

# Rapid Response to Aquatic Nuisance Species in the Northeast

Developing an Early  
Detection and  
Eradication Protocol

Workshop Proceedings

*Bar Harbor, Maine*

*May 20 and 21, 2003*





## Acknowledgements

The Northeast Aquatic Nuisance Species Panel would like to thank the following agencies, organizations, and people:

The National Sea Grant Office for their financial sponsorship of the workshop and support of ongoing Rapid Response planning efforts in the region.

All conference speakers, who traveled from near and far to lay the foundation for this workshop. Speakers included:

Lars Anderson  
Nathan Dechoretz  
Steve Early  
Lisa Jameson

Breakout group discussion leaders and panelists for their assistance in framing a complicated planning issue and dealing with the occasional rowdy conference attendee. Discussion leaders included:

Mike Hauser  
Judy Pederson  
Susan Snow-Cotter  
Les Mehrhoff  
Amy Smagula  
John McPhedran

All conference participants for their contribution to the rapid response planning effort.

...and Michele Tremblay, for her tireless work in announcing, organizing, registering, reserving, printing, etc. etc. It wouldn't have happened without Michele.

The Workshop was organized by Jay Baker, Aquatic Nuisance Species Program Coordinator, Massachusetts Office of Coastal Zone Management.



**September 2003**

[www.northeastans.org](http://www.northeastans.org) • [info@northeastans.org](mailto:info@northeastans.org)

The workshop and this document were made possible by a grant from the National Oceanic and Atmospheric Administration Sea Grant under award #NRMP0000-3-00231. Proceedings design by naturesource communications • [www.naturesource.net](http://www.naturesource.net)



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## Introduction and Overview

Over the last several years, states and provinces in the Northeastern US and Atlantic Canada have intensified efforts to manage both marine and freshwater aquatic nuisance species (ANS). Following the lead of New York and the Lake Champlain Basin, several states have completed or initiated the development of state ANS management plans. In the summer of 2001, a coalition of provincial, state, and federal agencies; academics; nonprofit organizations; and industries formed the Northeast Aquatic Nuisance Species Panel (NEANS Panel), which seeks to coordinate ANS management activities in the region. For further information on the NEANS Panel, visit [www.northeastans.org](http://www.northeastans.org).

Recognizing the difficulty in controlling the spread of ANS once they become established, the majority of management actions developed in conjunction with these initiatives have focused on prevention. However, managers in the Northeast have also recognized the need to quickly respond to an invasion in cases where prevention fails. Early detection and eradication protocols are essential components of a comprehensive ANS management effort.

In May of 2003, the NEANS Panel sponsored a workshop entitled, “Rapid Response to Aquatic Nuisance Species in the Northeast: Developing an Early Detection and Eradication Protocol.” This workshop laid the groundwork for rapid response planning in the region through the presentation of a series of rapid response case studies and other rapid response planning efforts from around the country, as well as a series of breakout discussions where workshop participants began crafting the fundamental elements of a regional rapid response planning document. Workshop participants also drafted the following goal statement during the meeting:

*Through this planning effort, the Northeast Aquatic Nuisance Species Panel seeks to provide guidance and technical support for the development of aquatic nuisance species (ANS) rapid response protocols. The goal of these protocols is to identify new ANS infestations in time to allow risk mitigation efforts to be taken and, where feasible, to eradicate these infestations through the implementation of environmentally sound measures before the species can become permanently established.*

This statement will guide further planning efforts in the Northeast Region.

The proceedings that follow provide an overview of presentations and discussions that made up the spring rapid response planning workshop, and highlight some next steps for rapid response planning in the region. The NEANS Panel will use these proceedings to develop a more formal planning document.

—Jay Baker, Aquatic Nuisance Species Program Coordinator, Massachusetts Office of Coastal Zone Management





**Agenda**  
**Rapid Response Workshop**  
**May 20-21, 2003**  
*Bluenose Inn • Bar Harbor, ME*

**Tuesday, May 20, 2003**



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<b>12:00 PM</b>	<b>Welcome and Introduction</b> - Jay Baker, MA Office of Coastal Zone Management Workshop Goals; Major Rapid Responses Plan Components
<b>12:30 PM</b>	<b>Case Study I</b> - Lars Anderson, USDA Agricultural Research Service Response to <i>Caulerpa taxifolia</i> in Southern California
<b>1:10 PM</b>	<b>Case Study II</b> - Steve Early, MD Department of Natural Resources Eradicating the Snakehead Fish in Maryland
<b>1:50 PM</b>	<b>Regional Rapid Response Planning Efforts</b> - Nathan Dechoretz, CA Department of Food and Agriculture The Western Regional Panel Model Rapid Response Plan for Aquatic Nuisance Species
<b>2:10 PM</b>	<b>Battling Invasive Species in the National Parks</b> - Lisa Jameson, National Park Service, Exotic Plant Management Teams
<b>2:30 PM</b>	<b>The National Rapid Response Perspective</b> - Lars Anderson National Invasive Species Council Guidelines for Early Detection and Rapid Response
<b>2:50 PM</b>	<b>Cookie break</b>
<b>3:10 PM</b>	<b>Panel Discussion (above speakers with Amy Smagula, NH Department of Environmental Services and Leslie Mehrhoff, University of CT)</b> - Moderator, Judith Pederson, MIT Sea Grant Early Detection of Aquatic Invaders in the Northeast
<b>4:30 PM</b>	<b>Full Group Discussion</b> - Moderator, Michael Hauser, VT Department of Environmental Protection Fundamental Elements of a Rapid Response Protocol Revisited
<b>5:30 PM</b>	<b>Adjourn</b>





**Agenda**  
**Rapid Response Workshop**  
**May 20-21, 2003**  
*Bluenose Inn • Bar Harbor, ME*

**Wednesday, May 21, 2003**

<b>8:30 AM</b>	<b>Presentation of an Invasion Scenario</b> - Jay Baker Overview of the day's tasks
<b>8:45 AM</b>	<b>Breakout Groups</b> - Developing the Model Rapid Response Plan  <b>Group A: Risk Assessment</b> - Moderator, John McPhedran, ME Department of Environmental Protection What Triggers a Rapid Response?  <b>Group B: Pre-invasion Pieces</b> - Moderator, Judy Pederson, MIT Sea Grant Aligning Rapid Response Resources and Protocols  <b>Group C: Post-Invasion Pieces</b> - Moderator, Amy Smagula, NH Department of Environmental Services Responding to the Invader
<b>10:00 AM</b>	<b>Reports from Breakout Groups</b>
<b>10:45 AM</b>	<b>Break</b>
<b>11:00 AM</b>	<b>Full Group Discussion</b> – Moderator, Susan Snow-Cotter, MA Office of Coastal Zone Management Next Steps: Defining the Role of the NEANS Panel
<b>12:00 PM</b>	<b>Adjourn</b> - lunch provided for Rapid Response Workshop participants



