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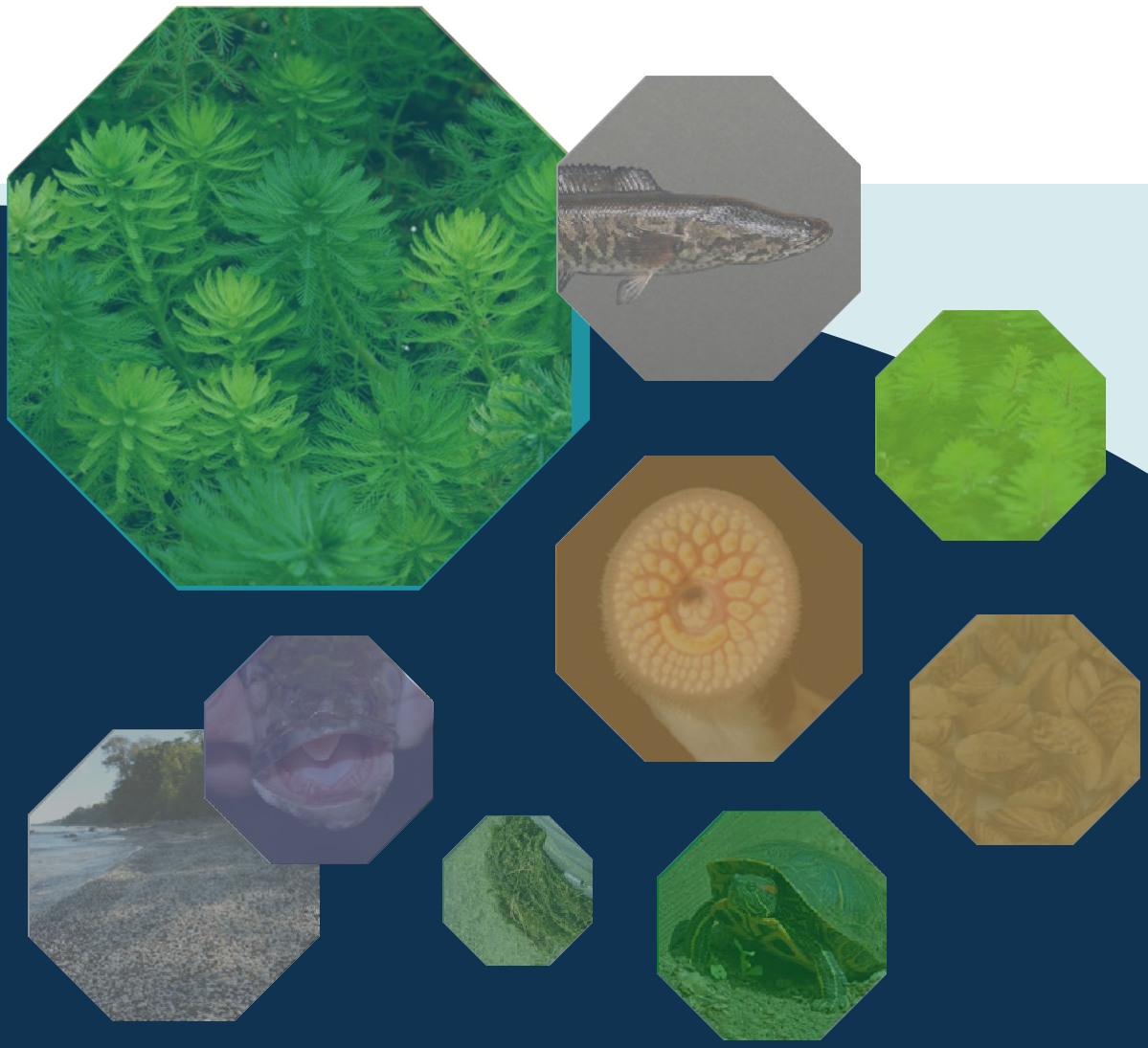
Rapid Response Plan & Procedures

for Responding to Aquatic Invasive Species in Pennsylvania



Sea Grant Pennsylvania

Governor's Invasive Species Council of Pennsylvania

Great Lakes RESTORATION

2022

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Acknowledgements

This plan was developed and approved by the Pennsylvania Invasive Species Council (PISC) in September 2014. Original development was led by the Aquatic Invasive Species Rapid Response Subgroup for PISC, with core members outlined below. The group consisted of representatives from the Pennsylvania Fish and Boat Commission, Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Agriculture, and Pennsylvania Sea Grant. Additional agency representatives, PISC members and stakeholders provided valuable technical input and review into the development of this document.

