, D.C.

22nd Annual Meeting
Western Aquatic Plant Management Society
March 4-5, 2003
Sacramento, CA
Contact: Terry McNabb at terry@aquatechnex.com
or (360) 647-5020.

Western Society of Weed Science Annual Meeting
March 11-13, 2003
Sheraton, Kauai, Poipu Beach
Koloa, Hawaii
Contact: Wanda Graves at 510-7790-1252 or
Wgraves431@aol.com
http://www.wsweedscience.org/annual_meet/index.php

3rd International Conference on Marine Bioinvasions
March 16-19, 2003
Scripps Institution of Oceanography
La Jolla, CA
For more information: 254-776-3550 or info@sgmeet.com

Noxious Weed Management Short Course
for Land Managers
April 14-17, 2003
The Western Society of Weed Science and the Western Weed Coordinating Committee
Loveland, Colorado
Contact: Celestine Duncan at 406-443-1469 or
Weeds1@ixi.net

12th International Conference on Aquatic Invasive Species
June 9-12, 2003
The Cleary International Centre
Windsor, Canada
Contact: Elizabeth Muckle-Jeffs at profedge@renc.igs.net

43rd Annual Aquatic Plant Management Society Meeting
July 20-23, 2003
Portland, Maine
http://www.apms.org/2003/2003.htm

Send meeting announcements to:
Jeanne Prok, ANS Digest
2500 Shadywood Rd., Excelsior, MN 55331
e-mail: Jeanne@freshwater.org
Deadline for the next issue is April 1, 2003.

Nuisance Notes from the Western Regional Panel on ANS

ANS TASK FORCE APPROVES MANAGEMENT PLANS FOR ALASKA AND MONTANA

At the ANS Task Force Meeting in Honolulu, Hawaii on November 14, Bob Piorkowski from Alaska and Tom Gallagher from Montana presented their state's ANS Management Plans. Both plans were approved and are now eligible for implementation funding from the US Fish and Wildlife Service. For more information about State ANS Management Plans, contact Shawn Alum, (703-358-2025) or shawn_alum@fws.gov.

State Updates

Alaska: The Alaska Department of Fish and Game (ADF&G) completed writing the Alaska ANS plan in early October. It was approved by the Aquatic Nuisance Species Task Force during their fall meeting. It is posted on the ADF&G web page (http://www.state.ak.us/adfg/). ADF&G continues to administer a contract with Pacific States Marine Fisheries Commission to research various marine and freshwater invasive species problems on the West Coast. Atlantic salmon and green crab invasive species cards developed by the ADF&G and the USFWS Alaska Region were received from the printer and are now being distributed to the public. Public ANS education continues along with regular responses to media inquiries. Limited pike eradication work was carried out on the Kenai Peninsula. The problem of Atlantic salmon escapees continues to receive considerable attention and effort from state and federal staff. WRP Contact Bob Piorkowski (907-465-6109), bob_piorkowski@fishgame.state.ak.us

California: California Governor Gray Davis signed a bill into law creating an ANS Council. The Council will be chaired by the Director of the California Department of Fish and Game and will be comprised of agency and stakeholder group representatives. The Council will help coordinate a comprehensive approach to the management of ANS and oversee the progress of the Department in the development of the ANS Plan. California continues to combat the invasive marine alga, Caulerpa taxifolia. Surveillance of high risk sites continues and the last sighting of the plant was in September.
The CALFED interagency Nonnative Invasive Species (NIS) Program has a new coordinator, Erin Williams, and a watershed coordinator who works directly with watershed groups to coordinate NIS activities on the ground. CALFED funded NIS projects include species such as invasive spartina, purple loosestrife, arundo donax, zebra mussels, and Asian clams. Additional projects include outreach/education to industries involved in importation or transportation of nonnative species, ballast water, and the creation of a restoration guidebook. WRP Contact Susan Ellis (916-653-8983), sellis@dfg.ca.gov. CALFED Contact Erin Williams (209-946-6400), erin_williams@fws.gov

Kansas: Kansas Wildlife and Parks asked the Kansas Wildlife Commission to add all species of snakehead fish to the prohibited species list for Kansas. Although snakeheads are now prohibited by federal law, Kansans can still possess and sell them within the state. The Commission is also considering adding white perch to the prohibited list, following Indiana's lead to require the anglers kill any white perch caught. WRP Contact Tom Mosher (620-342-0658), tomm@wp.state.ks.us.

