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2002 ANNUAL REPORT

Message from the Gulf of Mexico Regional Panel

The Gulf of Mexico Regional Panel is pleased to present its 2002 Annual Report on Aquatic Invasive Species to the national Aquatic Nuisance Species Task Force. The Gulf Regional Panel's goal in aquatic invasive species management is to maintain ecosystem health and preserve biodiversity in the Gulf region, in a manner that provides a high quality of life for residents and sustains local and regional economies dependent on these healthy ecosystems. It is well recognized that established aquatic invasive species require intensive management, and that preventing new introductions is the most effective and lowest cost strategy for control. As such, the Gulf Regional Panel is committed to assisting the five Gulf States - Alabama, Florida, Louisiana, Mississippi, and Texas - in managing their individual and shared aquatic invasive species issues through prevention, early detection, control, restoration, research, outreach, and information management efforts.



In 2002, administrative oversight of the Gulf Regional Panel transferred from the Environmental Protection Agency's Gulf of Mexico Program to the Gulf States Marine Fisheries Commission. The restructured Gulf Regional Panel will continue to report solely to the national Aquatic Nuisance Species Task Force. The 2002 Annual Report provides a summary of this transition and the restructured Gulf Regional Panel. Information on the reauthorization of the National Invasive Species Act of 1996, aquatic invasive species accomplishments for 2002 from each Gulf state, and an update on several individual aquatic invasive species in the Gulf region are also included in the Annual Report.

The restructured Gulf Regional Panel thanks the Gulf of Mexico Program and past members who contributed to the achievements to date, and looks forward to the successful pursuit of its aquatic invasive species management goals in 2003 and beyond.



Table of Contents

Restructuring the Gulf of Mexico Regional Panel	4
- Overview of the Restructuring Process	4
- Gulf Regional Panel Meeting: October 1 - 2, 2002	4
- Gulf Regional Panel Work Groups	4
Reauthorization of the National Invasive Species Act	8
- Interstate Commission Recommendation on Regional Panels for the Reauthorized National Invasive Species Act	8
2002 Gulf of Mexico Region Accomplishments	10
- 2002 Accomplishments: Alabama	10
- 2002 Accomplishments: Florida	10
- 2002 Accomplishments: Louisiana	11
- 2002 Accomplishments: Mississippi	12
- 2002 Accomplishments: Texas	14
- 2002 Accomplishments: Gulfwide	15
2002 Aquatic Invasive Species Updates	16
- Four Important Invasive Species in the Gulf Region	16
- New Species and Significant Range Expansions for 2002	19
Gulf Regional Panel Organizational Structure and Membership	21
Acknowledgements	23

Restructuring the Gulf of Mexico Regional Panel

Overview of the Restructuring Process

The Gulf of Mexico Program (GMP) provided management of the Gulf Regional Panel beginning in 1999, when the GMP's Invasive Species Focus Team (ISFT), then the Nonindigenous Species Focus Team, was invited by the national Aquatic Nuisance Species (ANS) Task Force to serve as the Gulf Regional Panel. The GMP Policy Review Board determined that the GMP Management Committee was more broadly structured and asked the ANS Task Force to allow the Management Committee to serve as the Gulf Regional Panel. The ANS Task Force agreed, and the Management Committee subsequently served as the Gulf Regional Panel. In December 2001, an ad hoc committee of the GMP Management Committee was charged to work with the ISFT to develop recommendations on the future of the Gulf Regional Panel. At the Management Committee's annual meeting in May 2002, the ad hoc committee recommended that the Gulf Regional Panel be restructured to transfer administrative support from the GMP to the Gulf States Marine Fisheries Commission (GSMFC). The Management Committee accepted the recommendation and withdrew the ISFT and the Gulf Regional Panel. A June 7, 2002 letter from the GMP formally notified the co-chairs of the ANS Task Force of the GMP's intentions with regard to the Gulf Regional Panel, and a letter subsequently was sent out to ANS Task Force members to solicit comments on the transition of the Gulf Regional Panel. Following the receipt of comments, the ANS Task Force formally invited the GSMFC to assume administrative management of the new Gulf Regional Panel, which became effective September 1, 2002. The first meeting of the newly restructured Gulf Regional Panel was held on October 1-2, 2002 (see below). The organizational structure and membership of the Gulf Regional Panel is presented on pages 20-21 in this report.

The Gulf Regional Panel receives administrative support from the GSMFC, and reports directly to the ANS Task Force. Specific activities of the GSMFC in support of the Gulf Regional Panel include:

- facilitating communication among Gulf Regional Panel members,
- planning and coordinating two Gulf Regional Panel meetings per year,
- maintaining an administrative record of Gulf Regional Panel meetings,
- providing staff support for development of Gulf Regional Panel documents, and
- providing fiscal management of funds supporting Gulf Regional Panel activities.

In addition, the GSMFC will act as a liaison between the Gulf Regional Panel and the ANS Task Force, provide logistical and administrative support for Gulf Regional Panel committees and sub-groups, and prepare and present an Annual Report from the Gulf Regional Panel to the ANS Task Force.

Gulf Regional Panel Meeting: October 1 - 2, 2002

The first meeting of the restructured Gulf Regional Panel was conducted on October 1-2, 2002, in Tampa, Florida. The Gulf States Marine Fisheries Commission (GSMFC), as the new administrative body supporting the Gulf Regional Panel, organized the meeting. The primary objectives of the meeting were to provide information on the Gulf Regional Panel's origin and responsibilities, aquatic invasive species activities at the national level, and the organization of the restructured Gulf Regional Panel. Meeting participants received overviews and participated in discussions of the following topics:

- The national ANS Task Force, and responsibilities of the Gulf Regional Panel to the Task Force.
- The National Invasive Species Council and the Invasive Species Advisory Committee.



- Reauthorization of the National Invasive Species Act.
- The U.S. Geological Survey's Nonindigenous Aquatic Species Database and associated website.
- The regional website Nonindigenous Species in the Gulf of Mexico Ecosystem, cosponsored by the GSMFC and the Gulf Coast Research Laboratory Museum.
- Species updates on giant salvinia, brown tree snakes, Asian swamp eels, snakeheads, and lionfish.
- Gulf Regional Panel activities to date, including the Initial Survey of Aquatic Invasive Species Issues in the Gulf of Mexico Region document, ballast water workshops, the shrimp virus initiative, and past recommendations of the Gulf Regional Panel.
- The status of Gulf state invasive species management plans.
- GSMFC administrative issues, including the Regional Panel Grant Agreement and the Sport Fish Restoration Program.
- Updates on preparation of the Gulf Regional Panel's 2002 Annual Report.
- Membership of the restructured Gulf Regional Panel.
- Development of a charter document for the restructured Gulf Regional Panel.
- Establishment of a steering committee for the restructured Gulf Regional Panel.
- Organization of work groups.

Prior to adjourning, the Gulf Regional Panel members asked Ron Lukens to continue to serve as Chairman for the next meeting, when a formal election of Chair and Vice-chair will be held. The next Gulf Regional Panel meeting was tentatively scheduled for spring 2003.