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- Jim Grazio, Pennsylvania Department of Environmental Protection
- Bob Morgan, Pennsylvania Fish and Boat Commission
- Sara Stahlman, Pennsylvania Sea Grant
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This 2022 update was prepared by the Aquatic Invasive Species Rapid Response Plan Update Committee which includes PISC members and representation from Pennsylvania Sea Grant, the Pennsylvania Fish and Boat Commission, the Department of Agriculture, Penn State University, and the Crawford County Conservation District.

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Purpose of the plan

This rapid response plan for aquatic invasive species (AIS) is an inter-agency decision support tool designed to aid regulatory agencies (Appendix A: Authority) in conducting a coordinated and structured response to new AIS infestations. It outlines the steps to follow upon receiving a report and serves as a guide for determining when a response is appropriate and what types of responses should be considered. This is a working document and revising it will be an ongoing process. As additional information gaps are identified, they will be incorporated into this document. This document was developed by the Pennsylvania Invasive Species Council Aquatic Working Group Rapid Response subcommittee.

Policy

The Pennsylvania Fish and Boat Commission (PFBC), and other regulatory agencies will coordinate responses to AIS threats while operating under any existing internal agency protocols as necessary and deemed appropriate by the agency initiating the response.

INTRODUCTION

Based on the definition from the federal *Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990*, aquatic invasive species (AIS) are defined in this document as non-native species that threaten the diversity or abundance of native species, the ecological stability of infested waters, human health and safety, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters. Invasive species are, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem

(Office of the President of the United States, 1999).

Article 1, Section 27 of the Pennsylvania Constitution states that *the people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic, and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustees of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.* Pennsylvania has more than 84,000 miles of streams and many in- state lakes, sharing five major watersheds with other states and Canada. All of these waterways have the potential to host aquatic invasive species, therefore creating AIS management implications. Once invasive species become widely established, controlling their spread is both technically difficult and expensive, while eradication can be impossible. Therefore, prevention of new introductions must remain the first priority in fighting aquatic invasions (PA AISMP 2007).

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 to an introduction should occur as soon as possible after the introduction is realized, and before the species is established.

When prevention efforts fail to stop the introduction of an aquatic invasive species, it is critical that a process be in place to address the new infestations quickly and effectively. This document is intended for use by Pennsylvania state agencies with authority over or concerns about aquatic invasive species in the Commonwealth (see Appendix A: Authority). Objective four of the Pennsylvania Aquatic Invasive Species Management Plan (PA AISMP 2007) calls for the development of a rapid response effort 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 has developed a process for quickly responding to new AIS infestations in the Commonwealth.

This plan details that process and was designed to address the critical period between the introduction and the establishment of a new AIS when the focus of management must shift rapidly from prevention to eradication and control. In so doing, the ultimate goal of the rapid response plan model is to capitalize on the window of opportunity to stop the establishment of new harmful invasive species shortly after introduction, when prevention has failed (ANSC, 2005).

PROCEDURE

Instructions for Using the Rapid Response Plan

The Pennsylvania rapid response plan was designed using a three-tiered approach, with each section becoming increasingly more detailed. The action steps described below and diagrammed in Section 1 should be followed chronologically, but the process may end at varying points depending on the details of each situation. This plan is designed to complement and be used in conjunction with other existing response and action plans (e.g., Pennsylvania Fish and Boat Commission's species-specific action plans—didymo, golden alga, invasive carp, rusty crayfish, water chestnut, VHS and zebra/quagga mussels.)

Section 1: is a decision tree that gives a concise overview of all the action steps that may be needed in the rapid response process. This section is most useful for visualizing the "big picture" of the response. It is intended to accompany the narrative section of the plan but can also be used as a quick reference summary/overview of action steps when responding to an incident. Supplemental information regarding each step, if available, is referenced in the decision tree and directs users to the areas of Sections 2 and 3 where more detail about that action can be found.

Section 2: Expands on each action item outlined in the decision tree and includes a brief explanation or a set of directions to help guide the user through each of the steps. This section was designed to be used as a stand-alone document if desired, with a checklist format that is quick and easy to follow.

Section 3: Provides comprehensive information about each of the action steps that may be needed to assist in developing the response. In addition to in-depth information, this section contains contact information for federal and state agencies, interested parties, and others who may need to be included in the response effort, and includes interactive tools such as the Response Options template and the Incident Response Plan template that can be used to aid in the decision-making process.

