

November 16, 2017

*Erie, Pennsylvania*

Aquatic Invasive Species Rapid Response Mock Exercise:  
Responding to Hydrilla in the Lake Erie Watershed  
*After-Action Report*



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# Acknowledgements

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Holly Best, Pennsylvania Department of Conservation and Natural Resources

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Bob Morgan, Pennsylvania Fish and Boat Commission

Brian Pilarcik, Crawford County Conservation District

Richard Ruby, U.S. Army Corps of Engineers

Sarah Whitney, Pennsylvania Sea Grant

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# Executive Summary

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Development of the Pennsylvania Aquatic Invasive Species (AIS) Rapid Response Plan (the Plan) began in 2009. Since that time, field exercises were conducted on infestations of round goby, Didymo, and New Zealand mudsnail that occurred in Pennsylvania between 2010 and 2013. These field exercises helped to shape the content and structure of the plan and resulted in the most current three-tiered plan structure. The Plan was formally adopted by the Pennsylvania Invasive Species Council (PISC) in September, 2014. In 2015, a mock exercise was held to introduce the plan to agency staff, and practice using it to respond to starry stonewort in Presque Isle Bay. The starry stonewort exercise resulted in additional revisions and updates to the Plan and was the most recent version used for this exercise.

On November 16, 2017, resource managers and biologists from federal and state agencies and organizations participated in a mock rapid response exercise simulating the discovery of Hydrilla in Lake Erie. The scenario proposed that the invasive plant, *Hydrilla verticillata* had been discovered in Lake Erie. Participants were challenged to use the Pennsylvania AIS Rapid Response Plan to work through each step of the process to developing an action plan.

By working through the Plan in a systematic fashion, participants and facilitators were able to identify existing gaps and challenges in the Plan, and developed a list of action items for PISC and individual agencies to consider. The workshop participants identified the following key issues and suggestions for improvements

<b>Issue</b>	<b>Suggestions for Improvement</b>
Confusion among state agencies about who is responsible for what in some situations (for example: aquatic plants, private lands,)	Agencies should work together to identify “gray” situations and develop clearly-defined roles and responsibilities
Lack of funding for RR outside of Lake Erie watershed. Lack of “emergency” RR funding across state.	Increase funding for AIS prevention and control, including RR activities.
New agency staff are not fully trained on RR plan.	Implement more regular RR training within agencies and as part of other job training. Increase promotion of the plan to state agencies and organizations.
Lack of a unified reporting process in Pennsylvania	Work within agencies to develop an internal reporting chain for AIS that cannot be interrupted by personnel vacancies.
Lack of dedicated agency and organization staff working on aquatic invasive species issues in Pennsylvania	Seek alignment between agency-specific issues and AIS impacts to help encourage the need for dedicated staffing for invasive species.
In some cases, the actions steps in the plan are not being used by agencies and organizations to address new infestations.	Work with upper level management at state agencies to create buy-in on using the Plan and following its guidelines for rapid response.

# 1. Introduction and Background

Pennsylvania's water resources are a vital ecological and economic resource to the Commonwealth. More than 86,000 miles of waterways flow across five major watersheds, and the landscape is dotted with lakes, rivers, streams, and wetlands. Pennsylvania is blessed with more miles of waterways than any other state in the continental United States.

There are many serious threats to the Commonwealth's water resources, including aquatic invasive species (AIS), which are non-native species that cause negative ecological, economic, or health-related impacts. Once widely established, controlling the spread of aquatic invasive species is technically difficult and expensive, while eradication can be impossible. Therefore, early detection and rapid response to a new infestation is critical.

The National Invasive Species Council defines rapid response as "a systematic effort to eradicate, contain, or control a potentially invasive non-native species introduced into an ecosystem while the infestation of that ecosystem is still localized." To be most effective, a response must occur as soon as possible after the introduction is identified, and before the species is established.

Objective Four of the Pennsylvania Aquatic Invasive Species (AIS) Management Plan (the Plan) calls to "Develop a system for early response to eradicate or contain a target species before the species can become permanently established." In addition, one of the Plan's priority strategies is to "Implement a coordinated system for rapid response efforts to contain or eradicate newly detected aquatic invasive species" (Strategy 4A). In response to this mandate, the Pennsylvania Invasive Species Council (PISC) has adopted a process for quickly responding to new AIS infestations in the Commonwealth.