Gulf Regional Panel Work Groups

Gulf Regional Panel members established seven work groups at the initial meeting of the restructured Gulf Regional Regional Panel in October 2002. The themes of these work groups are based on themes listed in the National Invasive Species

Council's National Invasive Species Management Plan (<http://invasivespecies.gov/council/nmp.shtml>), and include Pathways and Prevention, Eradication/Control/Restoration, Vessel-Mediated Transport, Education and Outreach, Early Detection/Rapid Response, and Information Management. An International Cooperation work group was not deemed necessary at this time, because Mexico has a seat (currently unoccupied) on the Gulf Regional Panel. In addition, the U.S. Coast Guard has a unique relationship with Mexico, and this may be a good forum in which to introduce an invasive species dialogue.

Pathways/Prevention

Pathways and prevention are integrally tied, since the ability to prevent the transport of a non-native species is most often directly related to the potential to interrupt the transport pathway, or to prevent non-native organisms from ever entering the pathway.

Charge: Identify pathways 1) through which non-native species are known or thought to be transported into the Gulf of Mexico region and 2) which have the potential for effective interdiction. Develop plans and recommendations for approaches to addressing prevention of transport of non-native species into the Gulf of Mexico region by addressing their transport pathways. Time lines for completing specific tasks should be identified.

Eradication/Control/Restoration

Once a non-native species has entered the region, the most effective approach to controlling its spread is to eradicate the species. This is likely only possible in the very early stages of invasion (early detection and rapid response), but remains the most desirable post-invasion result. Barring eradication, management and control actions will be required to halt or minimize the growth of the incipient population and the spread of the non-native organism to other areas. Restoration involves actions that are taken to try to return the habitat and native organisms to their pre-invasion



status following successful eradication efforts. Restoration can be useful in controlling the growth and spread of the incipient population.

Charge: Identify those non-native organisms for which eradication is possible. Develop recommendations for actions to effect eradication. Identify those non-native organisms for which management and control actions are needed in order to halt or minimize the growth and spread of the population. Develop recommendations for actions to halt or minimize the growth and spread of the population. Develop recommendations for actions to restore habitats and native populations to pre-invasion status. Time lines for completing specific tasks should be identified.

Vessel-Mediated Transport

Vessel-mediated transport is a category of pathways that includes ballast water, other vessel piping and watering systems, and organisms attached to hulls. Some of the most significant invasions of non-native species were the result of vessel-mediated transport, primarily via ballast water. Recent concern has been expressed over other transport mechanisms associated with vessels. While this is a pathway category, it is separated from the Pathways/Prevention Work Group because of its significance.

Charge: Identify those species that are or are likely to be transported into the Gulf of Mexico region through vessel-mediated pathways. Identify information needs regarding vessel traffic throughout the region, and develop recommendations for actions to halt or minimize the transport of non-native organisms via vessels using ports in the Gulf of Mexico region. Time lines for completing specific tasks should be identified.

Research/Development

Research and development needs range from basic biological/life history research to data collection to technological development addressing the various aspects of non-native species. For many species and many pathways, the lack of basic research and technological development is the key factor constraining the ability to effectively address a non-indigenous species invasion.

Charge: Identify important research needs to address biological, ecological, and environmental aspects of non-native species transported into the Gulf of Mexico region. Develop recommendations for needed research. Identify non-native species invasions for which technological development is needed to eradicate or halt the growth or spread of an invasion. Develop recommendations



for specific technological needs. Time lines for completing specific tasks should be identified.

Education/Outreach

Many non-native organisms are unwittingly transported by the general public, businesses, and industries that are unaware of the implications of their actions. Even after an invasion has occurred, non-native organisms can be spread over wide areas by otherwise innocent activities. For example, aquatic weeds, zebra mussels, and other organisms can be transported on recreational boats, both by trailering or running from one water body to another. Education and outreach to the public, businesses, and industry can provide vital information that will allow those groups to minimize their impact on the unwitting distribution of non-native organisms.

Charge: Identify target audiences for which education and outreach materials would be appropriate. Identify and recommend specific education and outreach materials that need to be developed to provide to the target audiences. Develop strategies for evaluating the effect of education and outreach efforts. Time lines for completing specific tasks should be identified.

Early Detection/ Rapid Response

If eradication is to be successful, strategies for detecting non-native species invasions in their earliest stages are critical. Once detection of an invasion has been confirmed, a mechanism that enables a rapid response to the invasion is vital to achieving eradication or effective control, if eradication is not possible.

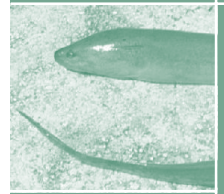
Charge: Identify strategies and methods for early detection. Existing monitoring programs should be considered and evaluated for their appropriateness for fulfilling this need. If gaps are discovered, recommendations for monitoring should be developed. Agencies and organizations with authorities and responsibilities to address non-native aquatic invasive species, and which have

assets and resources that could be made available should be identified. Strategies should be developed for employing those assets and resources in a rapid deployment to address incipient invasions. Time lines for completing specific tasks should be identified.

Information Management

An efficient and readily available mechanism must be employed to make data and information accessible to agencies and organizations to develop effective prevention and control strategies and to implement those strategies. Internet access to data and information is one of the most effective delivery methods currently available.

Charge: Identify data and information needs for prevention and control actions. Work with appropriate web page and database management facilities to assure that available data and information are accurate and complete. In addition, recommendations for accessibility should be developed. Informational sections of web pages should be evaluated and recommendations made for updating. Time lines for completing specific tasks should be identified.



Reauthorization of National Invasive Species Act

Nonindigenous species have been present on land and in the waters of the United States for centuries. Indeed, many species known to be nonindigenous or invasive have become so commonplace that most people are not even aware that they were introduced, either intentionally or unintentionally. Impacts from invasive species have occurred in small increments over many years, and have resulted in complete changes in the environment that often make the habitat unsuitable for native species survival.

In 1990, the Congress passed and the President signed into law the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA), which was designed to provide coordination of federal agency activities to address aquatic invasive species. Of particular importance were the provisions for a national ballast water management program, the establishment of the national Aquatic Nuisance Species (ANS) Task Force, and the call for the development of state aquatic invasive species management plans. In 1996, The NANPCA was reauthorized and became the National Invasive Species Act (NISA). This legislation strengthened the ballast water provisions and added generic language for establishing regional panels around the country to provide regional priorities and recommendations to the ANS Task Force.

Late in 2002, bills were introduced in the House of Representatives and the Senate to reauthorize NISA, entitled the National Aquatic Invasive Species Act (NAISA). A hearing on the House Bill was held in November 2002; however, no further action was taken, and the bills languished as the 107th Congress adjourned. Sponsors of the bills committed to reintroducing them in the 108th Congress within the first 100 days of the session. Stakeholders will be following this issue closely.

There are a number of important provisions in the bills. Funding authorizations are significantly

increased. In particular, funding to support state management plans is increased. Assistance to the states will be critical in enabling states to address their invasive species concerns. The provisions allow funding to assist states in developing and implementing their plans, whereas prior to these changes, states could only receive funding to implement plans. The new bills also make the heretofore voluntary ballast water management program mandatory. In addition, they call for screening of planned importation of non-native species not currently in trade. A number of other provisions in the bills will strengthen the Nation's ability to address the continued threat of new invasive species and management and control of existing invasive species in a unified way. The Gulf Regional Panel has been involved with development of recommendations regarding the language in the bills and strongly supports passage of this important reauthorization.