The process of responding to newly introduced species, or species that have expanded their ranges to new locations in Pennsylvania, will operate under the assumption that "all it takes is one." This means that a single occurrence of an individual invasive species (i.e., one specimen), if deemed a significant threat, can be sufficient to trigger a rapid response.

SECTION 1: OVERVIEW OF RAPID RESPONSE ACTIONS

The decision tree provides a quick reference to the rapid response process and should not be used as a stand-alone document. References provided in the boxes indicate important information that should be referenced during the response process.

SECTION 2: RAPID RESPONSE ACTIONS CHECKLIST

This section of the rapid response plan can be utilized as a stand-alone document to address the aquatic invasive species rapid response procedure in Pennsylvania. For more detailed supplemental information about each action step, references to the appropriate section of the rapid response plan are given.

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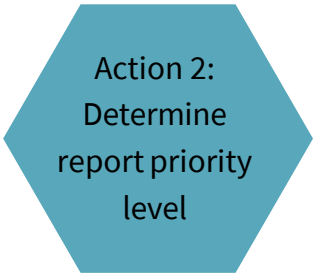
Reports of invasive species may come from a wide variety of sources including the general public, partner organizations, and state agencies. The agency or organization receiving the report will immediately report the possible new AIS occurrence to the Pennsylvania Aquatic Invasive Species Coordinator by choosing one of these reporting methods: 1.) submitting an online AIS reporting form at https://pfbc.pa.gov/forms/reportAIS.htm

(Appendix D); 2.) Calling the Pennsylvania invasive species reporting hotline at 1-833-Invasiv 3.) Using the reporting feature with the 'PA AIS' smartphone application (See Section

3.1 and Table 1). The AIS coordinator will then facilitate the report to the agency with jurisdictional authority over the species to begin the rapid response process.



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Based on a preliminary investigation and best professional judgment, the agency with jurisdictional authority will determine if the report is credible and in need of further action. If no act ion is necessary, the observation will be documented and reported according to internal agency protocol, but other than periodic monitoring, no further action is recommended. If yes, move on to Action 3. (See section 3.2).

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Once the appropriate jurisdictional agency (as identified in Appendix A) has received the report and decided further action is appropriate, they will facilitate identification and verification of the species as described in section 3.3. Once verified, they will follow the outlined communication protocols in Appendix C for reporting the occurrence to additional contacts and partners; for example, if the species impacts federal resources, state park lands, or private property, the appropriate contacts should be notified at this time.

(See Section 3.3 and Table 1 for a list of federal agencies and their contact information). Sightings should also be reported to mapping and tracking databases such as iMAP invasives, USGS Nonindigenous Aquatic Species database, and EDDmaps, as appropriate.

As necessary, identification and verification of the species can be assisted by following the guidance provided in Appendix C: Protocols for Reporting and Collecting Specimens, which includes detailed steps on how to:

- Gather information
- Collect specimens
- Contact outside resources for identification

Action 4: Conduct rapid risk assessment

Confirming a new priority AIS in the state or watershed will result in a risk assessment of the invasion and specific situation. The following steps can serve as guidelines for the jurisdictional agency in deciding if further action is required. Assistance from external experts may be needed to aid in this decision. (See Section 3.4).

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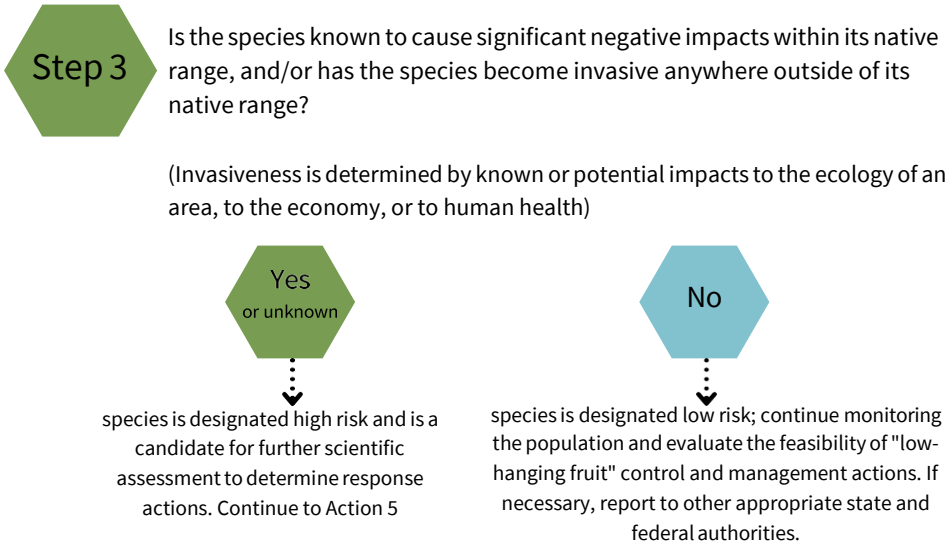
Step 1 Is the species a new invasion to the state or geographic location or to the waterway, watershed, or ecosystem?