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# **Section I**

# **Case Studies**

## **ANS Rapid Response in the Northeast, Developing an Early Detection and Eradication Protocol**

Jay Baker, Aquatic Nuisance Species Program Coordinator  
Massachusetts Office of Coastal Zone Management  
Boston, MA

This presentation introduces the purpose of the spring 2003 Northeast Aquatic Nuisance Species Panel (NEANS Panel) workshop “Rapid Response to Aquatic Nuisance Species in the Northeast: Developing an Early Detection and Rapid Response Protocol.” An overview of the major topics to be discussed is provided, along with an outline of the fundamental elements of a rapid response protocol that was developed based on previous planning efforts (Western Regional Panel, 2003, McEnnulty et al, 2002, National Invasive Species Council, 2003). Early detection and rapid response are the second line of defense against aquatic nuisance species after prevention. However, response to an invader requires multiple planning steps and can encounter a variety of regulatory hurdles. The potential for success in a response effort is greatly enhanced by planning prior to an infestation. This workshop is the first step in a northeast regional rapid response planning process.



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The rapid response planning workshop seeks to build consensus on the basic elements of a rapid response protocol. In undertaking a rapid response effort, managers must plan for the following components of an eradication attempt:

- Detection
- Delineation
- Assessment
- Implementation
- Monitoring

Many steps can be taken prior to an invasion to promote a successful rapid response campaign. These include identifying species that pose a high risk to the region, identifying available control technologies, and designating entities that will be responsible for undertaking various components of the response.

The workshop will begin with a series of plenary speakers. Speakers will present case studies of previous and ongoing rapid response efforts in the US and provide overviews of early detection and eradication planning efforts. Breakout groups will begin refining the basic elements of a rapid response protocol by discussing the NEANS Panel’s role in conducting risk assessments, assisting states with pre-invasion planning components, and guiding post invasion response measures. The workshop will conclude with a discussion of next steps for the NEANS Panel in assisting states and provinces in the region with rapid response planning efforts.

## California's Reaction to *Caulerpa taxifolia*: A Model for Invasive Species Rapid Response, Lars Anders, USDA Agricultural Research Service

Lars W.J. Anderson, Ph.D.

USDA-ARS Exotic and Invasive Weed Research

Davis, CA

When the invasive marine alga *Caulerpa taxifolia* was discovered June 12, 2000 in California at Agua Hedionda Lagoon, there was already an awareness of the risks and potential impacts to the environment due to a fifteen-year history of spreading in the Mediterranean Sea. Furthermore, this strain had already been placed on the Federal Noxious Weed list in 1999. This knowledge greatly facilitate both consensus building and setting clear eradication goals among a large number of federal, state, and local agencies as well as private groups and non-governmental organizations that became the “Southern California *Caulerpa* Action Team” (SCCAT). The ability to quickly initiate field containment and treatment within three weeks of discovery was enabled by (1) timely notification of the “find;” (2) the proactive staff of the San Diego Regional Water Quality Control Board who deemed this invasion tantamount to an oil spill, thus freeing up emergency funding; and (3) the mobilization of field diver crews already working in the area. Additional resources from Cabrillo Power (electrical power utility) and eventually a series of federal (National Oceanic and Atmospheric Administration-Fisheries) grants, state funds, and nongovernmental organization grants have sustained the program. Through the SCCAT members, regulatory issues were identified and resolved in on-going meetings that also included recommendations for changes in public access and usage of the lagoon. The Weakest link in the chain of action was the absence of a clearly responsible “lead agency” with both the authority to act and readily-available funds.



SCCAT, in effect, became the lead agency by default, and, through its members provided the impetus, expertise, and political will to do what was necessary. Through SCCAT, three essential components were brought to bear on the problem: (a) expertise, and knowledge on the biology of *C. taxifolia*; (b) knowledge on the uses, “ownership” and characteristics of the infested site; and (c) knowledge and experience in the implementation of aquatic plant eradication. These, combined with the requisite resources (ca. \$1 million per year) have resulted in containment, treatment, and excellent progress toward eventual elimination of the alga from Agua Hedionda. Successful rapid response to other aquatic invasive species will require similar readiness to act and immediate access to adequate funding. By conducting “fire alarm” exercise with potential invasive species, the expertise, resources, regulatory issues, and entry pathways can be identified before the arrival of the pest, thereby greatly reducing the times needed for an effective and appropriate response.

## Eradicating the Snakehead Fish in Maryland

Steve Early

Maryland Department of Natural Resources  
Baltimore, MD

On May 18, 2002, an angler caught an 18 to 19-inch fish that he was unable to identify from Walkingfish Pond in Crofton, Maryland (Patuxent River drainage). The angler photographed and then released the fish, which was subsequently identified as a species of Snakehead. On June 30, 2002, another angler caught and retained a 26-inch Snakehead. On July 8, the same angler caught eight juvenile Snakeheads with a dip net. The Department of Natural Resources (DNR) captured more than 100 young-of-the-year Snakeheads. All were positively identified as *Channa argus*, the northern Snakehead. Investigation by the DNR Police led to the admission by a local resident of a release into the pond of two 12 to 14-inch fish sometime during 2000. These fish had been purchased on the live food fish market in New York.

The northern Snakehead is a top-level predatory fish native to eastern Asia and is well adapted to temperate climates. It is reported to be an air breather, which means that it can live in oxygen-depleted waters by gulping air at the water's surface and can survive several days out of water if kept moist. Potentially the fish could live in most North American fresh water.



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Walkingfish Pond covers approximately four acres with an average depth of 4-8 feet. Several aquatic plant species, including watershield (*Brasenia schreberi*), bladderwort (*Utricularia* sp.), white waterlily (*Nymphaea odorata*), slender pondweed (*Potamogeton* sp.), and duckweed (*Lemna* sp.) are established over 95% of the pond.