Interstate Commission Recommendation on Regional Panels for the Reauthorized National Invasive Species Act

In 2002, the Gulf, Atlantic, and Pacific States Marine Fisheries Commissions, the Great Lakes Commission and the Great Lakes Fisheries Commission agreed to pursue legislative authorization to establish regional programs to implement regional, multi-state, and state-federal programmatic actions to address invasive species issues along the coastline of the United States. The language below was formally adopted by the interstate commissions, and has been recommended as language to include in the reauthorization of the National Invasive Species Act.

Interstate Commissions: The Atlantic, Gulf, and Pacific States Marine Fisheries Commissions (Marine Fisheries Commissions), the Great Lakes Commission (GLC), and Great Lakes Fisheries



Commission (GLFC) are each authorized to establish regional programs to address coastal freshwater, estuarine, and marine aquatic invasive species. Such regional programs will be implemented at the discretion of each interstate commission upon a decision by their respective member states.

Regional programs developed pursuant to this provision will:

- i. coordinate and cooperate with the ANS Task Force,
- ii. coordinate and cooperate with Regional Panels which correspond with the geographic area in which an regional interstate program is developed, and
- iii. utilize, to the maximum extent possible, products and recommendations of the ANS Task Force and appropriate Regional Panels to formulate regional program action plans.

These provisions will ensure that all coastal aquatic invasive species activities within a region are consistent and compatible, and that there is no duplication of effort or divergence of program resources.

(1) Plan Development: The three Marine Fisheries Commissions and the GLC and GLFC will provide coordination and administration for the development of a regional plan for prevention and control of coastal estuarine and marine aquatic invasive species for their respective member states.

(A) Regional plans developed under 1204(c) 1(A) will be compatible with and not be in conflict with or supersede any other plan developed by a state which is a member of a Marine Fisheries Commission or the GLC or GLFC to address aquatic invasive species.

(B) Marine Fisheries Commissions and the GLC and GLFC are each authorized to establish a program to coordinate and administer coastal freshwater, estuarine, and marine aquatic invasive species prevention and control activities conducted by the states.

(2) Plan Implementation: The three Marine Fisheries Commissions and the GLC and GLFC are authorized to establish programs to provide coordination and administration to implement regional plans developed under their auspices. Coastal invasive species programs will coordinate with the ANS Task Force and the appropriate Regional Panels as established in Subsection 2, 1201 and 1203 as amended, respectively.

Interstate Marine Fisheries Commissions, GLC, GLFC, and Coastal States funding to carry out the activities of coastal, freshwater, estuarine, and marine invasive species prevention and control will be administered through the Department of Commerce/National Oceanic and Atmospheric Administration/National Marine Fisheries Service through cooperative agreements with the appropriate Marine Fisheries Commissions and the Department of the Interior/U.S. Fish and Wildlife Service through cooperative agreements with the GLC and the GLFC.

(A) Sufficient funding will be provided for programmatic activities, and will be split equally among the Great Lakes, Atlantic, Gulf, and Pacific coastal states to be administered by the respective Marine Fisheries Commission, the GLC, and the GLFC.

(B) The Great Lakes, Atlantic, Gulf, and Pacific States Marine Fisheries Commissions are each authorized to receive funding to coordinate and administer the planning and implementation of a program to prevent and control coastal freshwater, estuarine, and marine aquatic invasive species in coastal and marine waters under their respective jurisdictions.



2002 Gulf of Mexico Region Accomplishments

2002 Accomplishments: Alabama

Alabama Marine Resources Division Invasive Species Monitoring

The Alabama Marine Resources Division monitors all specimens collected in its monthly assessment program and identifies them to the species level when possible. Unidentified specimens are preserved and other experts are consulted for a definitive identification. In 2002, Leslie Hartman was assigned the duty of monitoring invasive species occurrences in Alabama in response to the increasing threats posed by aquatic invasive species in the Gulf region. Ms. Hartman received Aquatic Nuisance Species - Hazard Analysis Critical Control Point training sponsored by U.S. Fish and Wildlife Service. She attended Alabama's first statewide Aquatic Nuisance Species Planning meeting sponsored by the Alabama Department of Conservation of Natural Resources, and participated in rapid assessment planning for an invasive species investigation of Mobile Bay scheduled for the fall of 2003.

2002 Accomplishments: Florida

Florida's Aquatic Plant Management Program

In 2002, invasive nonindigenous plants were reported in 96% of the 426 public lakes and rivers surveyed in Florida, waterbodies that comprised 1.26 million acres of freshwater. Floating plants, such as water hyacinth (*Eichhornia crassipes*) and

water lettuce (*Pistia stratiotes*), covered 7,680 acres statewide during 2002, and are under maintenance control in 95% of the 244 public waterbodies that they infest. Approximately \$3.1 million were spent controlling 23,200 acres of floating plants during fiscal year 2001-2002.



Hydrilla (*Hydrilla verticillata*) has been found in as many as 257 public waterbodies in Florida over the past seven years, and is considered to be under maintenance control in the majority of waterbodies surveyed in 2002. An estimated 48,715 acres of hydrilla were reported standing in public waterbodies in 2002. Approximately \$17.3 million were spent managing hydrilla in public waterbodies during fiscal year 2001-2002. In 2002, two giant salvinia (*Salvinia molesta*) infestations were found near Naples, Florida. These infestations were treated with the goal of containment and eradication. These efforts are on-going, and giant salvinia was not detected at these locations during the last several months of 2002.

Florida Fish and Wildlife Conservation Commission Activities (FFWCC)

In 2002, the FFWCC Non-Native Fish Research Laboratory continued investigations into the Asian swamp eel (*Monopterus albus*) and the bullseye snakehead (*Channa marulius*). Distribution and





dispersal of swamp eels in south Florida canals were investigated, along with sampling to determine associations with native freshwater fish. Life history studies were continued on the bullseye snakehead, and included food habits, fecundity, lower lethal temperatures, and length and weight measurements. Other exotic fishes currently under investigation by the FFWCC include brown hoplos (*Hoplosternum littorale*), *Theraps* hybrid, clown knifefish (*Notopterus chitala*), spotfinned spiny eel (*Macrogathus siamensis*), and eastern happy (*Haplochromis callipterus*). This work is part of ongoing studies of introduced fishes in southeastern Florida urban canals.

2002 Accomplishments: Louisiana

Louisiana State Management Planning Efforts

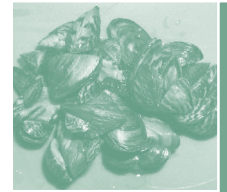
In 2002, Governor Mike Foster designated the Louisiana Department of Wildlife and Fisheries (LDWF) as the lead in organizing a comprehensive approach to state invasive species management planning efforts. In the summer of 2002, an Executive Briefing was conducted to kick off the management planning project. Speakers invited to make a presentation to an invitation-only audience of executive stake holders included Dr. Jim Carlton (Williams College), Dr. Jack Isaacs (LDWF economist), Keith Stoma (Entergy), Peter Johnston (Waterman Shipping Co.), and Jason Baker, the primary writer of the Massachusetts state plan. This initial work was funded by grants through the Gulf of Mexico Program.