- Yes — Go to Step 3
- No — Go to Step 2

Step 2 If a population of the species is already present in the state or geographic location or in the watershed, waterway, or ecosystem, is the species population increasing, and/or is the species new to this location of this latest occurrence?

- Yes — Go to Step 3
- No

species is designated low risk; continue monitoring the population and evaluate the feasibility of "low-hanging fruit" control and management actions. If necessary, report to other appropriate state and federal authorities.



Action 5: Conduct site specific assessment

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Once the specimen has been classified as high or unknown risk, additional information will be needed about the infestation and the site location to help identify possible response options. Examples of information to assess include the geographic extent and abundance of the infestation, potential origin, and reproductive status. The site-specific assessment may require the use of resources such as boats and kayaks, rakes, GPS units, secchi disks, and other kinds of monitoring and sampling equipment to assist in gathering the necessary information. More details on the kind of information needed for the site-specific assessment are outlined in Section 3.5.

Action 6: Evaluate Response Options

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After the necessary information is gathered, the Response Options Template Tool can be used to help determine priority objectives and develop response options to meet those objectives. Response options may include (but are not limited to) chemical, mechanical or biological controls, law enforcement, education and outreach, closing or limiting access, monitoring, etc. The template can then be used to determine the most feasible response options based on available and needed resources, pertinent laws, regulations, and available funding.

Action 7: Develop and Implement Incidence Response Plan

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To ensure all response objectives are met, an incident response plan will be developed to provide the framework and basic organizational structure for the chosen response action. The incident response plan worksheet can be found in Section 3.7 and will identify critical areas and roles of the response such as:

- Identification of the best qualified individuals to fill leadership roles
- Definition of time frame
- Identification of funding mechanisms
- Identification of constraints and limitations
- Confirmation of Available Resources
- Details of the equipment and personnel needed to implement the response
- Identification of any areas of the response that require legal approval or permitting

The first step in planning a response is to determine if an Incident Command System (ICS) structure is appropriate (See Appendix F). Once the response action has been chosen, other agencies, organizations, commercial entities, neighboring states and other stakeholders that have a vested interest in the rapid response process should be contacted. Timely information should be dispensed to stakeholders, colleagues, conservation organizations, watershed associations, and others impacted by the infestation. For a partial list of suggested contacts see Section 3, Table 2. A press release informing the public of the situation and proposed actions should also be considered at this time.

Action 8: Conduct Follow-up Actions

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During and after the implementation of the action plan, the jurisdictional agency will be responsible for follow-up to the incident. Follow-up will include education and outreach, a survey and monitoring plan to prevent or document recurring infestations, and a post-incident evaluation to review the strengths and weaknesses of the response actions. As appropriate development of a restoration plan for the area is also encouraged. Detailed information on follow-up actions can be found in Section 3.8.

SECTION 3: RAPID RESPONSE PLANNING, PROCEDURES, AND SUPPLEMENTAL INFORMATION

An AIS rapid response requires many steps and significant coordination and analysis. It is critical that state agencies are prepared to act when the need for rapid response is warranted. The process of responding to newly introduced species, or species that have expanded their range to new locations in Pennsylvania, will operate under the assumption that "all it takes is one." This means that a single occurrence of an individual invasive species (i.e., one specimen), if deemed a significant threat, can be sufficient to trigger a rapid response. The following are the detailed steps needed to respond to a typical incident.

Action 1: Report suspected AIS

State agencies may not be the first entity to find a new infestation. On-the-ground personnel or members of the public may initially discover the infestation and report it to a non-governmental agency or organization most familiar to them such as a watershed conservancy, conservation district, trout unlimited, etc. The entity receiving the report should immediately submit the report to the Pennsylvania Aquatic Invasive Species Coordinator by choosing one of these reporting methods: 1. Submitting the Pennsylvania Fish and Boat Commission online AIS reporting form (Appendix D); 2. Calling the Pennsylvania invasive species reporting hotline at 1-833-Invasiv; 3. Using the reporting feature with the Pennsylvania Field Guide to Aquatic Invasive Species Smart Phone App (Download in the Apple Store by searching 'PA AIS'. The AIS coordinator will then facilitate the report to the agency with jurisdictional authority over the species to begin the rapid response process.