New Mexico: The New Mexico Department of Game and Fish is working with Governor-elect Bill Richardson's Transition Team to expand the Department's activities to prevent the introduction and spread of ANS in New Mexico. This initiative will support public outreach programs focused on educating boaters about their role to prevent the spread of ANS to western waters, and the dissemination of information (e.g. signs, watch cards, boat maintenance pamphlets) regarding ANS at state agency offices and at areas of high public use on state lands. WRP Contact Brian Lang (505-476-8108), blang@state.nm.us

South Dakota: South Dakota Department of Game, Fish and Parks has updated and revised the section in the 2003 South Dakota Fishing Handbook regarding ANS. A new regulation passed in 2002 regarding the importation of bait. "Licensed anglers may not import bait except for fathead minnows, golden shiners, creek chubs, or white suckers without an importation permit. It is illegal to bring nonnative bait into South Dakota." The new ANS biologist for the state is Jeff Shearer. WRP Contact Jeff Shearer (605-773-2743), jeff.shearer@state.sd.us

Utah: The Utah ANS Action Team met in November to discuss progress and plans for 2003. Development of a state ANS Management Plan is the main activity for 2003. Zebra mussel monitoring reports were received from 31 locations in the state. A new invader, the New Zealand mudsnail, was discovered by Dr. Mark Vinson in the Green River below Flaming Gorge dam. The discovery elicited a number of media releases and public outreach activities alerting the public. Vinson has been retained to inventory the major waters of the state for the snail and thus far has identified four new sites; on the Bear, Little Bear, Logan and Provo Rivers.
Utah Division of Wildlife Resources hosted a Hazard Analysis and Critical Control Point workshop for ANS in June, which was attended by about 40 professionals from the Rocky Mountain area. WRP Contact Randy Radant (801-538-4760), randyradant@utah.gov or Don Archer (801-538-4817), donarcher@utah.gov.

Provincial Update

Alberta: Alberta is continuing to monitor and control purple loosestrife. The number of sites and plants within the existing sites has declined significantly since the initiation of the Alberta Purple Loosestrife Eradication Program in 1994. Although new sites were discovered in 2002, most of these were small infestations (one to five plants) and have been controlled by physical removal or spraying with tricolopyr. Biological control using the leaf feeding beetle (Galerucella calmarienisin) has been implemented successfully at a large infestation in the Edmonton area. WRP Contact Rob Burland (403-382-4015), rob.burland@gov.ab.ca.

British Columbia: BC Ministry of Water Land and Air Protection set up a committee in 2002 to examine alien species and their effects on biodiversity in British Columbia. It is expected that an alien species strategy will be developed by March 2003. Ballast regulatory issues continue at the coast-wide coordination level to establish consistency with other jurisdictions along the Pacific Coast. The origin and identity of invertebrate organisms being transported to Canada's Pacific coast by ballast water was published by the Department of Fisheries and Oceans. WRP Contacts Pat Lim at Dept. of Fisheries and Oceans (604-666-6529) limP@pac.dfo-mpo.bc.ca and Gary Caine at BC Fisheries (250-897-7545), gary.caine@gems7.gov.vbc.ca.

Manitoba: Boater inspections of recreational watercraft continued throughout the 2002 season. No zebra mussels or vegetation were found on any water-based equipment. The program will continue throughout the 2003 season. The Manitoba Committee on Introductions and Transfers of Aquatic Organisms will be adding a number of potentially invasive exotic species to the provincial Fisheries Regulation, thus making it illegal to transport these species into the province. WRP Contact Dwight Williamson (204-945-7030), dwilliamso@gov.mb.ca or Wendy Ralley (204-945-8146), wralley@gov.mb.ca.

Saskatchewan: Saskatchewan is currently in the final stages of official adoption of the Saskatchewan Biodiversity Action Plan. Addressing the threats posed to biodiversity by invasives is a primary objective of the proposed plan and a priority issue for Saskatchewan Environment. Concurrent with recent organizational changes, a formal Provincial Invasive Exotic Species Strategy is being initiated. The Strategy is expected to involve the development of a multi-stakeholder working group; a risk assessment and prioritization process for evaluating invasives; and policy and regulations aimed at preventing or reducing the negative impacts of invasives on the environment. New WRP Contact Ann Gerry (306-787-1835), agerry@serm.gov.sk.ca.