Early in 2002, Alysia Kravitz and Richard Campanella from the Center for Bioenvironmental Research at Tulane and Xavier Universities were hired to research and write the state management plan. Governor Foster signed an Executive Order establishing a task force to work with these writers. The 29 members on the task force are representatives from state and federal government agencies, university researchers, and other stakeholders. The writers give task force members homework questions to complete between meetings, to expedite plan development. The draft state plan is scheduled for completion by the end of 2003.

Louisiana Sea Grant College Program Invasive Species Outreach Activities

Invasive species outreach in Louisiana has focused on teachers, students, and the general public. In 2001-2002, Louisiana Sea Grant supported a booth on invasive species at the Earth Day celebration in Baton Rouge, at the Louisiana Science Teacher's Association (LSTA) convention in Lafayette, and at Ocean Commotion, a one-day event for middle and elementary school students and teachers held on Louisiana State University's campus. Sea Grant produced a brochure entitled "Be on the Lookout," that identifies species currently known to be invasive in Louisiana and the species that should be monitored as strong candidates for invasion. Sea Grant also published a book for children in grades 3-5, that demonstrates how invasions change an ecosystem, and how human intervention is necessary to control invasive species. The book is entitled, "OH NO! Hannah's Swamp is Changing", and has several activities associated with it, including a poster on which students find and color native and invasive species. The book is coordinated with the science curriculum at those grade levels and meets state and federal science education standards. Workshops for teachers were conducted on this book at LSTA and at the Ouachita Parish Teachers Professional Education Day. Workshops are currently under development for teachers to stimulate use of the book during 2003.

In developing the state management plan, Sea Grant has conducted education outreach during task force sessions to help the task force members understand



the many threats to Louisiana. In many cases, they are only familiar with one or two high profile invasive species. Sea Grant developed a briefing book that familiarizes the task force members with the management planning process as well as gives them background to help them in their work. The Sea Grant legal staff is conducting research on the legal aspects of the management plan.

2002 Accomplishments: Mississippi

Zebra Mussels (*Dreissena polymorpha*)

On February 14, 2002, staff of the Gulf Coast Research Laboratory (USM-IMS) collected three zebra mussels from Mississippi Sound between Cat Island and Gulfport, representing the first report of zebra mussels from Mississippi waters. These specimens were collected at Station 58, adjacent to the Gulf Intracoastal Waterway just south of the Gulfport ship channel, during routine sampling associated with the Gulf of Mexico Estuarine Inventory. Identification of the specimens was verified by Doug Shelton, Alabama Malacological Research Center in Mobile, Alabama. Other native mussels have been found with banding patterns, and thus identification is a very important process to be achieved through expert verification (as in this case) or by genetic methods. While the specimens were unattached, byssal threads were evident, indicating prior attachment. The specimens, alive when collected, were about the size of a thumbnail. These were initially assumed to be juveniles, but it was noted that zebra mussels can mature at 2cm, and thus the specimens might have been adults. Additional samples were collected from this station the following March and April, and monthly sampling has been conducted since May. However, to date, no additional specimens have been collected. Since zebra mussels have not been reported from any other Gulf

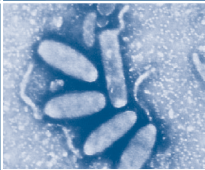
coastal river system, it is assumed that the specimens originated from the Mississippi River and that they were knocked off a vessel hull. A fact sheet was developed by the University of Southern Mississippi's Center for Fisheries Research and Development on the three invasive mollusk species found in the northern Gulf of Mexico; the blue mussel (*Mytilus edulis*) and the Santo Domingo mussel (*Brachidontes domingensis*) were reported in 2001.

Australian Jellyfish (*Phyllorhiza punctata*)

Fishermen and boaters were asked to report sightings of Australian jellyfish in 2002, and two specimens were reported from waters near the barrier islands in Mississippi Sound. Several Australian jellyfish were spotted during the course of routine sampling activities by researchers at the Gulf Coast Research Laboratory; approximately ten jellyfish were observed in waters near the barrier islands in July 2002. A single sighting was reported in August 2002 in waters adjacent to the Biloxi Lighthouse. Tissue samples were taken from three Australian jellyfish medusae in July 2002, and samples were given to Dr. William Graham, Dauphin Island Sea Lab, and to Brian Ortmann of the University of Southern Mississippi for genetic analysis.

Mississippi Department of Wildlife, Fisheries & Parks Tilapia Study

In November 2000, the Mississippi Department of Wildlife, Fisheries & Parks (MDWFP) funded a study of tilapia in coastal Mississippi waters. The objectives of this study were to examine the spatial and temporal distribution of tilapiine fishes in watersheds of south Mississippi, to examine the influence of invasive, nonindigenous tilapiine fishes on the structure of native fish assemblage/community, and to quantify the degree of trophic interaction among tilapiine fishes and native freshwater fishes. Sampling was conducted with nets, seines, and electrofishing for a total of 44 days during the period from November 2000 to June 2002 at 20 sampling locations, either near aquaculture facilities rearing tilapia or where tilapia had been anecdotally reported.



Nile tilapia (*Oreochromis niloticus*) ranked 6th in abundance for all sites. In the Pascagoula and Escatawpa River systems they ranked 2nd in abundance, and in the Simmons Bayou and Coastal Rivers systems they ranked 16th in abundance. Generally, native fish abundance is low at sites where tilapia were collected. Nile tilapia were found at 50% of all sites. Some Nile tilapia as small as 60mm (total length) had eggs. Tilapia yolksac (<4.5mm) and eggs were collected at one site in February 2002. Tilapia from 4.5–430.0 mm were collected during the study. At one site below the effluent outfall from an aquaculture facility, the water temperature never dropped below 15°C providing a thermal refuge for tilapia as the water temperature at the ambient site was below 10.5°C for 30 days. The prey of bluegill and redear sunfish overlap with that of young Nile tilapia. However, young Nile tilapia in this study primarily feed on bottom sediments. More dietary overlap occurred between these native species and adult Nile tilapia. The study concluded that Nile tilapia are not in direct feeding competition with native centrachids.

Black Carp (*Mylopharyngodon piceus*)

The MDWFP provided scientists and interested parties black carp media articles and other literature. The MDWFP did not comment on the Federal Register notice proposing to list black carp as an injurious species of wildlife under the Lacey Act. The MDWFP maintains and updates a file of aquaculturists permitted to use black carp in Mississippi.

Aquatic Plants

The Mississippi Exotic Pest Plant Council (MS-EPPC), established in the summer of 2000 as a non-profit organization to raise awareness, facilitate information exchange, and provide advisory and technical support concerning exotic plant species, conducted a cogon grass symposium in December 2002. The Mississippi Natural Heritage Program and the MS-EPPC have produced a list of the aquatic vascular plants of Mississippi. Of the 166 aquatic vascular species, 15 were recognized as nonindigenous, and less than 10 species should be considered pests.