Include the following in an AIS sighting report:

- Name and contact information (phone and email) of reporter and/or data collector
- Date of observation
- The exact location of the discovery including the latitude and longitude (decimal degrees) if possible
- Driving directions to the nearest site access
- Clear, close-up, digital photographs from different angles of the unknown specimen(s) as well as general photos of the immediate environment where the specimen was found. Include key landmarks to assist in finding the site.
- Notes about the location, habitat, and environmental conditions of the discovery site.

Note to State, Federal, and Non-Governmental Organizations: If you are the first to receive notification from the public, but you are not the authority responsible for that taxon, please gather the information to include in an AIS sighting report and immediately forward the report to the Pennsylvania Aquatic Invasive Species Coordinator via one of the methods listed above. If the suspected sighting is a federally regulated species or a joint federal and state regulated species, the state agency with regulatory authority should immediately contact the federal authorities responsible for that taxon (Table 1). A list of additional contacts to initiate rapid response communication protocols can be found in Appendix A and Table 2. Specimens should be handled in compliance with state and federal regulations regarding the transport of prohibited species.

Action 2: Determine report priority level: Does the report warrant further action?

Once the report has been made, the agency with jurisdictional authority over the AIS in question will conduct a preliminary investigation and use best professional judgment to determine if the report is credible and if further action is necessary. In some cases, a confirmed report will be labeled low priority for one or more of the following reasons:

1. The species is already known from the area.
2. The species will not be able to survive Pennsylvania's climate.
3. For that location, there is an existing report of a higher risk species, to which resources will be allocated.

Low priority reports should be reported within the agency and to other agencies, organizations, and mapping and tracking initiatives according to internal protocol and kept on file.

Action 3: Identify/verify the species

Once it has been determined that the species is high threat or priority, the jurisdictional agency will facilitate verifying the identity of the species. The following procedures should be followed to evaluate the situation and ensure proper handling of potential samples and specimens:

A. *Gather Information*
When a potential invasive species is found in the field, document the find in as much detail as possible so the specimen can be positively identified, and the location can be found again. If possible, record the latitude and longitude (decimal degrees) of the discovery, provide driving directions to the nearest access point, and make notes about the location, habitat, and environmental conditions of the discovery site. Tools such as digital cameras, GPS units, notebooks, and the PA AIS field guide can be helpful to accurately document the find. Additional tips for gathering information are below:

- If a plant species, take note of the size of the plant and how large an area it covers
- If unsure of the identification of the specimen, write down a detailed description (color, size, shape, distinguishing features, etc.)
- Take several clear, **close-up** digital photographs from different angles of the specimen(s)
- Include something of commonly known size in the photo to establish a scale (for example, a coin, eyeglasses, or a camera lens cover)
- Take photos of the immediate environment where the sighting occurred and key landmarks to assist in finding the site

B. *Specimen Collecting Information*
If a sample specimen is needed to assist in identification, it is important to keep the specimen contained to avoid possible spread of the AIS, or any organisms that might be attached to it. Because it can violate state regulations to live transport or live possess many AIS, contact the agency with jurisdictional authority for the species as soon as possible for permission and guidance on how to properly handle the specimen (Appendix A).

C. *Identifying and Reporting:*
Newly reported AIS must be verified by an expert who is recognized by the responding agency. When possible and deemed necessary, specimens should be verified by a second expert and voucher specimens should be retained and stored properly for future analysis. Specimens should be handled in accordance with 58 PA Code 71.6 and 73.1 (See Appendix B: Legislation). In the case that the agency with jurisdictional authority does not have a taxonomic expert for identification on staff, Appendix A should be referenced for additional agency contacts which may be able to aid in the identification of the species or for a referral on an external identification expert. In some cases, the specimen may need to be mailed; contact the recipient for specific shipping instructions. (See Appendix C)