The Pennsylvania AIS Rapid Response Plan is a support tool designed to aid agencies and organizations in conducting a coordinated, structured, and timely response to new AIS infestations. It outlines a systematic approach to responding to a reported AIS infestation, and provides guidance for determining when a response is appropriate and what types of responses should be considered. Past mock exercises have been the basis for improvements and revisions to the existing Plan. The 2015 Mock Exercise After Action Report is available via Pennsylvania Sea Grant's website at: [www.seagrant.psu.edu](http://www.seagrant.psu.edu).

The *Hydrilla in the Lake Erie Watershed* mock rapid response exercise held November 16, 2017 in Erie, Pennsylvania introduced participants to Pennsylvania's AIS Rapid Response Plan and the process to follow when dealing with a reported infestation.

The main objects of the exercise were to:

- Provide resource managers with an opportunity to practice using the Plan to respond to a mock scenario involving the introduction of *Hydrilla verticillata* to three locations in Presque Isle Bay in Erie, Pennsylvania.
- Test the Pennsylvania rapid response plan framework and identify existing gaps and challenges

The Pennsylvania AIS Rapid Response Plan is a working document. Input and recommendations from this, and future exercises, will be used to improve upon the current rapid response plan. Hydrilla was chosen as the species for the mock exercise due to recent discoveries of hydrilla in Pymatuning Reservoir, a 17,000 acre reservoir in Pymatuning State Park located in northwest Pennsylvania. The reservoir is located in both Pennsylvania and Ohio, and is roughly 50 miles from Lake Erie. Pymatuning State Park is one of the most popular and widely visited state parks in Pennsylvania, because it offers many recreational opportunities such as boating, swimming, kayaking, canoeing, bird watching and fishing. Anglers from throughout the region can launch their boats at one of several marinas around the reservoir to enjoy an afternoon of fishing or participate in one of the annual crappie and walleye tournaments.

In 2010, during a routine aquatic plant inventory conducted by Pennsylvania DEP, DCNR, the Crawford County Conservation District, and the University of Pittsburgh, a single Hydrilla fragment was pulled from the Ackerman Island area on the south end of Pymatuning reservoir. The sample was sent to Morris Arboretum where it was confirmed to be Hydrilla and Pymatuning State Park staff were notified.

In 2014, Hydrilla was found at additional locations around Pymatuning Reservoir. In response, an interagency meeting was held in April 2015 to discuss potential courses of action. A survey of the reservoir was conducted to determine the full extent of the infestation, and an herbicide treatment was applied at high priority sites around boat launches. A total of 57 acres were treated. The 2015 survey of the lake showed a 10 percent frequency of locations with Hydrilla, and the 2016 survey showed a 28 percent frequency of Hydrilla. In 2017, the frequency of Hydrilla remained around 28 percent.



Figure 1: Map of Pymatuning Reservoir



## 2. Exercise Agenda

November 16, 2017

Tom Ridge Environmental Center

Erie, Pennsylvania

- 9:00**            Opening Remarks
- 9:15**            Overview of the Rapid Response Plan and Introduction of the Mock Scenario
- 9:25**            Reporting, Determining Priority, and Verifying Identification of the species
- 10:15**           Break
- 10:30**           Hydrilla Identification – Brian Pilarcik, Crawford County Conservation District
- 11:00**           Conduct Risk Assessment
- 11:20**           Great Lakes Hydrilla Risk Assessment- Richard Ruby, USACE Buffalo District
- 12:00**           LUNCH
- 12:30**           Conduct Site Specific Assessment
- 1:00**            Evaluate Response Options
- 1:30**            Break
- 1:45**            Lake Erie Cooperative Weed Management Area Response to Hydrilla in Erie County-  
Tom Cermak, Pennsylvania Sea Grant
- 2:00**            Implement Incident Response Plan
- 2:40**            Follow-up actions and Evaluation of Response
- 3:20**            Final Discussion and Mock Exercise Evaluations
- 3:30**            Thank you and Adjourn

### 3. Rapid Response Mock Exercise Scenario

The following scenario is fictional, and was created for the purposes of this exercise.

#### Overview

On July 14, 2017 a volunteer at Presque Isle State Park in Erie, PA discovered a small patch of an unknown plant species near the West Pier Boat launch on Presque Isle State Park. The volunteer used the identification information from the *Pennsylvania Field Guide to Aquatic Invasive Species* to determine that the plant most closely resembled *Hydrilla verticillata*. Careful not to touch or move the plant, the volunteer took several close up photographs of the patch, and made notes to record the location. He returned to the Tom Ridge Environmental Center and reported his finding to a park manager.