Other Mississippi Invasive Species Activities

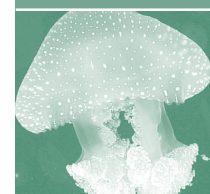
Two invasive species projects were awarded to the University of Southern Mississippi through the Coastal Impact Assistance Program in 2002. The J.L. Scott Marine Education Center and Aquarium in Biloxi received funding to develop educational programs and to promote public awareness on invasive species. The Center for Fisheries Research and Development at the Gulf Coast Research Laboratory is in the process of compiling a comprehensive list of the marine fauna in coastal waters of the state of Mississippi. This list will be maintained by the Natural History Museum in Jackson and will form the baseline inventory of known organisms from coastal waters of Mississippi.

2002 Accomplishments: Texas



Aquatic Vegetation Management

In Texas there are an estimated 45,000–85,000 acres of nonindigenous aquatic vegetation (35,000–70,000 acres of hydrilla, 5,000–7,500 acres of water hyacinth, 3,000–6,000 acres of Eurasian watermilfoil (*Myriophyllum spicatum*), 1,000–2,000 acres of alligatorweed (*Alternanthera philoxeroides*), 500 acres of giant salvinia, and 200 acres of water lettuce). Under Texas' State Aquatic Vegetation Plan (SAVP), all vegetation management activities require the submittal of a treatment proposal to the Texas Parks and Wildlife Department (TPWD), as well as to the local governing entity (e.g., river authorities, water districts, etc.). The proposal must then be found to be consistent with the SAVP before further action may be taken. During calendar year 2002, 77 treatment proposals were submitted to TPWD. These proposals involved 12,175 acres of nonindigenous vegetation. Proposals included 830.5 acres of physical removal, 5,163 acres of



biological control, and 6,181 acres of herbicide treatment. Vegetation management hotspots include the Rio Grande (hydrilla and water hyacinth), Lake Texana and Toledo Bend Reservoir (giant salvinia and water hyacinth), Caddo Lake (water hyacinth), southeastern Texas (water hyacinth), and Lake Austin (hydrilla).

TPWD, in cooperation with several other organizations, plans to implement a long term, integrated pest management strategy to control hydrilla in Lake Austin. Flooding of Lake Austin in July 2002 caused extensive damage and was attributed to hydrilla intrusion. The Lake Austin plan incorporates all available methods of eradicating hydrilla, including stocking of sterile triploid grass carp to

eat hydrilla, drawing down the level of the lake to restrict hydrilla growth, using mechanical harvesters to remove hydrilla, applying pesticides to kill hydrilla, and using insects that eat hydrilla.

Galveston Bay Invasive Species

Assessment Project

The Galveston Bay Invasive Species Assessment Project has three primary objectives: to accumulate and assess existing information on exotic species invading Galveston Bay ecosystems, to identify and evaluate control methods used on these or similar species, and to conduct a risk assessment for species identified. The compilation of a list of current and anticipated problem species in Galveston Bay is underway. In addition, a survey has been developed for distribution to resource agencies and other groups involved with invasive species management to augment the species list. Once completed, the species list will be analyzed by local experts and prioritized according to criteria including but not limited to level of ecological threat and potential to control. The Assessment Project should be completed by the end of 2003.

2002 Accomplishments: Gulfwide

Nonindigenous Species in the Gulf of Mexico Ecosystem Website and Database

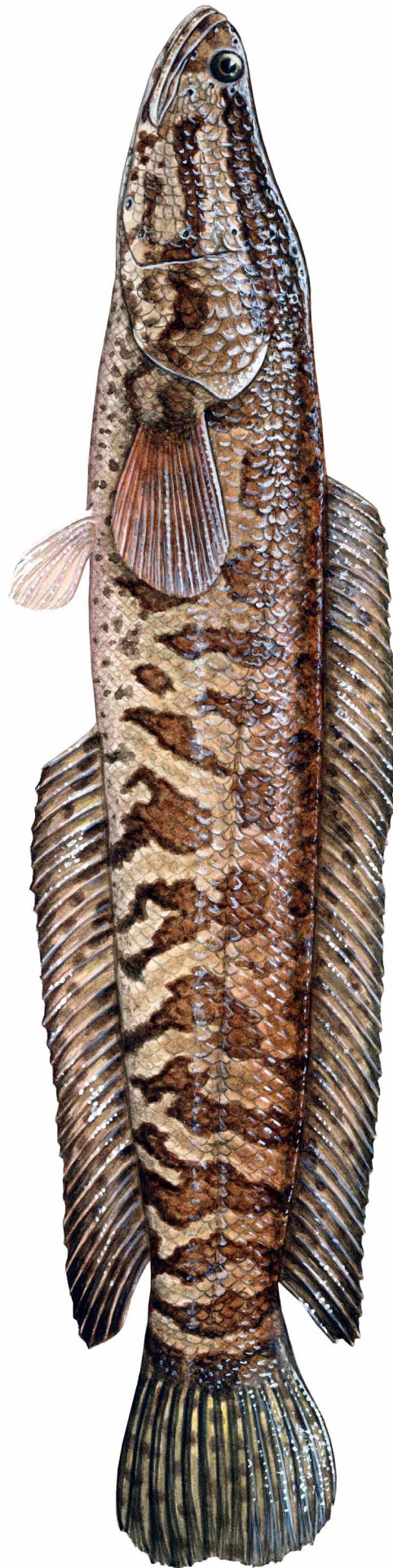
One of the most important tasks identified in the National Invasive Species Plan is the development, implementation, and management of a web site and database for invasive species. Such a site provides instantaneous access to the most updated information on invasive species processes and species records/accounts. In late 2002, the Gulf States Marine Fisheries Commission (GSMFC) began management of a web site and database originally developed by the Gulf Coast Research Laboratory/Institute of Marine Sciences/University of Southern Mississippi. The work was funded under a grant provided by the GMP. Upon receipt of the web site and database, it was apparent that some work would be required to bring it up to date. The GSMFC staff began immediately to rework the information and identify needs for data updates.



The structure of the web site currently focuses on supporting the database and queries on species accounts. Plans are underway to make the site a comprehensive invasive species site, including general information about invasive species, region-specific information about invasive species, information on the Gulf Regional Panel and its relationship with the ANS Task Force, federal and state legislation related to invasive species, updating occurrence data, and streamlining the query process. Significant progress is expected during 2003 regarding the general content and format of the web site.

In addition to the activities discussed above, the Gulf Regional Panel established an Information Management Work Group (discussed on page 7 of this report), during the meeting held in October 2002. During that meeting, it was discussed that the Work Group would provide general and technical assistance to the GSMFC staff regarding keeping the text content and the data updated. In addition, the Work Group will provide advice on all phases of restructuring the web site.

There is currently a cooperative initiative underway among the U.S. Geological Survey office in Gainesville, Florida, the Smithsonian Environmental Research Center, NatureServe, and the GSMFC to establish a distributed query, whereby individuals can access data from each of the databases managed by the agencies/organizations listed above through a single query. Work is currently underway to develop the computer programs to support the distributed query.