Fewer than 100 yards of low-lying forested land separate the pond from the Little Patuxent River. While there is not a regularly flowing connection between the ponds and the river, or clear evidence of recent overflow, it is possible that water is exchanged between the ponds and river during extreme rainfall events or high river stages. The glassy darter, a Maryland endangered species is found in the adjacent river. Electrofishing surveys in the adjacent river did not collect any Snakeheads.

The Secretary of DNR convened a scientific advisory panel on July 19, 2002 to recommend appropriate action. Subsequently the panel recommended treatment with herbicides to facilitate rotenone application for eradication of all fish life in the pond and in two adjacent ponds with potential water connection. Other methods including explosives, draining, and chlorine were not considered as effective.

Many logistical issues arose during the response: pesticide permits; chemical acquisition & storage; applicator training and health certification; physical pond containment to prevent fish escape; weather prediction; hydrologic connection to other water systems; evaluation of potential impacts to threatened and

endangered species; physical access to site for equipment; controlling press and public access to limit chemical exposure and prevent additional fish movement; air traffic restrictions; providing parking and traffic control in a restricted area; authority to enter private property; coordination with other agencies including the US Fish and Wildlife Service, county police, local landfill, fire department, ambulance, and state departments of Agriculture and Environment; acquisition, installation, and maintenance of appropriate signage; response (up to 100 daily) to concerned public; and identification of similar species. Control is estimated to have cost \$110,000.

An important component of this activity was public communication. I cannot over emphasize the need for a good public communications officer. There should also be a single operational point of contact with the press to ensure a correct and consistent message. The American Fisheries Society rotenone manual was invaluable.

Subsequent sampling in the ponds verified total eradication of fish life. Additional sampling in the adjacent river has not found any Snakeheads. Maryland anglers continue to report possible Snakeheads on a weekly basis though all have been native species.

On July 23, 2002 the Secretary of the Interior proposed that the 28 Snakehead species be added to the list of injurious species, which would prohibit the importation of the fish anywhere in the United States and make it illegal to transport the fish across state lines. In 2003, the Maryland General Assembly passed legislation providing state agencies the authority to enter private property to control nuisance aquatic species.

Had tropical depressions occurred during the interval between sighting and treatment, it is very likely the pond would have flooded and Snakeheads could have escaped to a large riverine system. Immediate response to at least insure total containment is paramount.









# **Section II**

# **Rapid Response**

# **Planning Efforts**

## A Regional Rapid Response Planning Effort

Nathan Dechoretz, Chief

Integrated Pest Control Branch, California Department of Food and Agriculture  
Sacramento, CA

At the request of the Western Regional Panel for Aquatic Nuisance Species (WRPANS), the California Department of Food and Agriculture's (CDFA) Integrated Pest Control Branch (IPCB) developed a model rapid response plan for the Western Region. This request was based on CDFA-IPCB's long and successful history in the detection and eradication of *Hydrilla* in California. The Hydrilla Eradication Program is part of the CDFA Pest Prevention System that includes Pest Exclusion, Pest Detection, Pest Eradication and Control, and Plant Pest Diagnostics.

At the request of the WRPANS, the model response plan includes a discussion on three responses to new aquatic invasive species and why those responses were either successful or why the responses struggled somewhat. The three responses were *Caulerpa* in Coastal Southern California, *Salvinia* in the Lower Colorado River, and *Hydrilla* in California.



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The model plan states that the major components of a successful rapid response program are leadership, coordination, regulatory actions, response (treatment), public information, evaluation, and the available funding and other support resources. Leadership relates to who has legal authority to take action as well as the operational structure and capabilities to conduct the eradication program. This is a major reason why California's Hydrilla Eradication Program is successful. The CDFA has legal and regulatory responsibility to eradicate *Hydrilla*, if feasible, whenever it is found. The model plan recommends states establish an Aquatic Nuisance Species Council (ANSC) that can assist in identifying authorities, establishing priority problem species, and obtaining funding and other resources necessary to respond in an effective and timely manner. The ANSC can also function as a coordination/cooperation focal point by facilitating or encouraging interagency cooperative agreements or partnerships between public and private organizations.

The WRPANS model response plan emphasizes the need to address regulatory issues associated with preventing the movement of the pest, and compliance with federal and state environmental laws and regulations. Regulatory actions such as quarantines can prevent movement pre- and post-invasion. Addressing environmental laws in a proactive manner can significantly contribute to a state's ability to respond in a timely manner. For example, addressing endangered species issues and developing environmental documents for priority species will allow for a smooth transition from planning to action.

When an aquatic invasive species is detected, a number of actions should occur to enhance the responsible agency ability to initiate treatment. First and foremost, there needs to be an official identification of the pest. Once done, convene a Science Advisory Panel to evaluate feasible ways of eradication and

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establish treatment, and if necessary, survey protocols. Development and implementation of action plans will enable project management to achieve eradication. These action plans should include roles and responsibilities of all involved in various levels of the project from administration and logistics to treatment and project evaluation.

While all components of a rapid response plan are important, failure to adequately address the concerns of the public and decision-makers, or provide accurate scientific information can have a disastrous impact on the implementation of the recommended actions. An effective and credible information component and staff will prevent many problems that impede project operation or cause expansion of activities that increase cost of the project unnecessarily.

The WRPANS Rapid Response Plan emphasizes the need for continuous program evaluation. This is needed for accountability, credibility, and flexibility. In addition, rapid response plans must address funding and resources needed for high priority species. Sources of funds to address initial project operations as well as potential funds and resources for long term activities need to be identified.

In summary, responding to an incipient invasion to a new aquatic invasive species can be complex, costly, and controversial. However, to be successful the response should be flexible, fast-acting, and fully funded. This requires planning, prioritizing and persevering.



## Battling Invasive Species in National Parks

Lisa Jameson, Exotic Plant Management Team  
Center for Urban Ecology, National Park Service  
Washington, DC

(Excerpted from *Exotic Plant Management Teams: A mobile strike force* a publication of the Natural Resource Program Center of the National Park Service, US Department of the Interior)

The United States national parks are home to complex native communities of plants and animals that have developed over millions of years. The delicate balance arrived at over time in these systems is threatened by a wide number of exotic plants that are able to reproduce rapidly and displace native plants. When the populations of native plants are reduced, the animals that depend upon them lack the food and shelter needed for survival. Today exotic plants infest some 2.6 million acres in the national park system, reducing the natural diversity of these places. The National Park Service has established Exotic Plant Management Teams (EPMTs) to combat and control exotic plants.