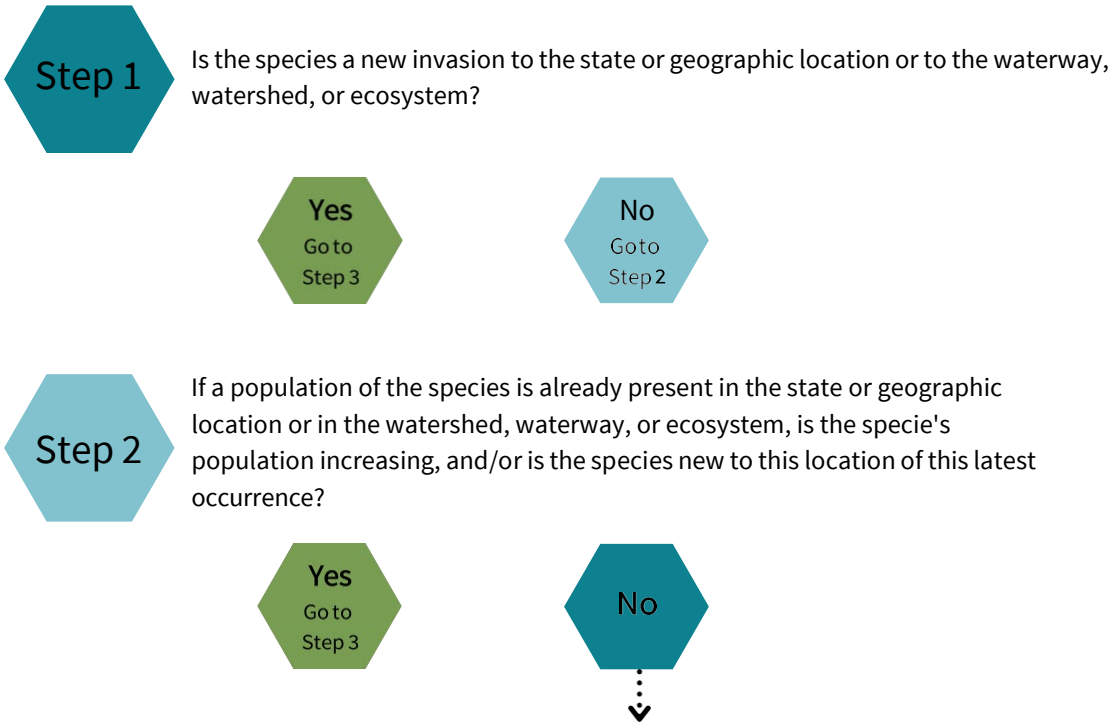
If species identification is verified, initial communication with key partners, stakeholders, and other appropriate entities should be considered during this action. For example, if the reported AIS has been verified on federal lands, in areas that impact federal resources, or is found to be an invasive plant species regulated under the federal noxious weed list, or an injurious species regulated under the Lacey Act, the U.S. Department of Agriculture and/or the U.S. Fish and Wildlife Service should be notified.

Entities with jurisdictional and/or management authority for the location of the infestation, or property owners may need to be contacted for permission so that verification can occur. A press release or other public notification should also be considered after positive verification has occurred to help facilitate additional detections, aid in containment, limit the spread of the invasion, and raise awareness about the issue.

A list of state and federal agencies that may need to be contacted can be found in Appendix A and Table 1 in Section 3.5. It is also recommended to report sightings to mapping and tracking initiatives such as iMAP invasives, USGS Nonindigenous Aquatic Species database, or EDDmaps, as appropriate.

Action 4: Conduct rapid risk assessment: Is the species a candidate for rapid response action?

Because the rapid response process will operate under the assumption that "all it takes is one" to trigger a rapid response, it is not necessary at this stage to know the density of the population or the extent of the infestation. It is far more critical to assess the potential threat the introduced species poses. The jurisdictional agency, with assistance from other sources as needed, will conduct the following risk assessment:



If the species is designated low risk, and is not a candidate for action, then the occurrence should be noted and reported but no further rapid response action is needed. These low-risk species will need to be monitored to ensure the population does not undergo significant expansion. If changes occur in the population, the infestation should be put through the risk assessment process once again to determine if action is necessary.

If the species is designated high or unknown risk, it is a candidate for potential action, and an incident response plan will be developed. Results from this action may be communicated to relevant partners and stakeholders at the discretion of the responding agency. Nearby property owners, municipalities, and other relevant parties should be considered, as many of these entities may be valuable resources in conducting the risk assessment and may be able to provide information that might not otherwise be available to the responding agency.