News from the Great Lakes Panel on Aquatic Nuisance Species

ANS UPDATE

Fall 2002 *Volume 8, No. 3*

Great Lakes Panel Update

Considerable staff effort has focused on the National Invasive Species Act (NAISA) of 2002. This legislation, introduced in Congress in September, will reauthorize the National Invasive Species Act (NISA) of 1996. Panel-approved recommendations on NISA reauthorization, an outcome of a Great Lakes Panel symposium held in May 2001, are well represented in the introduced bill. Panel staff and Panel Chair, Ron Martin, participated with other regional panel representatives in a series of conference calls, coordinated by the Northeast-Midwest Institute, providing guidance as NAISA language evolved. The Commission is now focused on rallying support for NAISA in Congress. **Contact:** Kathe Glassner-Shwayder, Great Lakes Commission, 734-971-9135, shwayder@glc.org.

Washington Watch

Sens. Carl Levin (MI) and Susan Collins (ME) along with Congressmen Wayne Gilchrest (MD), Vernon Ehlers (MI), Brian Baird (WA), and Peter Hoekstra (MI) introduced the National Aquatic Invasive Species Act of 2002, federal legislation to slow the onslaught of aquatic organisms invading U.S. waterways. Also introduced in the House is the National Aquatic Invasive Species Research Act of 2002. The bills will reauthorize the National Invasive Species Act of 1996, and represent a coordinated bipartisan, bicameral effort among the lawmakers to address the threat of aquatic invasive species. This comprehensive legislation contains provisions for regulation of ballast discharge from commercial vessels and planned importations of live organisms; a national monitoring network; rapid response funds; state/regional grants; and authorization of research to ensure that proper methods are used for prevention, control and eradication. **Contact:** Joy Mulinex, Senate Great Lakes Task Force, Northeast-Midwest Institute, 202-224-1211, joy_mulinex@levin.senate.gov, website: www.nemw.org/biopollute.htm#laws..

News from Around the Basin

ILLINOIS: A new website highlighting Illinois' ANS activities and resources is now online (www.iisgcp.org/il-ans/) and includes a place to report new ANS sightings. A multilingual brochure, *The ABCs of PCBs: Know Your Catch*, outlines the basic facts of PCBs and occurrence in Great Lakes fishes. An Asian carp watch card is in development, and will contain information on both the silver and bighead carp. **Contact:** Pat Charlebois, IL-IN Sea Grant, 847-872-0140, charlebo@uiuc.edu.

MICHIGAN: In September 2002, Michigan's ANS State Management Plan Update was formally approved by the directors of the departments of Environmental Quality, Natural Resources and Agriculture. The Michigan legislature passed resolutions in support of the plan and ANS Prevention Day, held Oct. 2, 2002. The Michigan Great Lakes Protection Fund solicited projects for ballast water treatment research in July 2002, awarding Fleet Technology a grant to continue studying the corrosivity of hypochlorite on ballast tanks. Eurasian ruffe was found by the USFWS field staff during a routine survey of Lake Michigan in Escanaba, Mich. **Contact:** Emily Finnell, MI DEQ, 517-241-7927, finnelle@michigan.gov.

MINNESOTA: Sea Grant and the Department of Natural Resources mailed a packet of resource materials, including the videotape *From Net to Sale: Controlling ANS with the HACCP Approach for Baitfish and Aquaculture Industries* to 1,233 licensed minnow dealers/hatchery operators and retail live bait shops across the state. Minnesota and Michigan Sea Grant programs recently completed *ANS-Hazard Analysis and Critical Control Point* workshops in Oregon, Montana, and Utah. The USFWS and several natural resources management agencies are planning to implement ANS-HACCP plans to help ensure that their fish stocking operations are ANS free. **Contact:** Doug Jensen, MN Sea Grant, 218-726-8712, djensen1@d.umn.edu.

NEW YORK: The state recently proposed regulations banning the possession, importation, sale, and introduction of the Chinese mitten crab. These are the first state regulations addressing a marine invasive species, and the second state regulations dealing with ANS in general since zebra mussel regulations were promulgated in 1991. In 2001, the state implemented a regulation prohibiting the use of round goby as bait. The first draft of the revised state ANS management plan has been completed. **Contact:** Timothy Sinnott, NY DEC, 518-402-8970, txsinnot@gw.dec.state.ny.us.