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Modeled after the approach used to fight wildfires, EPMTs are designed to provide a highly-trained, mobile strike force of plant management specialists to assist parks in the control of exotic plants. Since 2000, at least ten teams have been established using a competitive process.

Each of the teams has developed strategies for combating exotic plants that reflect the needs and resources of the parks that they serve. For example, the Florida EPMT is a partnership with the Florida Department of Environmental Protection to address the state's exotic plant problem. Through this program, the state of Florida matched each dollar spent to control plants in Florida's eleven national park units. By contract, the National Capital Region EPMT directly assists the ten parks in its region to identify, map, and control exotic vegetation. Control measures range from the use of chainsaws to the application of herbicides.

The success of the EPMTs derives from their ability to adapt to the conditions of the parks that they serve while working cooperatively with local agencies and experts. To assure that these lessons are not lost and to evaluate the effectiveness of the EPMT concept, the National Park Service's Biological Resource Management Division is developing a database that tracks progress and gathers information about each project.

Stemming the spread of exotic plants is critical to protecting the health and natural diversity of our national parks. Exotic Plant Management Teams hold tremendous promise for meeting this challenge.

## The National Rapid Response Perspective: National Invasive Species Council Guidelines for Early Detection and Rapid Response

Lars W.J. Anderson, Ph.D.

USDA-ARS Exotic and Invasive Weed Research  
Davis, CA

(Presentation given by Lars Anderson—abstract excerpted from the National Invasive Species Council Early Detection and Rapid Response Draft Guidelines)

These guidelines are provided by the federal and non-federal members of the Early Detection and Rapid Response (ED&RR) Subcommittee of the Invasive Species Advisory Committee (ISAC) of the National Invasive Species Council (Council). These guidelines are intended to assist those who wish to establish or evaluate Early Detection, Rapid Assessment, and Rapid Response systems for invasive species. These guidelines (Version I) will be revised as science, technology, and experience with systems and species advance.

Preventing the introduction of invasive species is the first line of defense against invasions. However, even the best prevention efforts will not stop all introductions. Early detection and rapid response efforts increase the likelihood that invasions will be addressed successfully while populations are still localized and population levels are not beyond that which can be contained and eradicated. Once populations are widely established, all that might be possible is the partial mitigation of negative impacts. In addition, the costs associated with ED&RR are typically far less than those of long-term invasive species management programs.

The charge of the Council is to assist in the coordination of invasive species efforts, and there is a distinct need for ED&RR systems to be coordinated. In addition, ED&RR is identified as a high priority in the Council's *National Invasive Species Management Plan* (Plan) which provides a blueprint for coordinated action on invasive species. Specifically, action items #23 and #24 in the Plan concern the development of guidelines and systems for the coordinated detection and response to incipient invasions. This will include working with state, local, tribal, and private entities to draft proposals that will, among other things, provide permanent funding for early detection and rapid response efforts.

These guidelines were drafted using the input from a broad range of experts and from information in extensive documents that have analyzed or proposed ED&RR systems including: work by the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), a report by Jim Worrall of the U.S. Forest Service, the work of the Western Regional Panel of the Aquatic Nuisance Species Task Force, the definition of “rapid response” developed by the Council, and work on ED&RR systems done in New Zealand and Australia. These guidelines represent a summary compilation of the input from a full range of subject matter experts, people with direct experience in ED&RR efforts, and stakeholders that included members of the ISAC and representatives of Council member agencies.



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The hallmarks of successful ED&RR systems include: potential threats are identified in time to allow risk-mitigation measures to be taken; new invasive species are detected in time to allow efficient and environmentally sound decisions to be made; responses to invasions are effective and environmentally sound and prevent the spread and permanent establishment of invasive species; adequate and timely information is provided to decision-makers, the public, and to trading partners concerned about the status of invasive species within an area; and lessons learned from past efforts are used to guide current and future efforts.

Detecting and responding to invasions requires a complex series of coordinated and sustained efforts. Actions may include: reviewing relevant legal authorities; coordinated planning; identification of high priority species and at-risk sites; routinely monitoring certain areas; prevention and containment efforts; surveillance, detection, and reporting activities including data collection and management; the collection, identification, and storage of voucher specimens; determining if newly-detected invasive populations are still localized; determining the relative and potential risk associated with an introduction; priority setting; sharing resources across jurisdictional boundaries; monitoring, treating and removing populations; restoring habitats; coordinated public communication efforts; training volunteers and professionals in detection, identification, and removal techniques; sharing information; and developing case studies.



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Research, adequate staffing and funds, and effective public communication are essential to support ED&RR activities. These interlacing actions can be grouped into three main categories: 1) Early Detection, 2) Rapid Assessment, and 3) Rapid Response. The following document lists components within each of these categories that experts consider either essential (i.e., must be present) or important to a systems success.



# **Section III**

# **Group Discussions**

## Elements of a Rapid Response Plan: Pre- and Post-invasion Rapid Response Actions

Moderator: Michael Hauser, ANS Specialist  
VT Department of Environmental Conservation  
Waterbury, VT

During this discussion moderated by Michael Hauser, workshop participants revisited the Rapid Response Framework outlined by Jay Baker during the first presentation of the day. The group evaluated key elements of pre invasion planning and post invasion implementation of rapid response measures. The group agreed that most of the elements presented were appropriate. In addition, participants emphasized the need for public outreach prior to and during each phase of a response to an aquatic invader.

The following are the key elements of a rapid response protocol agreed to by workshop participants.

### Detection

#### *Pre-invasion*

- Develop criteria for listing potential invaders as “trigger” species. Criteria should include any documented invasions and impacts, life history information, etc.
- Develop “trigger” list of species
- Identify protocols for positively identifying invaders including lists of taxonomic experts
- Develop monitoring networks

#### *Post-invasion*

- Document the presence of a suspected “trigger” invasive species
- Positively identify the invader according to established protocols
- Report the invasion to appropriate entities

### Delineation

#### *Pre-invasion*

- Identify entity responsible for conducting biological surveys for various aquatic environments / species
- Develop criteria for determining necessity of quarantine

#### *Post-invasion*

- Determine distribution of invader
- Begin stakeholder consultation
- Determine need for eradication through risk assessment

### Quarantine

#### *Pre-invasion*

- Evaluate authority to quarantine infested areas
- Identify agencies responsible for quarantine of specific system, types (i.e. marine vs. freshwater)





### *Post-invasion*

- Restrict access to or from infested water body or facility
- Continue stakeholder consultation
- Begin monitoring of the infestation

## **Assessment**

### *Pre-invasion*

- Identify minimum set of environmental data to be collected on the effected area
- Identify control options for trigger species, including technology, impact to invader, secondary impacts, etc.