Action 5: Conduct site specific assessment

To determine appropriate response options, the jurisdictional agency will gather information on the species and the infestation level. The specific details of a particular occurrence or invasion will inform the decision about whether a rapid response is feasible and necessary. This assessment is intended as an information gathering process to determine the potential environmental, economic, or human health threat, and evaluate if the AIS and the particular details of the occurrence make it a candidate for a rapid response. There are some quantitative and concrete criteria that can be used for the assessment; however, best professional judgment of the circumstance will be used to determine if a response is appropriate to minimize threat. It should be noted that, because of the urgency involved, it will sometimes be necessary to evaluate response actions without optimal information being available. In these cases, agency personnel will need to rely on best professional judgment or advice from external sources. Examples of information necessary to determine response actions include, but are not limited to:

- Geographic extent and abundance of the invading species (i.e., local and regional range, sources of inputs, the waterway's drainage area, receiving stream or river, boat launch sites, and other points of public access, and any other obvious pathways for potential spread).
- Origin of the AIS
- Evidence of reproduction, e.g., multiple age classes present in the infestation site
- Determination of whether there is need for law enforcement action or if any additional form of investigation is needed
- Determination of additional location specific risk factors or impacts that should be considered for this species (e.g., to the environment, human health, economy, etc.) in this location

The site-specific assessment may require the use of resources such as boats and kayaks, sampling rakes, GPS units, secchi disks, traps, identification guides, and other kinds of monitoring and sampling equipment to assist in gathering the necessary information. Leveraging partnerships and resources will be valuable in ensuring all the needed resources and manpower for information gathering can be accessed and available. Table x can be referenced to determine potential state and local partners to assist in this step.

Action 6: Evaluate response options

Once the necessary information is gathered, the scientific assessment template tool below can be used to determine the priority response objectives and examine response options necessary to meet those objectives. Examples of possible response options can be referenced in Appendix J. Response options may include (but are not limited to) chemical, mechanical or biological controls, law enforcement, education and outreach, monitoring, etc.
The template can then be used to determine the most feasible response options based on available and needed resources, pertinent laws, regulations, and available funding.

The leading response agency should also consider a press release during this action to raise awareness for the issue and stay in front of misinformation, rumors, and general questions. The press release should include mention of the initial report, confirmation of the species identification, biological information, and appropriate results from the risk assessment. Lastly, the press release should also give a general description of the next steps (assess response options, etc.) and provide a point of contact for questions and additional information.

Response Options Template

1. Response Objectives
   List the goals and objectives for the response to this infestation. Objectives should be achievable, measurable, and flexible.

   Examples may include, but are not limited to:
   - Maintain economic value of a resource
   - Avoid ecological harm
   - Prevent further spread
   - Contain or eradicate invasive species in known areas of infestation
   - Protect human health
   - Establish early rapport with the public through education and involvement
   - Further evaluation

2. Examine all Feasible Response Options
   Based on the information gathered in the site-specific assessment, list possible response actions that may be feasible to address this infestation:

   Examples of potential actions to consider include, but are not limited to:
   - Chemical controls
   - Containment
   - Mechanical controls
   - Outreach to user groups
   - Biological controls
   - Implementation of boat/bait bucket checks
   - Targeted signage

3. Decision Making: Comparing Options
   Take the response options in Step 2 of this response options template and complete the following table for each option to compare and contrast the best possible action for this infestation. Add more pages as necessary.

	Response Option 1	Response Option 2	Response Option 3	Response Option 4
What resources would be needed to implement this control strategy? (if appropriate, insert the quantities of each)	☐ Personnel ☐ Equipment: ☐ Power Boats ☐ Kayaks/Canoes ☐ Nets ☐ Fishing poles ☐ Electrofishing gear ☐ Waders ☐ Pesticides and applicators ☐ Transportation	☐ Personnel ☐ Equipment: ☐ Power Boats ☐ Kayaks/Canoes ☐ Nets ☐ Fishing poles ☐ Electrofishing gear ☐ Waders ☐ Pesticides and applicators ☐ Transportation	☐ Personnel ☐ Equipment: ☐ Power Boats ☐ Kayaks/Canoes ☐ Nets ☐ Fishing poles ☐ Electrofishing gear ☐ Waders ☐ Pesticides and applicators ☐ Transportation	☐ Personnel ☐ Equipment: ☐ Power Boats ☐ Kayaks/Canoes ☐ Nets ☐ Fishing poles ☐ Electrofishing gear ☐ Waders ☐ Pesticides and applicators ☐ Transportation
List any other resources that may be needed to address this infestation				
Of the needed resources, which are readily available?				
What is the cost estimate for this response option?				
Do any regulations or permitting restrictions apply to this action?				
How feasible is it to meet your response objectives using this response option?				

If a control or eradication option is being considered, additional points to discuss may include:

- An assessment of the potential environmental, political, social, and economic impacts of the control and/or eradication method.
- The availability and feasibility of the control or eradication method.
- Analysis of precedents for using an eradication/control methodology with this species or similar species.
    - Assessment of the potential to achieve success in the eradication effort
    - Timetable to achieve objectives.

Based on the information in the above table, list the chosen response action. Action could range from "no action" to "only education and outreach" to "containment" to "control" or "eradication" depending on the cost, resource availability, feasibility of success, etc.