In light of this discovery, a Presque Isle State Park manager took the ranger boat to do a quick sweep of the area described by the volunteer. In addition to the patch found near West Pier, she also identified an additional patch of the suspect plant about 525 feet outside the channel to Marina Lake, and another at the boat launch in Marina Lake (Figure 2). The park manager took a sample of the plants found at each of the three locations and sealed them in a plastic Ziploc bag before returning to the Tom Ridge Environmental Center. She immediately referenced the Pennsylvania AIS Rapid Response Plan to begin the response process, taking note that while this potential invasive species was found on state park lands, DCNR does not have authority over species found 500 feet outside of the perimeter of the park.

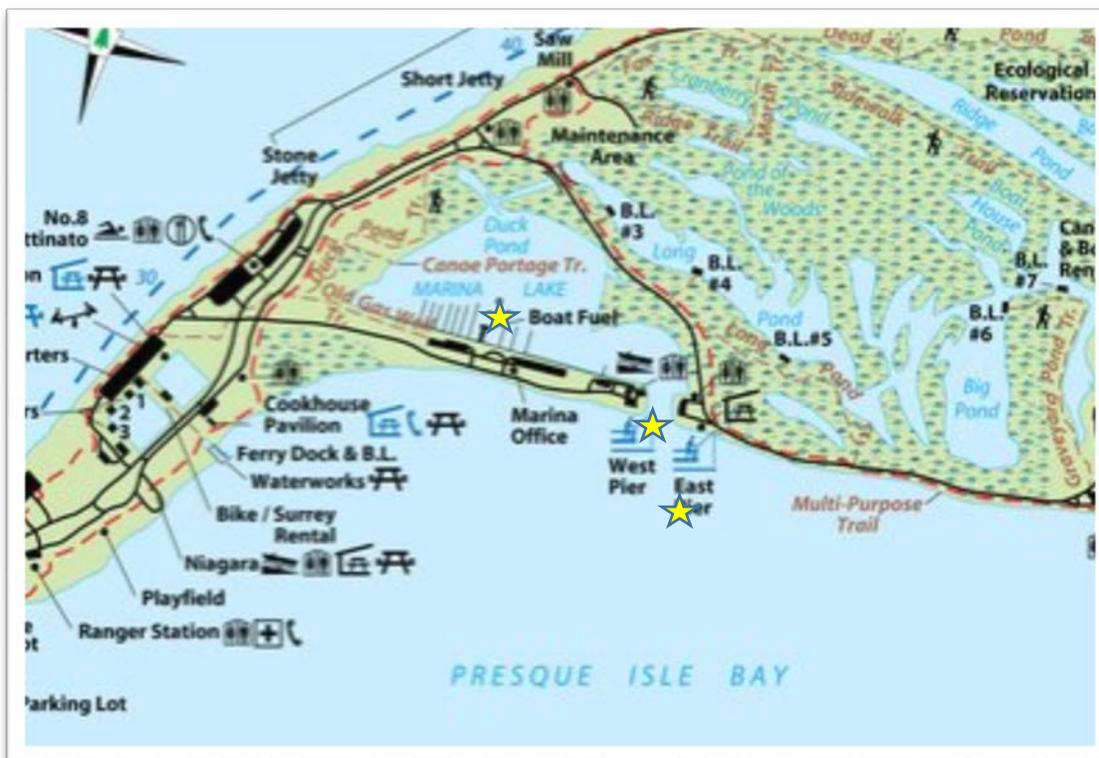


Figure 2: Mock exercise scenario map showing starred locations where Hydrilla was reported. In reality, as of 2017, Hydrilla has not been found in these locations.

## 4. Action Item Summaries, Challenges and Proposed Solutions:

The Pennsylvania AIS Rapid Response Plan outlines the following seven steps to deal with the proposed scenario:

Action 1: Report suspected species to AIS coordinator

Action 2: Is the Reported Infestation a High Priority?