### *Post-invasion*

- Assemble physical and biological data on effected area (hydrologic regime; biological community including presence of rare and endangered species, etc.)
- Consider range of control options
- Identify risks associated with various controls/no control
- Consult Stakeholders
- Select preferred control option

## **Implementation**

Begin experimental or full-scale eradication effort

## **Monitoring**

### *Pre-invasion*

- Identify agencies responsible for post treatment monitoring

### *Post-invasion*

- Assess effectiveness of selected control measure or no control



## Group A: Pre-invasion Rapid Response Planning Efforts

Moderator: Judith Pederson, Manager for Coastal Resources Center,  
MIT Sea Grant  
Boston, MA

**1. Do we currently have the capacity to effectively monitor for incipient invasions in marine and freshwater systems? If not, what areas need to be strengthened?**

No. The NEANS Panel should conduct a survey of aquatic and marine invasive species monitoring efforts in the region and make it available to natural resource managers. The Panel should make recommendations to states and provinces on how monitoring efforts can be strengthened.

The Panel should develop a list of taxonomists available for confirmation of new invasive species introductions or range expansion. The NEANS Panel should consider establishing an invasive species hotline for reporting new invaders.

**2. What types of information related to “trigger” species and aquatic habitats should be collected prior to their detection in the region?**

The NEANS Panel should develop criteria for listing rapid response trigger species. Once the criteria are developed, the level of risk of the introduction and impacts of various species should be determined. Potential pathways for the spread of trigger species should be identified. States and provinces should evaluate their authority to respond to specific taxa including identifying permits necessary to apply specific control technologies.

The NEANS Panel should consider hosting a series of workshops led by experts in major taxa (e.g. mollusks). Workshops should address potential transport vectors, impacts, and control options.

**3. What information related to potential control technologies should be collected prior to an invasion?**

A state or province should identify regulatory constraints to implementing identified control options. The NEANS Panel should help provincial, state, and federal agencies implement an appropriate control technology following the detection of a new invasion.

**4. What should the rapid response organizational framework look like in each state? Who should be responsible for:**

- overall rapid response oversight
- monitoring
- confirmation
- deciding to eradicate
- implementing controls
- post-treatment monitoring

Provinces and states should identify entities that will be leading the charge in each stage of a rapid response protocol. Provinces and states should



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identify leads in the areas of public information and finance. The rapid response framework should include a formal public involvement process. This process should also be used to increase the capacity for monitoring and early detection.

**5. What are the regulatory constraints to implementing a rapid response protocol? How can we begin to address these constraints?**

Each province or state should develop and adopt generic permitting processes for implementing identified control options.

Although there is a tendency to develop a “black list” of species, the group noted that this often limits the ability of agencies to respond to and prevent unanticipated introductions. The approach should combine a defined list of potential invaders, risky activities within pathways, and major taxa or groups that enforcement agencies can focus on for prevention, eradication, management, and control.



## Group B: Risk Assessments for Aquatic Invaders

Moderator: John McPhedran, Biologist, Invasive Species Program  
ME Department of Environmental Protection  
Augusta, ME

### 1. What factors should be considered when determining whether a species should trigger a rapid response and what additional factors should be considered when determining whether a rapid response should be initiated? (e.g. presence of rare and species, habitat concerns, risk of reintroduction, feasibility of eradication)?

The NEANS Panel should develop criteria for listing species that would trigger rapid response. The group developed the following primary questions to ask when determining whether a particular species triggers a rapid response:

- What are the pathways for the species of interest? Can we control further spread or has the species colonized all available habitat?
- What is the biology and life history of the species?
- Is this species known to be invasive elsewhere?
- What habitats are or may be affected by this species?
- What is the broad setting of the infestation, including feasibility of eradication in the context of existing financial and ecological constraints and available control techniques?



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### 2. Can/should we attempt to predict incipient invasions. What are the fundamental elements of this type of effort?

Yes. Some risk assessments have been conducted by states and provinces in their respective processes of developing their own lists of invasive species. The NEANS Panel should tackle this issue in the near future. Because states and provinces may use the above questions to determine whether to respond, they may wish to tailor the risk within the particular state or provincial area, e.g., at the watershed scale. The NEANS Panel should direct state and provincial agencies and other regional personnel to existing resources. Since risk assessments are already available for a number of species, the NEANS Panel will direct state agency personnel to these resources.

### 3. Should the states and region develop a trigger list, or should new invasions be evaluated on a case-by-case basis?

The NEANS Panel should develop a Regional Advisory List of Invasive Aquatic Species. As of May 2003, the NEANS Panel Science and Technology Committee is compiling species lists from states and provinces. The Committee should refine this list and publish the top five or ten species in each category (such as marine, freshwater, wetland,) and seek agreement on the top invasive species from the NEANS Panel. Literature citations should accompany the listed species. The NEANS Panel should distribute the completed regional list to the states and provinces. The NEANS Panel should consider developing a list of species for which formal risk assessments are available and needed.

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#### **4. Who should be involved in the list-making process?**

Lists currently under development document species by state and province. Examples include lists at the Invasive Plant Atlas of New England (IPANE) and MIT Sea Grant. The NEANS Panel, state, provincial, and federal agencies, researchers, and non-governmental groups should participate in the list-making process.



## Group C: Post-invasion Rapid Response Actions

Moderator: Amy Smagula, Clean Lakes and Exotic Species Program Coordinator  
NH Department of Environmental Services  
Concord, NH

- 1. How should the detection of a rapid response “trigger” species be confirmed (other regions have identified a variety of taxonomists to confirm the sighting). Note: Group A will be discussing the definition of a trigger species.**

The NEANS Panel should form a list of on-call experts in the region. Authoritative taxonomists or specialists (approved by the appropriate state or province) should be available immediately to identify species. This is important for legal and regulatory as well as eradication actions. The Panel should identify the appropriate agencies to which invasions are to be reported for immediate action. The list of agencies should be specific to freshwater and marine systems. The time frame for positive identification by experts will vary. In some cases, DNA testing and overseas expertise may be necessary. These resources should be identified in a Rapid Response planning document.