2002 Aquatic Invasive Species Updates

Four Important Invasive Species in the Gulf Region

Rio Grande Cichlid

(Cichlasoma cyanoguttatum)

The Rio Grande cichlid is the only cichlid native to the United States. It was originally restricted to the lower reaches of the Rio Grande drainage, but has been introduced into the Edwards Plateau region of central Texas and into Hillsborough, Polk, and Dade counties, in Florida. It is also widely distributed in the canals on the southern end of Lake Ponchartrain in New Orleans. This species is taken as a sport fish both in Florida and Louisiana. In Florida it appears to be less frequently taken, since it does not become abundant in this part of its introduced range. However, in Louisiana the species is often the only species taken in certain areas around New Orleans, having extirpated most other sport fish species. Recreational fishing may provide a means to reduce the abundance of this species, although such a management option would likely result in the permanent residence of the species in time.



Asian Clam (*Corbicula fluminea*)

Asian clams naturally occur in southeast China, Korea, and in the Ussuri Basin of southeastern Russia. This species is found in freshwaters throughout the United States, including all five Gulf states and northern Mexico. Estuarine populations have been reported for San Francisco Bay, California and Chesapeake Bay, Virginia, but no estuarine populations have been reported to date for the Gulf of Mexico ecosystem. Over its native range the Asian clam is marketed fresh or dry for human consumption and as feed for domestic fowl. In the United States this species is commercialized as fish bait.

The date and means of introduction of the Asian clam is not known. Generally, the introduction of this species is attributed to Chinese immigrants who used Asian clams as food. The earliest verifiable record of this species in North America consists of three specimens found dead on the beach at Nanaimo, Vancouver Island, British Columbia in 1924. Asian clams are believed to have established a viable population on the west coast of the United States sometime prior to 1938, but they may have been established as early as the mid 1800's. Early records taken in the late 1930's and early 1940's exist for the Sacramento and San Joaquin River systems in California and the Columbia River system in Washington. From there this species rapidly invaded the Colorado, Tennessee, and Ohio River systems, spreading east along the Gulf states to the Florida panhandle by 1960, and to southern Florida by 1967. The Asian clam was first reported in the Mobile River in 1962, where it was



The Rio Grande cichlid probably alters the structure of fish communities where abundant, through aggressive interactions and/or direct competition for resources. There have been reports of variation in the trophic ecology of this species, which were tentatively attributed to competition with centrarchids for resources. Additional study of this species is urgently needed to understand conditions that seem to afford this species tremendous scope for expansion in Louisiana while others seem to limit its spread in Florida.

described as "abundant". It was first reported for the Savannah River in 1972 and reached Virginia that same year.

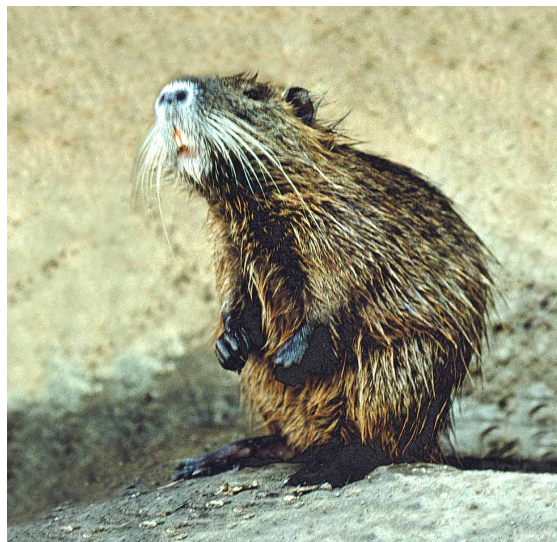
Transport on barges containing river gravel probably contributed to its rapid spread. Other means of dispersal may have included transport by waterfowl, intentional releases by recreational aquarists, and intentional or accidental releases by fisherman who used this species as bait. In Alabama, besides the expanding populations from the west, the asian clam may have been introduced into the Saugahatchee Creek from experimental ponds of the Auburn University Department of Fisheries and Applied Aquaculture in the summer of 1972. The history of introduction of the asian clam into Texas is largely unknown. However, the Asian clam has been reported as common in freshwaters of Texas. In any case, Asian clams have had one of the most rapid range expansions of any nonindigenous species in North America.

Because of its reproductive success and high infestation, this species has become a serious pest throughout the United States, especially in irrigation and drainage canals, as well as water distribution and industrial water use systems. Given the high growth and production rates of this species, concerns have been raised over the capacity Asian clams have to alter trophic and nutrient dynamics of aquatic systems, and to displace native bivalves. In addition, Asian clams appear to be capable of tolerating polluted environments better than many native bivalves.

Nutria (*Myocastor coypus*)

Nutria are native to southern Brazil, Bolivia, Paraguay, Uruguay, Argentina, and Chile, but in the Gulf of Mexico ecosystem, they are established along coastal areas of all five Gulf states. Nutria were intentionally introduced into North America for their fur. They were extensively marketed as the next "mink". However nutria fur never caught on in the United States. Nutria were first introduced into the Gulf of Mexico near New Orleans in the early 1930's. It's believed that all the individuals released during this first introduction were recaptured by trappers. In 1938, between 12 and 20

nutria imported from Argentina were introduced into Avery Island, Louisiana by Tabasco tycoon E.A. McIlhenny. These individuals reproduced prolifically. Many escaped from captivity or were released, and rapidly multiplied in the wild. The first specimens of nutria appeared in the Louisiana fur market during the 1943-44 season. In the 1945-46 season the number of nutria trapped reached 8,784. The number of nutria present in Louisiana was reported to have reached one million by 1957. By the 1969-70 season over 1.5 million nutria were trapped in Louisiana alone. Presently, they are more important than the muskrat in Louisiana's trapping industry.



Nutria have expanded their range throughout the Gulf states at an alarming rate. There is a healthy population established along the north and central parts of the western coast of Florida. As is the case with most other populations, this population originated from individuals which migrated from Louisiana, and individuals that were intentionally or accidentally released from nutria fur farms within the state. Additionally, nutria have been introduced throughout the Gulf of Mexico ecosystem to control aquatic vegetation in lakes and ponds, with negative results. Nutria will readily consume all types of vegetation, and frequently prefer native plants and crop plants to the species they were intended to control.

Nutria numbers peaked in the 1970's, and then began to decline. Weather extremes including





hurricanes, droughts, and freezes, as well as increased trapping, habitat degradation and increases in alligator populations have been attributed to the decline. However, trapping efforts declined in the mid 1980's because of a fall in fur prices, and nutria numbers have since been steadily increasing. Recent attempts to control nutria populations include efforts to commercialize nutria meat.

Nutria may deplete wild vegetation in coastal areas, severely damaging wetlands. Nutria often have damaged soybean plantations near Mississippi's coast. Extensive damage caused to rice plantations has been attributed to nutria both by direct predation of the rice and by extensive damage to the levees surrounding rice ponds caused by burrow digging. In 1957, thousands of nutria were pushed inland by Hurricane Audrey. Many invaded sugar cane fields, where they reeked havoc, damaging innumerable plants many of which they did not even consume. Nutria have also been attributed with the decline of muskrat populations in Louisiana, reportedly competing with muskrats and water fowl for trophic resources. On some of Mississippi's barrier islands, nutria reportedly dig up and eat the roots and rhizomes of sea oats, which are of critical importance in stabilizing beach dunes. Nutria carry a number of parasites and diseases.