Action 3: Identify and Verify the Species

Action 4: Conduct a Risk Assessment to Determine if Species is a Candidate for Rapid Response Action

Action 5: Conduct Site Specific Assessment(s) and Evaluate Response Options

Action 6: Develop and Implement an Incident Response Plan

Action 7: Conduct an Evaluation and Plan Next Steps

Working through each of these seven action steps, participants determined the likelihood or credibility of each step for this particular scenario, and provided feedback and suggested alterations to the existing Pennsylvania AIS Rapid Response Plan in order to make improvements.

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### Action 1: Report suspected species to AIS coordinator

Previous mock exercises determined that the initial report of a suspected aquatic invasive species should be reported immediately and directly to the coordinator for the Pennsylvania Invasive Species Council (PISC). However, the council coordinator position is currently vacant, and thus there is a gap at the very first action step. Participants discussed the gap and ways in which the initial reporting could be submitted and expedited, despite existing or future staffing issues. General reporting mechanisms such as an AIS reporting hotline, e-mail, and online reporting forms should be used for reporting invasive species in Pennsylvania, and titles and positions (such as the PISC Coordinator) should be referenced, rather than identified as specific people in that role. In addition, participants suggested developing a separate internal document, containing a list of specific contacts for each agency which could be updated frequently to reflect changes in staff.

Workshop discussion also raised questions about whether multiple agencies should receive the initial, general reporting, and if yes than how would a responding agency notify other agencies that the reporting is being reviewed. Participants also wondered whether reporting should be broken out by location (east/west).

#### Action Items for Rapid Response Committee:

- Work with PISC to determine best point for initial reporting in Pennsylvania.
- Ensure each agency identifies a point person as an AIS reporting representative.
- Determine which agency will host a general AIS reporting hotline. Setup a reporting hotline and e-mail address.

## Action 2: Is the Report High Priority?

Agencies and organizations will use best professional judgement to determine if the reported infestation is credible and in need of further action. Examples where reports might be designated low priority include if the species is already well documented in the established area; if the species is shown to have a low climate match based on Pennsylvania climate-matching tools; and if for that location, there are existing reports of priority high risk species where resources are being allocated. In this case, action might be warranted at a later time when more resources become available. If no action is necessary, the observation will be documented and reported internally and to mapping and tracking databases such as iMap Invasives, USGS Non-indigenous Aquatic Nuisance Species Database and EddMaps, but no action, other than periodic monitoring, is recommended.

## Action 3: Identify and Verify the Species

Once it has been determined that the species is high threat or priority, the agency or organization taking the lead on the report will facilitate the process to identify the species, which may include consulting outside expertise, gathering information and photographs, and potentially collecting the specimen. The Pennsylvania Rapid Response Plan includes Appendix C: Protocols for Reporting and Collecting Specimens, which provides specific guidance and protocols for collecting and submitting specimens. Workshop participants identified inconsistencies with Appendix C and internal agency collection procedures.

### Action Items:

- Update Appendix C, along with the collection information presented in the PA AIS field guide to reflect be consistent with agency collection procedures.

Photo description: Aquatic plants can be difficult to identify. Participants worked to improve their aquatic plant identification skills by viewing common native and invasive aquatic plants during the workshop. Photo credit: Pennsylvania Sea Grant



## Action 4: Conduct a Risk Assessment to Determine if Species is a Candidate for Rapid Response Action

Pennsylvania's current risk assessment process consists of three questions:

1. Is this a new invasion?
2. If a population already exists, is it increasing?
3. Is the species known to cause significant impacts?

Workshop discussion on this action centered on ways to improve the risk assessment process in Pennsylvania, and whether additional questions should be considered. The group agreed that at this point in time, the three question system is sufficient.

## Action 5: Conduct Site Specific Assessment and Evaluate Response Options

Action 5 of the Plan consists of distinct two parts:

- 5a. Conducting a site specific assessment for the infestation
- 5b. Evaluating possible response options

The purpose of this action step is to compile as much information about the infestation as possible, and use that information to determine priority objectives, and develop response options to meet those objectives.

### Action 5a: Conduct Site Specific Assessment

Workshop participants were split into small, working groups, and given the following assessment and evaluation questions to consider:

- What portion of the water body could be colonized (water depth less than 30 feet)?
- What is the potential for dense bed formation based on substrate composition?
- What is the potential for rapid (less than 3 years) spread of Hydrilla at the site?
- What is the strength of vectors for internal or external Hydrilla spread (boat traffic, flow, currents, seasonally mobile bird populations, etc.)?
- What resources and uses are potentially threatened (water supply, swimming, boating, fishing, aesthetics, populations of sensitive or protected species)?
- What is the potential for eradication based on extent and density of coverage and vectors of spread?
- Is law enforcement action, or any additional form of investigation needed?