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- 2. What factors should be considered when determining whether an eradication effort should be initiated (e.g. potential for complete eradication, presence of rare species, habitat concerns, risk of reintroduction, availability of control technologies)?**

The NEANS Panel should draft a list of factors to be considered when determining whether an eradication effort should be implemented. Legal access must be secured for inspection visits as should authority to quarantine boats and other lake traffic. Gaps in legislation should be filled to provide the authority (beforehand) to determine population density and the presence of threatened or endangered species (within water body and downstream). This information is important when deciding whether to eradicate or contain the invasion. Community and citizen involvement should also be obtained to gain support for eradication or containment. The NEANS Panel should develop a model for Science Advisory Committees (SAC) to draft the list of factors and recommended actions.

- 3. What factors should be considered when selecting the most appropriate physical, chemical, or biological controls (e.g. species life history, impacts, need for mitigation resulting from control efforts, etc.)?**

The decision making process should take into consideration species life span, history, impacts, and need for mitigation resulting from control efforts. Species-specific models are best. The individual SAC can fulfill this function. The NEANS Panel should develop a planning document that addresses the uses and values that will be impacted such as water supply, recreation, etc. Repercussions (e.g. algal blooms, dead fish) that could result from a chemical treatment should be considered. The planning document

should also help managers determine how quickly the effort can or must start. Education and ultimately, enforcement, can help address re-introduction issues.

**4. Who should be involved in the decision making process?**

Public buy-in needs to be ongoing and continue during the rapid response planning and implementation process. Agencies should be involved and have regulatory authority. Their work should focus on the best choices between rapid response and simple response. Governors' and Premiers' offices should be notified of invasions. The SAC should present its findings and recommendations. Appropriate state and provincial agencies will convene this group. The SAC should contain regional and state or provincial experts. One model could be having a lead agency for each issue. The SAC should hold a public hearing and invite stakeholders if needed and hire or contract with a dedicated and experienced Information Officer who is the link between response team and press.

**5. What actions, if any, should follow an eradication attempt? What are the fundamental elements of a post treatment monitoring protocol?**

The NEANS Panel should define the fundamental elements of a post treatment monitoring protocol. A time period should be established for the monitoring effort although education and outreach should continue indefinitely. Restoration options should wait until subsequent management efforts are completed or ceased. Economics of the effort must be analyzed so that ongoing costs can be realized. For instance, five-year plans and funding might be necessary. A report should be written at the end to document the success, failure, or continued needs of the effort. Continued post-evaluation is also needed to determine if infestation was contained, for how long, and what other management practices may be needed. Periodic evaluation should lead to continued improvement of the plan or models associated with the plan. Everything loops back into prevention.

**6. How do we determine if a control option has been successful? What do we do if it isn't?**

Economics will play a role in determining success. For instance, the economic impact of a restored fishery can be documented. Public opinion on success is important (using surveys, focus groups, etc.). Other factors that will determine success include duration of species free time and prevention of downstream waterbodies and other area infestations. The NEANS Panel should collect and disseminate "success stories" to the public and lessons learned to the public and agencies.



## Post-Breakout Group Panel Discussion: Early Detection of Aquatic Invaders in the Northeast

Moderator: Judith Pederson, Manager for Coastal Resources Center,  
MIT Sea Grant  
Boston, MA

Panelists included Lars Anderson, Nathan Dechoretz, Steve Early, Lisa Jameson, Les Mehrhoff, and Amy Smagula.

Judith Pederson moderated a lively panel discussion of early detection of pioneering aquatic invaders in the Northeast and elements of a monitoring network.

The group agreed that the issue is regional and that trained citizens and others should monitor for early detection. The discussion raised two questions:

1. Who should be notified?
2. Do those who are monitoring know this contact?

The panel discussed the opportunity of working with private industry. Currently, their combined presence and expertise has not been accessed. For instance, fishers are in the field on a daily basis and have the potential to be the first to identify invaders.

If the NEANS Panel and its members are to make long-lasting behavioral changes, it has to carefully consider how it manages its invasion-prevention efforts. An investment in education is key: several participants felt that investing in K-12 curricula, activities, and outreach materials for this age group was very valuable.

Because there are many species of concern and introduction vectors, the Panel's message should be very focused. Managers should select species of concern, rank them by priority, and then focus their outreach and management efforts first in these areas.

The following six areas were highlighted by the participants:

- Current resources for preventing and managing invasions are insufficient. Resources should be expanded to meet the needs of early identification and continued monitoring after management efforts.
- A state agency's approach to controlling the Snakehead fish was to first hire professionals who dispersed pesticides to ensure safety of humans and the ecosystem. They decided to kill the fish first, then determine ways to avoid introductions. Although this is not necessarily the recommended approach, it was effective in this instance. A database has been established detailing the methods and protocols of the approach. This should be considered a "back door" to the invader management.



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- Communities often reject proposed methods of eliminating a nuisance because of the environmental effects. Managers should write and present information clearly and succinctly so that the general audience can understand the options and weigh the risks. Informed citizens should make informed decisions.
- Communication is important at all levels and through several media including the increased access by individuals with access to the Internet. Managers should expand their use of this communication vehicle.
- Marketing the importance of preventing invasions and selling the message was discussed. The message should have broad appeal and be developed and distributed by those who have the best communication skills. The message should focus on resources (what do we have and what is needed), pathways (not just species, but pathways), and education. Awareness and education efforts, such as weed watcher programs, should be a high priority.



## Full Group Discussion: Defining the Role of the NEANS Panel

Moderator: Susan Snow-Cotter, Assistant Director  
MA Office of Coastal Zone Management  
Boston, MA

Following the Panel discussion, Susan Snow-Cotter facilitated the full group in a summarizing session that further refined issues and identified next steps and priorities.