In Louisiana, several agencies have joined to develop a five-year program to neutralize the nutria. The goal of the Louisiana Coastwide Nutria Control Program is to reduce marsh degradation from nutria in the state's coastal areas by reducing Louisiana's coastal nutria population by 400,000 animals per year over the next five years. The program increases the value of nutria for the trappers who gain revenue from meat processors and fur dealers. In addition, trappers will receive \$4 for each nutria tail turned in at designated collection centers close to the harvest areas.

Green Mussel (*Perna viridis*)

Perna viridis occurs naturally and is widely distributed in the Indo-Pacific. *P. viridis* may potentially increase its geographical distribution by step-wise larval dispersal, or "island hopping." The green



mussel was first recorded from Trinidad in the mid-1990s. The bivalve is not part of the native fauna of northern South America, but later moved southward from Trinidad to the Gulf of Paria in Venezuela by mode of prevailing currents in 1993. The green mussel is now well established in the Tampa Bay estuary, first discovered by divers conducting maintenance work at the TECO powerplant in South Hillsborough County. It is believed that the larvae may have been transported to Tampa Bay via ballast water. Consequently, the threat of invasion to neighboring coastal ports from intercoastal transport is now a distinct possibility that will require monitoring.

P. viridis could be commercially important because of rapid growth rate and high population densities. The green mussel is also a good candidate for cultivation because reproduction can be induced throughout the entire year. The mussel can also be transplanted from one environment to another with little adverse effect to the mussel itself. The green mussel has also been used as an indicator of heavy metal, organochlorine, and petroleum hydrocarbon contamination.

The accumulation of the green mussel can cause problems for power plants using seawater as a coolant. The mussels can block the flow of water, causing mechanical damage to the pumps by reducing the heat transfer efficiency. Green mussels have also been found clogging condenser

tubes, and can increase the rate of corrosion of tubes. Low levels of constant chlorination near the conduits and high water velocities may detach or kill the green mussels. However, not all mussels are killed and significant numbers are left behind to reproduce and increase the density again. Continuous high-level chlorination of the intake tunnels effectively detaches and kills the green mussels.

New Species and Significant Range Expansions for 2002

The Nonindigenous Aquatic Species Database, hosted and maintained by the U.S. Geological Survey, has been established as a central repository for accurate and spatially referenced biogeographic accounts of aquatic nonindigenous species in the United States. The Database includes scientific reports, spatial data sets, regional contact lists, and general information, and also enables online/realtime queries. The Database contains the following information on new species and significant range expansions of aquatic vertebrates, invertebrates, and plants in the Gulf of Mexico region for 2002.

Vertebrates

- The **giant toad** (*Bufo marinus*) appears to be established in Vero Beach, Indian River County, Florida. Over a dozen specimens have been collected and area residents report collecting more. This population reflects a northern expansion of the species along the southeast coast of Florida.



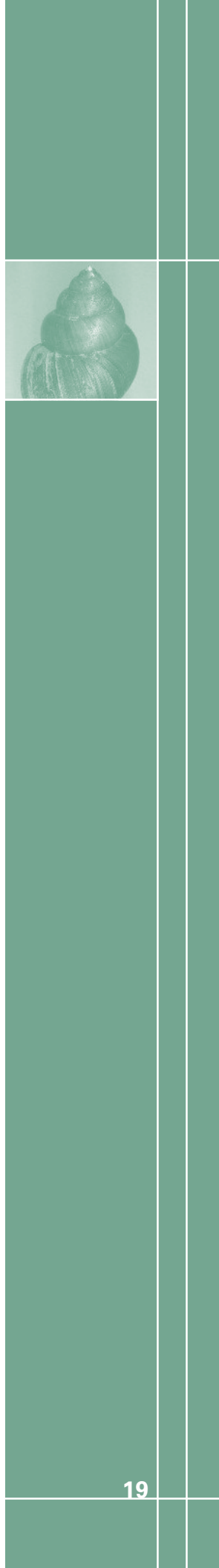
- **Lionfish** (*Pterois volitans*) have been found to be reproducing in the Atlantic from Florida to at least North Carolina. Juveniles have been collected as far north as Long Island. Individuals have also been reported off Bermuda. The source of this population may be aquarium releases, intentional releases by divers, or escapes from a large oceanside aquarium broken during Hurricane Andrew.



- Several **spotfin spinyeels** (*Macrogathus sailmensis*) were collected in May 2002 in a canal adjacent to the Everglades in south Florida. Native to Asia, this species is new to North America.

Invertebrates

- **Zebra mussels** (*Dreissena polymorpha*) were collected in Mississippi Sound, Mississippi in February 2002 (See page 11-12 of this report).



Plants

- **Roundleaf toothcup** (*Rotala rotundifolia*) was first reported in North America from a pond in northern Alabama. Well-established populations have simultaneously been found along urban canals in south Florida. In Florida, flowering and seed producing plants display both terrestrial and aquatic growth forms. The species originates from Southeast Asia, southern India, and Japan. It has been well received in the water garden trade for its brilliant, rose colored flowers and lush, creeping perennial growth. Belonging to the loosestrife family (Lythraceae), its colorful swards of terminal flowers are reminiscent of those of its hardy cousin, purple loosestrife.
- A deeply entrenched colony of the popular aquarium plant, **Cryptocoryne**, was determined to consist of three closely related species *C. beckettii*, *C. wendtii* and *C. undulata*, all coexisting at a karstic spring in Florida. These species are very similar to plants that have been spreading rapidly in the San Marcos River, Texas. The Florida population is expanding clonally in an isolated area while Texas plants are fragmenting and rooting downstream in a shallow river highly affected by visitors and recreational activities.
- The **crested floating heart** (*Nymphoides cristata*) is known for its small, ruffled flower. This species, along with *Nymphoides indica*, recognized for its snowflake like flower, is extremely invasive floating plants in Florida. These pretty, water garden escapees might affect all Gulf states and Hawaii.
- **Asian marshweed** (*Limnophila sessiliflora*) spread to southeast Texas invading shallow waters of public reservoirs.