Participants then discussed what information they had been given in the scenario, and what further information they would like to have before choosing a response option; noting that in a real-life response, it is often necessary to evaluate response options without optimal information being available.

**Table 1: Site Assessment Breakout Results**

What information is known?	What additional information would you like to have?
<b>Biology</b>	
Hydrilla is seasonal	
<b>Habitat</b>	
Hydrilla was found in Presque Isle Bay in three different patches, two that are located within DCNR park jurisdiction and one that occurred 25 ft. outside of DCNRs jurisdiction	Estimated acreage of the infestation
The area infested with Hydrilla is less than 30 feet in depth and consists of mostly sandy substrate	Estimate of tuber density within the patches
Conditions in the Bay are conducive for continued growth and spread of Hydrilla	Water flow patterns throughout the Bay
Native macrophytes such as coontail are present at the infestation site.	Historical data on water clarity
<b>Vectors of spread</b>	
Continual boat traffic out of marina lake	Would DCNR ever consider closing access to marina lake?
Marina Lake hosts yearly bass tournaments for anglers traveling from all throughout Pennsylvania	
Presque Isle Bay is home to many migratory bird populations	
Presque Isle is a popular tourist destination for water recreational uses	
<b>Potential impacts</b>	
Hydrilla could impede boat traffic, impact native fish and wildlife populations, and impact the local angling economy at Presque Isle State Park	How will Hydrilla compete with existing species such as starry stonewort?
	A Pennsylvania Natural Diversity Inventory (PNDI) to determine if any rare, threatened, or endangered species are present
<b>Management</b>	
DCNR has jurisdiction over the patches of Hydrilla within marina lake and within 500 feet of the park boundary.	Who has jurisdictional authority for the patch of Hydrilla beyond DCNR's jurisdictional boundary?

**Action 5b: Evaluate Response Options:**

Using the information gathered in Action 5a, participants identified specific objectives for the response:

- Minimize or eradicate existing populations and stop spread
- Maintain visitor and economic values of the park
- Educate recreation water users and visitors to the park

- Further evaluate and monitor existing patches

Participants then brainstormed about possible response options that could be implemented in this Hydrilla infestation, including chemical, mechanical, and biological control actions; law enforcement action; education and outreach; monitoring, and any other actions appropriate for these locations. Some of the options identified included:

- Monitor the existing range and spread of the population to determine how this might impact additional treatment options
- Develop education materials such as signage, and programs such as boat stewards positioned at entrance and exit sites, “certified” clean boat program, etc.
- Herbicide treatment with possible benthic barrier treatment
- Suction harvesting
- Dredging during the winter to avoid plant fragmentation
- Restrict access to certain areas of the bay to minimize boat traffic
- Coordinate with federal and state agencies, neighboring states, commercial operations, and anyone else who has current and future work planned in the Bay

The rapid response options template was used to compare the feasibility of the possible response options, taking into consideration available and needed resources, pertinent laws and regulations, permitting, and available funding. Participants were asked to consider:

- Are there any potential economic, political, social, or environmental impacts of the response method?
- What is the availability and feasibility of the chosen method?
- Has this method been used before with this or similar species?
- What is the potential for success?
- What is the time table for response?

## Action 6: Develop and Implement Incident Response Plan

The Pennsylvania AIS Rapid Response Plan includes an incident response framework, outlining who will take the lead and how the chosen response will be implemented. It also ensures that all involved entities are working together and that key players are at the table. Due to time restrictions, participants were introduced to the response framework but did not practice filling out the framework for the chosen response methods. Future trainings will focus on ensuring participants use the framework and identify any needed updates.



Discussions also highlighted the importance of communication at this step and throughout the rapid response process, in particular with other agencies, organizations, commercial entities, stakeholders, municipalities, neighboring states, and others who have a vested interest in the process.

## Action 7: Conduct Evaluation and Next Steps

Post incident evaluation helps to determine whether the response objectives were met, which areas of the response were successful, and what gaps or areas of improvement were needed in the response effort. Additional next steps include education and outreach to ensure stakeholders and the public are informed throughout the process, surveillance and monitoring, and remediation planning if necessary.