OHIO: The Department of Natural Resource's new color poster, *Aliens Among Us*, presents ANS graphics (fish, mollusks, and plants) and ways to prevent their spread. Other outreach efforts include development of an ANS prevention sign to post at boat ramps, collaboration with the Center of Science and Industry (COSI) to incorporate ANS education into middle school programs, and the distribution of goby and ruffe "watch" cards. A number of wetland areas were chemically treated to manage populations of purple loosestrife. Stream and lake surveys are being conducted to monitor the distribution and spread of nonnative fish and mollusks in Ohio. Letters of support were sent to the USFWS to add snakeheads and black carp to the list of injurious wildlife. Legislative support also is being garnered for NISA reauthorization. **Contact:** Randy Sanders, OH DNR, 614-265-6344, randy.sanders@dnr.state.oh.us.

ONTARIO: Work with the federal government continues in developing a national strategy on alien invasive species, including a joint meeting of the Council of Canadian Resource Ministers. A separate initiative, the 18-month review of the implementation of the *National Code on Introductions and Transfers of Aquatic Organisms*, continues into 2002. **Contact:** Beth MacKay, OMNR, 705-755-1950, beth.mackay@mnr.gov.on.ca.

PENNSYLVANIA: The fish hook water flea (*Cercopagis pengoi*) is appearing in large numbers off the shore of Erie, Pa. Several complaints have been received from anglers down-rigging for walleye and steelhead because water fleas are tangling around their lines, making reeling difficult. *Bythotrephes cederstroemi* has infested these waters for years, not affecting angling to this degree. Apparently the fish hook's longer tail may be more efficient at wrapping around angler fishing lines. **Contact:** Eric Obert, Pennsylvania Sea Grant, 814-898-6420, eco1@psu.edu.

WISCONSIN: The Department of Natural Resources has developed a series of Wild Cards for a variety plants and animals found in Wisconsin, including nine aquatic invaders. The cards, especially designed for children, include photos of the species, a description of identifying characteristics, and why it is a problem. An exotic fish virus is suspected of killing more than ten tons of carp in Cedar Lake in northwestern Wisconsin. If confirmed, the virus will be the first documented case in the wild in North America. Managers are concerned that the virus could be a problem for northern pike and some important forage fish. **Contact:** Ron Martin, WI DNR, 608-266-9270, martir@dnr.state.wi.us.

On The Bookshelf

The ABCs of PCBs: Know Your Catch brochure. **Contact:** Pat Charlebois, IL-IN Sea Grant, 847-872-8677, charlebo@uiuc.edu.

Invasive Aquatic and Wetland Plants Field Guide, an identification guide for the top 21 invasive species in North America. **Contact:** Pat Charlebois, IL-IN Sea Grant, 847-872-8677, charlebo@uiuc.edu; or Doug Jensen, MN Sea Grant, 218-726-8712; djensen1@u.umn.edu.

Annual Report for 2001: Harmful Exotic Species of Aquatic Plants and Wild Animals in Minnesota. **Contact:** Jay Rendall, MN DNR, 651-297-1464, jay.rendall@dnr.state.mn.us.

Full copies of the ANS Update, a quarterly newsletter prepared by the Great Lakes Panel on Aquatic Nuisance Species, are available upon request from the Great Lakes Commission. **Contact:** Katherine Glassner-Shwayder, Great Lakes Commission, 734-665-9135, shwayder@glc.org.

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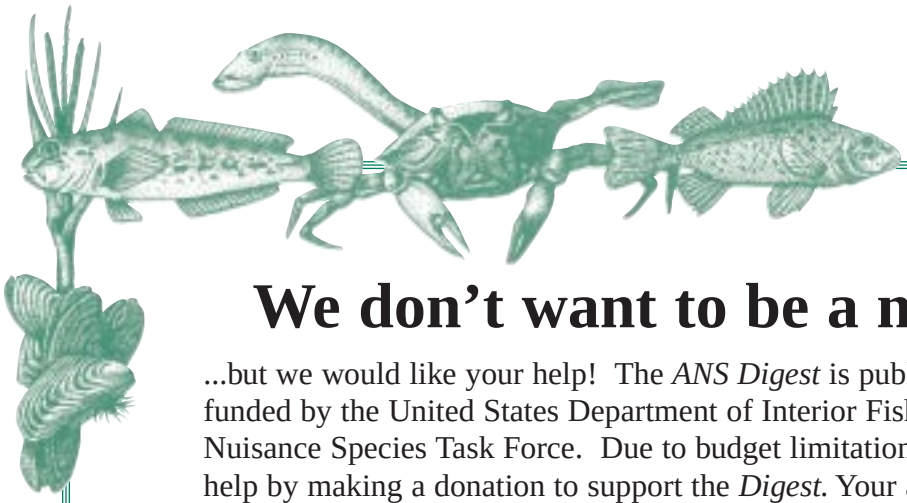

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