### *Next steps*

1. The proceedings of this meeting should be completed and distributed
2. The NEANS Panel should produce a rapid response planning document.  
Recommendations are to:
  - Keep it broad
  - Create a living document that contains rapid response resources for managers
  - Define the audience
  - Identify questions to be addressed at each stage of the response
3. How does the Panel move forward?
  - Form an over-arching rapid response committee
  - Identify one lead person with help from NEANS Panel committees
4. Rapid response workshops should be conducted and should
  - Be regional and issue-oriented
  - Cover NAISA guidelines
  - Take message to the states and provinces



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### *Top projects identified for the NEANS Panel with Panel lead group*

1. The Communication, Education, and Outreach Committee should create a living, web-based document.
2. The Science and Technology Committee should create a list of species of concern.
3. The Science and Technology Committee should create a list of taxonomists.
4. The Communication, Education, and Outreach Committee should create a communication and outreach model.
5. The Science and Technology Committee should draft a list of control technologies.
6. The Communication, Education, and Outreach Committee should work with state and provincial agencies to create a network or clearinghouse of experts that can be contacted based on species or geography of suspected invaders.

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## Participants

Mr David Alves, Aquaculture & Fisheries  
Coordinator  
RI Coastal Resources Management Council  
O Stedman Government Center  
4808 Tower Hill Rd  
Wakefield RI 02879 US  
401.783.3370 401.783.3767 fax  
dalves@crmc.state.ri.us

Mr Jay Baker, Nonpoint Monitoring  
Coordinator  
MA Coastal Zone Management  
251 Causeway St Suite 900  
Boston MA 02114-1219 US  
617.626.1204 617.626.1240 fax  
jason.baker@state.ma.us

Ms Cynthia Boettner, Coordinator  
US Fish and Wildlife Service New England  
Invasive Plant Group  
Silvio Conte National Fish & Wildlife Refuge  
52 Avenue A  
Turners Falls MA 01376 US  
413.863.0209 413.863.3070 fax  
Cynthia\_Boettner@fws.gov

Ms Ann Bove, Aquatic Biologist  
VT Department of Environmental  
Conservation  
Water Quality Division  
103 So Main St Building 10-N  
Waterbury VT 05671-0408 US  
802.241.3782 802.241.3287 fax  
Annbo@dec.anr.state.vt.us

Dr Christopher Deacutis, Research  
Coordinator  
Narragansett Bay Estuary Program  
RI Department of Environmental  
Management  
235 Promenade St  
Providence RI 02908 US  
401.222.4700 401.222.3564 fax  
deacutis@gso.uri.edu

Dr Lars WJ Anderson, Plant Physiologist  
and Lead Scientist  
USDA ARS Exotic and Invasive Weed  
Research Weed Research Unit  
UC Davis  
One Shields Av  
Davis CA 95616 US  
530.752.6260 530.752.4604 fax  
lwanderson@ucdavis.edu

Ms Nancy Balcom, Associate Extension  
Educator  
CT Sea Grant Extension Program  
University of Connecticut  
1080 Shennecossett Rd  
Groton CT 06340 US  
860.405.9107 860.405.0109 fax  
nancy.balcom@uconn.edu

Mr Roy Bouchard, Biologist III  
ME Department of Environmental  
Protection  
State House Station 17  
Augusta ME 04333 US  
207.287.7798 207.287.7191 fax  
roy.bouchard@maine.gov

Dr G Russell Danner, Fish Pathologist  
ME Department of Inland Fisheries &  
Wildlife  
Fish Health Laboratory  
RR 5 Box 975  
Augusta ME 04330 US  
207.287.2813 207.287.2813 fax  
grdanner@prexar.com

Mr Nathan Dechoretz, Branch Chief  
CA Department of Food and Agriculture  
Integrated Pest Control Branch  
1220 N St  
Sacramento CA 95814 US  
916.654.0768 916.653.2403 fax  
NDechore@cdfa.ca.gov



30

Mr R S Early, Director, Restoration & Enhancement  
MD Department of Natural Resources  
Tawes Building B-2  
580 Taylor Av  
Annapolis MD 21401 US  
410.260.8267 410.260.8279 fax  
searly@dnr.state.md.us

Ms Gretchen Fitzgerald, Committee on Marine Bioinvasions  
Ecology Action Centre  
1568 Argyle St Suite 31  
Halifax NS B3J 2B3 Canada  
902.429.2202 902.422.6410 fax  
fitzgerg@dal.ca

Ms Jennifer Ford, Committee on Bioinvasions  
Ecology Action Centre  
1568 Argyle St Suite 31  
Halifax NS B3J 2B3 Canada  
902.494.2146 902.422.6410 fax  
ans@ecologyaction.ca

Ms Jennifer Forman, S&T Committee Intern  
NEANS Panel  
37 Lyman Rd  
Framingham MA 01701 US  
508.405.0883 fax  
jennifer.forman@umb.edu

Ms Ann Gibbs, State Horticulturalist  
ME Department of Agriculture  
28 State House Station  
Augusta ME 04333 US  
207.287.3891 207.624.5025 fax  
ann.gibbs@maine.gov

Mr Paul Gregory, Environmental Specialist  
ME Department of Environmental Protection  
Invasive Species Program  
State House Station 17  
Augusta ME 04333 US  
207.287.6961 207.287.7191 fax  
paul.gregory@maine.gov

Ms Linda Gregory, Botanist  
Acadia National Park  
PO Box 177  
Bar Harbor ME 04609 US  
207.288.8725 fax  
linda\_gregory@nps.gov

Ms Karen Hahnel, Environmental Specialist  
ME Department of Environmental Protection  
Bureau of Land and Water Quality  
17 State House Station  
Augusta ME 04333-0017 US  
207.287.7732 207.287.7191 fax  
Karen.A.Hahnel@maine.gov

Dr Willard Harman, Professor, Limnology & Invertebrate Zoology  
NY State Federation of Lake Associations  
SUNY at Oneonta  
SUNY at Oneonta Biological Field Station  
5838 St Hw 80  
Cooperstown NY 13326 US  
607.547.8778 607.547.5114 fax  
harmanwn@oneonta.edu

Mr Michael Hauser, ANS Specialist  
VT Department of Environmental Conservation  
Water Quality Division  
103 So Main St  
Waterbury VT 05671-0408 US  
802.241.3777 802.241.3287 fax  
mikeh@dec.anr.state.vt.us



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Mr Russell Henry, Senior Policy Advisor  
NB Department of Agriculture, Fisheries, and  
Aquaculture  
850 Lincoln Rd  
PO Box 6000  
Fredericton NB E3B 5H1 Canada  
506.453.2406 506.453.5210 fax  
russell.henry@gnb.ca

Ms Lisa Jameson, Exotic Plant  
Management Team Liaison  
National Park Service  
Center for Urban Ecology  
4598 MacArthur Bl NW  
Washington DC 20007 US  
202.342.1443 202.282.1031 fax  
lisa\_jameson@nps.gov