Robert Morgan, Biologist with the Pennsylvania Fish and Boat Commission, led the group in a discussion to evaluate the response process for the Hydrilla infestation in Presque Isle Bay. Responses from this discussion are highlighted in Table 2:

**Table 2. Issues and Action Items for Improving AIS Rapid Response in Pennsylvania**

Issue	Currently	Suggestions for Improvement	Action Item
Familiarity with the rapid response plan	Lack of knowledge that it exists	Raise awareness of the rapid response plan	Continue to hold in-person rapid response trainings and mock exercises, as well as develop online trainings; tie-in with regular meetings; tie in with conservation districts. Identify ways to institutionalize training to include new employees and provide training refreshers.
Using the rapid response plan	Minimal use	AIS control and rapid response are not a priority and compete with other daily tasks	Work with upper level managers so acceptance and use comes from top down and is made a priority within the job description.
Reporting potential sightings	Too many competing reporting mechanisms, and many have specific contacts listed which quickly become outdated	Unify the reporting process in Pennsylvania	Creating general reporting mechanisms such as a hotline, e-mail, and online reporting form; Determine who will host these; List agencies rather than specific people as contacts and keep an internal form of specific contacts.
Collecting specimens	Collection protocols not consistent with agency protocols	Unify collection protocols to provide consistency with internal agency protocols	Work with agencies such as PFBC and DCNR to update the collection protocols in Appendix C and the collection procedures listed in the Pennsylvania AIS Field Guide.

Communicating with partner agencies, organizations, and stakeholders	Minimal list of contacts and partners	Increase the number of local contacts listed in the plan	Identify and add in additional partners at the state, county, and municipal levels.
AIS staff within agencies and organizations	Lacking dedicated staff	Increase capacity for staff to work on AIS issues	Look to other states such as New York to see how their staff function within PRISMS; Work with PISC to discuss duties and functions of the PISC coordinate with regards to rapid response
Rapid Response Funding	Lack of solid funding mechanisms to deal with new infestation quickly	Create a fund that could be used for rapid response and general control efforts	Look to other states to see how their rapid response activities are funded (ex. NY: legislation mandating a fraction of property tax income to invasive species); Work with PISC to brainstorm funding mechanisms; Leverage more with partners for resources and funding.
Rapid Response Roles and Responsibilities	A fragmented agency and office structure which breeds a “not mine” mentality when it comes to responsibility over AIS in Pennsylvania	Identify key roles within agencies	Work with rapid response mock exercise participants and PISC to determine specific roles for Pennsylvania agencies and who has responsibility over taxa; Look to identify ways that AIS rapid response and control efforts can help agencies with their own goals and priorities to create “win-win” efforts.