Gulf of Mexico Regional Panel

Organizational Structure and Membership

FEDERAL

Environmental Protection Agency, Region 4

Bryon Griffith

US Environmental Protection Agency
Gulf of Mexico Program
Building 1103
Stennis Space Center, MS 39529-6000
(228) 688-7161
FAX: (228) 688-2709
Griffith.bryon@epa.gov

National Park Service

Tony Pernas

National Park Service
40001 SR 9336
Homestead, Florida 33034
(305) 242-7846
FAX: (305) 242-7836
tony_pernas@nps.gov

Food and Drug Administration

Tom Herrington

FDA/Gulf of Mexico Program Office
Mail Code: EPA/GMPO
Stennis Space Center, MS 39529-6000
(228) 688-7941
FAX: (228) 688-2306
herrington.tom@epa.gov

National Marine Fisheries Service

Tom McIlwain

National Marine Fisheries Service
Southeast Fisheries Science Center
P. O. Drawer 1207
Pascagoula, MS 39567
(228) 762-4591
FAX: (228) 769-9200
tom.mcilwain@noaa.gov

U.S. Coast Guard

John Meyers

U. S. Coast Guard
501 Magazine Street, Suite 1341
New Orleans, LA 70130
(504) 589-6193
FAX: (504) 589-4999
Jmeyers@D8.uscg.mil

U.S. Geological Survey

Pam Fuller

U.S. Geological Survey
Florida Caribbean Science Center
7920 NW 71st Street
Gainesville, FL 32653
(352) 378-8181 Ext 312
FAX: (352) 378-4956
pam_fuller@usgs.gov

U.S. Navy

Bob Stender

Chief of Naval Education & Training
Code OS 441
250 Dallas Street
Pensacola, FL 32508-5220
(850) 452-4022
FAX: (850) 452-4066
robert-g.stender@cnet.navy.mil

U.S. Fish and Wildlife Service, Region 4

Pat Carter

U.S. Fish & Wildlife Service
1875 Century Blvd., Suite 250
Atlanta, GA 30345
(404) 679-7108
FAX: (404) 679-4141
pat_carter@fws.gov

U.S. Fish and Wildlife Service, Region 2

Bob Pittman

U.S. Fish & Wildlife Service
Region 2
P.O. Box 1306, Rm 3118
Albuquerque, NM 87103-1306
(505) 248-6471
bob_pitman@fws.gov

U.S. Army Corps of Engineers

Al Cofrancesco

U.S. Army Corps of Engineers
Environmental Laboratory
3909 Halls Ferry Rd.
Vicksburg, MS 39180
(601) 634-3182
FAX: (601) 634-2398
cofrana@wes.army.mil

U.S. Department of Agriculture

Vacant

STATE

Texas Parks and Wildlife Department

Dr. Earl Chilton

4200 Smith School Road
Austin, TX 78744
(512) 389-4652
FAX: (512) 389-4405
earl.chilton@tpwd.state.tx.us

Louisiana Dept. Wildlife and Fisheries

Mark McElroy

P.O. Box 98000
Baton Rouge, LA 70898-9000
(225) 765-2865
FAX: (225) 765-5176
mcelroy_mg@wlf.state.la.us

Mississippi Dept. of Marine Resources

Dale Diaz

Mississippi Department of Marine Resources
1141 Bayview Avenue
Suite 101
Biloxi, MS 39530
(228) 374-5022, Ext. 5244
Cell: (228) 216-4010
Dale.diaz@dmr.state.ms.us

Mississippi Dept. Wildlife, Fisheries, and Parks

Dennis Riecke

1505 Eastover Dr.
Jackson, MS 39211-6374
(601) 432-2207
FAX: (601) 432-2203
dennisr@mdwfp.state.ms.us

Alabama Dept. Conservation and Natural Resources

Leslie Hartman

Alabama Department of Conservation
and Natural Resources
Marine Resources Division
P.O. Box 189
Dauphin Island, AL 36528
(251) 861-2882
FAX: (251) 861-8741
lhartman@gulftel.com

Florida Fish and Wildlife Conservation Commission

Scott Hardin
620 S. Meridian
Tallahassee, FL 32399
(850) 488-4068
scott.hardin@fwc.state.fl.us

Florida Department of Environmental Protection

Don C. Schmitz
Florida Dept. of Environmental Protection
Bureau of Invasive Plant Management
3915 Commonwealth Blvd. MS 710
Tallahassee, FL 32399-3000
(850) 245-2809
FAX: (850) 245-2834
Don.Schmitz@dep.state.fl.us

REGIONAL COMPACT

Gulf States Marine Fisheries Commission

Ron Lukens
Gulf States Marine Fisheries Commission
P.O. Box 726
Ocean Springs, MS 39566-0726
(228) 875-5912
FAX: (228) 875-6604
rlukens@gsmfc.org

ENVIRONMENTAL/USER GROUP

Nature Conservancy

George Ramseur
The Nature Conservancy
1709 Government Street
Ocean Springs, MS 39564
(228) 872-8452
gramseur@tnc.org
Robbie Fisher (alternate)

Gulf Restoration Network

Cynthia Sarthou
Gulf Restoration Network
P.O. Box 2245
New Orleans, LA 70176
(504) 525-1528
FAX: (504) 525-0833
cyn@gulfrestorationnetwork.org

LOCAL COMMUNITIES

2 Seats Vacant

COMMERCIAL/INDUSTRIAL

Aquaculture

John Teem
National Aquaculture Association
111 W. Washington Street, Suite 1
Charles Town, WV 25414-1529
(304) 728-2167
FAX: (304) 728-2196
naa@intrepid.net

Port Authority

Paul Carangelo
Port of Corpus Christi Authority
1305 North Shoreline,
Corpus Christi, TX 78401
(361) 885-6137
FAX: (361) 881-5163
paul@pocca.com

UNIVERSITY/RESEARCH

Louisiana State University

Bruce Thompson
Coastal Fisheries Institute
Wetlands Resource Building
Louisiana State University
Baton Rouge, LA 70803-7503
(225) 578-6093/6337
FAX: (225) 578-6513
coetho@lsu.edu

University of Southern Mississippi/Institute of Marine Sciences/Gulf Coast Research Laboratory

Harriet Perry
Director - Center for Fisheries Research and
Development GCRL - USM
P. O. Box 7000
Ocean Springs, MS 39566-7000
693 E. Beach Drive, 39564
(228) 872-4218
FAX: (228) 872-4204
harriet.perry@usm.edu

TRIBAL

2 Seats Vacant

INTERNATIONAL

Mexico

Vacant

SEA GRANT

Marilyn Barrett-O'Leary
Louisiana Sea Grant College Program
103 Sea Grant Building
Louisiana State University
Baton Rouge, LA 70803-7507
(225) 578-6349
FAX: (225) 578-6331
moleary@lsu.edu

Alternate

Dr. Charles (Chuck) Jacoby
cajacoby@ufl.edu

NATIONAL ESTUARY PROGRAMS

David Yeager

Mobile Bay National Estuary Program
4172 Commanders Drive
Mobile, AL 36615
(251) 431-6409
FAX: (251) 431-6450
dwyeager@mobilebaynep.com

AT-LARGE

Herb Kumpf

P.O. Box 427
Banner Elk, NC 28604
(828) 898-2584
hsakumpf@skybest.com

Walter Cortenay, Jr.

U.S. Geological Survey
Florida Caribbean Science Center
7920 NW 71st Street
Gainesville, FL 32653
(352) 378-8181 Ext. 355
FAX: (352) 378-4956
Walter_courtenay@usgs.gov
courtenw@fau.edu

C. James Kruse

National Ports and Harbors Specialist
Texas Sea Grant College Program
701 N. Post Oak
Suite 430
Houston, TX 77024-3827
(713) 686-2971
FAX: (713) 686-5396
j-kruse@ttimail.tamu.edu

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