Ms Sandra Keppner, Aquatic Nuisance  
Species Coordinator  
US Fish and Wildlife Service  
405 North French Rd  
Suite 120A  
Amherst NY 14228 US  
716.691.5456 716.691.6154 fax  
sandra\_keppner@fws.gov

Ms Andrea Locke, Research Scientist  
Department of Fisheries and Oceans  
343 Université Av  
PO Box 5030  
Moncton NB E1C 9B6 Canada  
506.851.6248 506.851.2079 fax  
lockea@dfo-mpo.gc.ca

Mr Mark Malchoff, Program Leader  
Lake Champlain Sea Grant Project  
101 Hudson Hall 101 Broad St  
Plattsburg State University of NY  
Plattsburgh NY 12901-2681 US  
518.564.3037 518.564.3036 fax  
mark.malchoff@plattsburgh.edu

Mr Dennis McNeish, Fisheries  
Resource Planner  
Department of Inland Fisheries and  
Wildlife  
41 State House Station  
Augusta ME 04333 US  
207.287.5022 207.287.6395 fax  
dennis.mcneish@state.me.us



32

Mr John McPhedran, Biologist  
Invasive Species Program  
ME Department of Environmental Protection  
State House Station 17  
Augusta ME 04333 US  
207.287.6110 207.287.7191 fax  
John.McPhedran@maine.gov

Dr Leslie Mehrhoff, Director, Invasive  
Plant Atlas of NE  
G Safford Torrey Herbarium University  
of CT  
75 North Eagleville Rd  
Box U-43  
Storrs CT 06269-3043 US  
860.486.5708 860.486.6364 fax  
vasculum@uconnvm.uconn.edu

Mr Wayne Millington, NE Regional IPM  
Coordinator  
National Park Service  
209 A Ferguson Building  
University Park PA 16802 US  
814.863.8352 814.865.1649 fax  
Wayne\_Millington@nps.gov

Mr Charles O'Neill, Senior Extension  
Associate  
NY Sea Grant Extension Program &  
National Aquatic Species  
Clearinghouse  
Morgan II  
SUNY College at Brockport  
Brockport NY 14420-2928 US  
585.395.2638 585.395.2466 fax  
cro4@cornell.edu

Ms Hilary A Oles, Program Coordinator  
Adirondack Park Invasive Plant Program  
c/o Adirondack Park Agency Route 86  
PO Box 99  
Ray Brook NY 12977 US  
518.891.4050 518.891.3938 fax  
haoles@gw.dec.state.ny.us

Dr Judith Pederson, Manager, Center for  
Coastal Resources  
MIT Sea Grant College Program  
292 Main St  
Building E38-300  
Cambridge MA 02139 US  
617.252.1741 617.252.1615 fax  
jpederso@mit.edu

Mr Michael Pietrak, Project Manager  
Maine Aquaculture Association  
PO Box 148  
Hallowell ME 04347 US  
207.622.0136 fax  
mpietrak@worldnet.att.net

Ms Maggie Shannon, Executive Director  
ME Congress of Lake Associations  
7 West Rd  
Belgrade ME 04917 US  
207.495.8863 207.495.8870 fax  
msshannon@earthlink.net

Ms Amy Smagula, Clean Lakes and Exotic  
Species Program Coordinator  
NH Department of Environmental Services  
29 Hazen Dr  
PO Box 95  
Concord NH 03302 US  
603.271.2248 603.271.7894 fax  
asmagula@des.state.nh.us

Mr Jan Smith, Executive Director  
MA Bays National Estuaries Program  
251 Causeway St Suite 900  
Boston MA 02114 US  
617.626.1231 617.626.1240 fax  
jan.smith@state.ma.us

Ms Susan Snow-Cotter, Assistant Director  
MA Coastal Zone Management Program  
251 Causeway St Suite 900  
Boston MA 02114 US  
617.626.1202 617.626.1240 fax  
susan.snow-cotter@state.ma.us

Mr Jim Straub, Lakes and Ponds  
Program Coordinator  
MA Department of Environmental  
Management  
251 Causeway St 7th Floor  
Boston MA 02114 US  
617.626.1411 617.626.1349 fax  
jim.straub@state.ma.us

Ms Julie Thompson, Fish and Wildlife  
Biologist  
US Fish and Wildlife Service  
177 Admiral Cochrane Dr  
Annapolis MD 21401 US  
410.573.4517 410.269.0832 fax  
julie\_thompson@fws.gov

Ms Michele L Tremblay, ANS Program  
Manager  
naturesource communications  
PO Box 3019  
Boscawen NH 03303 US  
603.796.2615 603.796.2600 fax  
mlt@naturesource.net



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Dr Donna Turgeon, Marine Ecologist  
National Oceans and Atmospheric  
Administration  
1305 East-West Hw Room 8113  
Room 9210  
Silver Spring MD 20910-3282 US  
301.713.3020 fax  
donna.turgeon@noaa.gov

Ms Shannon Weigle, Program Manager  
Massachusetts Bays National Estuary  
Program  
251 Causeway St Suite 900  
Boston MA 02114 US  
617.626.1229 617.626.1240 fax  
Shannon.Weigle@state.ma.us

Ms Sarah Whitney, Project Manager,  
Resource Management  
Great Lakes Commission  
2805 South Industrial HW Suite 100  
Ann Arbor MI 48104 US  
734.971.9135 731.971.9150 fax  
swhitney@glc.org

Mr Dean Wilkinson, NOAA Invasive  
Species Coordinator  
Department of the Interior Office of the  
Secretary OS/SIO/NISC  
1849 C St NW  
Washington DC 20240 US  
202.354.1875 202.371.1751 fax  
dean\_wilkinson@ios.doi.gov

Ms Lisa Windhausen, Aquatic Nuisance  
Species Coordinator  
Lake Champlain Basin Program  
PO Box 204  
54 West Shore Road  
Grand Isle VT 05458 US  
802.372.3213 802.372.3233 fax  
lisa@lcbp.org



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## On the cover

A recent New England invader, *Hydrilla verticillata* has been found in other parts of North America. Image provided by Mary Gilroy, Environmental Scientist, City of Austin, Texas.

## Folio image

Rapa Whelk, (*Rapana venosa*). Image provided by Galleria Mediterranea.





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