## 5. Participants

**Table 2. List of workshop participants**

Name	Title	Organization	Email
Melissa Althouse	Wildlife Biologist	USFWS Erie National Wildlife Refuge	<a href="mailto:melissa_althouse@fws.gov">melissa_althouse@fws.gov</a>
Holly Best	Park Manager	DCNR Presque Isle	<a href="mailto:hbest@pa.gov">hbest@pa.gov</a>
Hilary Buchanan	Resource Technician	Venango Conservation District	<a href="mailto:hbuchanan@usachoice.net">hbuchanan@usachoice.net</a>
Sharon Carr	Field Technician	PA Dept of Ag	<a href="mailto:shacarr@pa.gov">shacarr@pa.gov</a>
Colleen Campion	Watershed Specialist	Wayne County Conservation District	<a href="mailto:ccampion@waynecountypa.gov">ccampion@waynecountypa.gov</a>
Larissa Cassano	Watershed Specialist	Mercer County Conservation District	<a href="mailto:lcassano@mcc.co.mercer.pa.us">lcassano@mcc.co.mercer.pa.us</a>
Tom Cermak	Coastal Outreach Specialist	Pennsylvania Sea Grant	<a href="mailto:tjc29@psu.edu">tjc29@psu.edu</a>
Nick Decker	Resource Manager	DCNR	<a href="mailto:ndecker@pa.gov">ndecker@pa.gov</a>
Jim Grazio	Great Lakes Biologist	PADEP	<a href="mailto:jagrazio@pa.gov">jagrazio@pa.gov</a>
Stacie Hall	Assistant Manager	DCNR Pymatuning	<a href="mailto:stahall@pa.gov">stahall@pa.gov</a>
Heidi Himes	Fish Biologist	USFWS	<a href="mailto:heidi_himes@fws.gov">heidi_himes@fws.gov</a>
Joseph Hudson	Watershed Specialist	Erie County Conservation District	<a href="mailto:jhudson@erieconservation.com">jhudson@erieconservation.com</a>
Nate Irwin	Aquatic Biologist	PA DEP	<a href="mailto:nirwin@pa.gov">nirwin@pa.gov</a>
Sandy Keppner	Northeast Region AIS coordinator	USFWS	<a href="mailto:sandra_keppner@fws.gov">sandra_keppner@fws.gov</a>
Mark Lethaby	Museum curator	Natural History Museum at TREC	<a href="mailto:mlethaby@verizon.net">mlethaby@verizon.net</a>
Craig Lucas	Fairview/Tionesta Hatchery Manager	PFBC	<a href="mailto:crlucas@pa.gov">crlucas@pa.gov</a>
Bob Morgan	Aquatic Biologist	PFBC	<a href="mailto:robmorgan@pa.gov">robmorgan@pa.gov</a>
Brian Pilarcik	Watershed Specialist	Crawford County Conservation District	<a href="mailto:brian@crawfordconservation.org">brian@crawfordconservation.org</a>
Scott Ray	Fairview Fish Culture Station Foreman	PFBC	<a href="mailto:scray@pa.gov">scray@pa.gov</a>
Richard Ruby	Fisherese Biologist	USACE- Buffalo District	<a href="mailto:Richard.J.Ruby@usace.army.mil">Richard.J.Ruby@usace.army.mil</a>
Sara Stahlman	Extension Leader	Pennsylvania Sea Grant	<a href="mailto:sng121@psu.edu">sng121@psu.edu</a>
Sarah Whitney	Director	Pennsylvania Sea Grant	<a href="mailto:swhitney@psu.edu">swhitney@psu.edu</a>
Diane Wilson	Group Manager	PA DEP	<a href="mailto:diawilson@pa.gov">diawilson@pa.gov</a>

## 6. Workshop Evaluation

The table below is a compilation of evaluations completed by workshop participants, which provide additional input and understanding into the needs and barriers agencies and organizations face in implementing a rapid response.

### 1. What type of organization do you represent?

State, county or local government	Federal government	College, university or research group	Non-profit conservation or watershed group	International
11	2	0	0	0

### 2. My position can best be described as:

Outreach or education	Program management	Communications, public relations/outreach	Resource manager	Research, science, engineering
2	1	0	7	3

### 3. How did you hear about this workshop:

Pennsylvania Sea Grant website	Listserv	Coworker	Conference/meeting	Other: Sea Grant employee; partner
0	2	7	1	2

### 4. How useful did you find the workshop?

Most Useful	Very Useful	Useful	Somewhat useful	Note useful	Did not answer
6	6	0	0	1	1

### 5. How was the pace of the workshop?

Too fast	Slightly too fast	Just right	Slightly too slow	Too slow
1	1	10	2	0

### 6. How was the time allocated for discussions during the tabletop exercise?

Too short	Slightly too short	Just right	Slightly too long	Too long
0	4	7	1	0

### 7. How well do you agree with the statement: I gained knowledge that I will apply in my job?

Strongly disagree	Disagree	Agree	Strongly Agree
0	0	1	12

**8. Are there any obstacles that might prevent you from using the rapid response plan in your agency/organization?**

- Funding and understanding of the importance up the chain of command
- Fragmented agency support and lack of actionable ownership
- Funds and available personnel
- Lack of human and financial resources
- Lack of knowledge of personnel
- Don't know who to reach out to
- General knowledge of coworkers
- Governance structure in Pennsylvania
- Funding/Time; lack of priority within my department

**9. How has this program benefited you? What was the most useful aspect of the workshop?**

- Met more potential contacts/partners; Learned what's happening; current info; got more ideas. Most valuable: Networking/Brainstorming
- I have a better understanding of agency integration and plant identification
- I had no previous experience with this, so it was all a great learning opportunity. The breakout discussions and plant ID were most useful to me
- Exchanging ideas with people from other agencies and organizations
- Knowledge of where to report and how to a response is initiated
- Talking with cooperating agencies
- Candid discussions
- Discussing what steps to take and how to assess the priority of an invasion
- Meeting with colleagues in other agencies; recognizing opportunities for improvement
- Going through exercises and learning more about the responsibilities of different agencies
- Networking

**10. Is there anything you can suggest to improve the rapid response plan?**

- Make sure folks know it exists- at the field level!
- More promoting, some people aren't aware of it to begin with
- Additional local contacts state/county/municipal
- Keep a live web document for personnel changes
- We have to keep getting the word out
- Updated contact list

**11. Are you interested in attending additional workshops about rapid response and AIS?**

Yes	No	Did not answer
10	0	3

**12. After participating in the tabletop exercise, are there any gaps and challenges that haven't already been discussed in implementing an effective early response plan for AIS in Pennsylvania?**

- The biggest hurdle is funding
- Need for species specific response (fish/plant/invert) ready to implement

- Where do we get funding for all of this stuff?
- Clearer description of who is on first

**13. What additional policies need to be in place to implement a successful AIS rapid response in Pennsylvania?**

- Fast track permitting process; Available funding; List of resources- people to call for help
- Fund account for faster response
- Obligate buy-in from upper level management
- Getting contact out to the public
- PA code for jurisdictional responsibility
- Funding pool; make invasives a priority

**14. What additional staffing needs to be in place to implement a successful AIS rapid response in Pennsylvania?**

- We need dedicated resource management staff-doesn't exist in PA State Parks
- More direct agency communication or specific point of contact
- Coordination at top and contacts & all agencies (?)
- Coordination in each agency and a contact in each agency
- Need a team/person to go to for all reports
- Yes, dedicated positions across agencies
- Buy in from agency heads/prioritize AIS; Full-time AIS Coordinator in PA
- Staff designated specifically for AIS

**15. Are there areas where additional coordination is needed?**

- More understanding of when to report/who to report to
- Within agency and interagency
- Yes, communication chain
- Dedicated funding for rapid response
- Action/Implementation
- At PISC level
- Yes, who is on 1st?

**16. Are there areas where additional communication is needed?**

- Publicize watch lists more prolifically
- This should definitely be done at required annual trainings across agencies
- All agencies and districts; education of all state/local personnel and where to go
- Yes-interagency
- Yes- above field staff level

**17. Additional comments:**

- Great workshop- Got me thinking!
- Compile a list of contact info of participants to be distributed after the workshop for networking and communication
- I want to be in the loop and help get the word out and help those in my county
- Excellent workshop
- Very good workshop, well organized and good mix of presentations and small group discussion

# Appendices

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## *Appendix A. Presentation Summaries*

### **Aquatic Invasive Plant Identification,**

**Brian Pilarcik**, *Crawford County Conservation District*

Pilarcik introduced participants to the identification and biology of Hydrilla as well as several other aquatic plants that could be found in Pennsylvania, including elodea, Brazilian waterweed, curly-leaf pondweed, starry stonewort, coontail, clasping leaf pondweed, long leaf pondweed, large-leaf pondweed, bladderwort, duckweed, watermeal, wild celery, southern naiad, brittle naiad, and fanwort. Handouts and quiz sheets were used to discuss key characteristics for identifying these aquatic plants and distinguish them from Hydrilla.

### **Great Lakes Hydrilla Risk Assessment: Objectives, Framework, and Modeling Highlights**

**Richard Ruby**, *Army Corps of Engineers, Buffalo District*

Ruby discussed the Great Lakes Hydrilla risk assessment project, which used distributional and dispersal modeling techniques to identify locations in the Great lakes most vulnerable to Hydrilla invasion based on environmental suitability. Studies focused on evaluating environmental and biotic factors to Hydrilla growth; and impact analysis was then used to assess to ecological, economic, and social/cultural impacts of Hydrilla establishment. Results from this work included recommendations for prevention, early detection, and rapid response to reduce spread, and the identification of best management practices for Hydrilla control.

### **Early Detection and Rapid Response: Taking Action as an NGO**

**Tom Cermak**, *Pennsylvania Sea Grant*

Cermak outlined actual efforts by the Lake Erie Watershed Cooperative Weed Management Area (LEW-CWMA) to treat newly identified populations of Hydrilla and bamboo within the Pennsylvania Lake Erie watershed. He discussed the steps taken to identify the infestation and to work with a private contractor to apply the herbicide. Important concepts included the identification of barriers to these rapid response efforts including the lack of available resources to control the infestation as well as the uncertainty or unwillingness of a jurisdictional agency to take leadership of this issue as it was on private land. Two key questions were: "Who has jurisdiction?" and "What funding and resources can they provide?"