The results of Action 5 should be shared with appropriate partners, federal agencies, local municipalities, property owners, and other relevant entities to ensure consistent and accurate sharing of information.

Table 1: Federal Entity Contacts

Federal Entity	Email & Phone	Web Address
National Park Service (NPS) Northeast Region Exotic Plant Management Team	Betsy Lyman betsy_lyman@nps.gov	https://www.nps.gov/index.htm https://www.nps.gov/orgs/1103/epmt.htm
U.S. Army Corps of Engineers	Alicia Palmer Alicia.E.Palmer@usace.army.mil 814-658-6812 Michael Vissichelli micheal.g.vissichelli@usace.army.mil 347-370-4663	https://www.usace.army.mil/Missions/Environmental/Invasive-Species-Management/
U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS)	Contact local APHIS office	https://www.aphis.usda.gov/aphis/home/
U.S. Coast Guard	Contact Local USCG Office	https://www.uscg.mil/
U.S. Environmental Protection Agency	Bill Bolen bolen.bill@epa.gov 312-353-6316	https://www.epa.gov/watershedacademy/invasive-non-native-species
U.S. Fish and Wildlife Service	Sandra Keppner sandra_keppner@fws.gov 585-948-5445 ext. 7039	https://www.fws.gov/initiative/invasive-species
U.S. Geological Survey (USGS)	Wes Daniel wdaniel@usgs.gov 352-264-3523	https://nas.er.usgs.gov/sightingreport.aspx

Action 7: Develop and implement incident response plan

If a decision is made to respond, the next step is to create an incident response plan. First, determine if an Incident Command System (ICS) structure is appropriate for the incident. Certain response scenarios may benefit from a highly coordinated and structured format, such as ICS. See Appendix F for more information on ICS and how to implement the system for AIS rapid response. If ICS is not appropriate for the incident, continue with Action 6.

The purpose of the incident response plan is to provide a framework for actions while ensuring that all involved entities work together. Successes and failures of the planned response will be continuously monitored, and actions will be adjusted as needed. The incident response plan is for use by the agency with regulatory authority but may also involve other agencies and organizations who will play a role in implementing actions. In addition to direct actions, education and outreach plays a key role in the implementation process. Ensuring that stakeholders and public entities are informed and engaged is important for obtaining buy-in on proposed actions, as well as encouraging added caution when working in affected areas or participating in activities that could spread species or further exacerbate the issue (examples of organizations that may play a role in the implementation process include Pennsylvania Sea Grant [can provide outreach materials, trainings, pathway-specific outreach programs, etc.]; the Pennsylvania Invasive Species Council [offers an informational website on invasive species, etc.]; and local clubs, organizations, and NGOs.

Name: **Date:**

Agency: **Phone Number:**

1.) Current Situation Assessment

A. *Infestation Location*

City/ Town:

County:

Nearest Street Address:

GPS Coordinates:

B. *Extent of Infestation*

Was there more than one age class identified at the infestation site? ☐Yes ☐ No

If yes, does the population appear to be established? ☐Yes ☐No

What is the approximate size of the impacted area?

Is the body of water connected to any other body of water by in/out flows, canals, tributaries, etc.? ☐Yes ☐ No

Is the body of water used for recreational activities? ☐Yes ☐ No

If yes, list the activities (fishing, power boating, swimming, jet skiing, etc.):

Is this body of water privately or publicly owned? Are there any impediments to accessing the site?

2.) Current Actions

Are any response actions currently taking place at the infestation site? (These could include education, containment, control, bait bucket/boat checks, etc.)

3.) Management

A. Planned action

Describe the response action that was chosen for this infestation:

B. Resources

What resources are needed for the chosen response?

What resources are readily available?

How can needed resources be obtained which are not readily available?

C. Personnel

List the names of all agency personnel that should be involved in the rapid response action:

Who will be the responsible lead in charge of overseeing the entire response action?

Name(s): **Contact info:**

Who will be responsible for acquiring the needed resources?

Name(s): **Contact info:**

Who will be responsible for overseeing outreach and communication to specific user groups and organizations?

Name(s): **Contact info:**

If appropriate, who will be responsible for seeing that necessary permits are acquired?

Name(s): **Contact info:**

If appropriate, who will be responsible for overseeing boat and bait bucket checks?

Name(s): **Contact info:**

List any other individuals involved in this response and their roles:

Name(s): **Role:**

D. Time-Frame

What is the estimated time-frame to complete the response action from start to finish?

4.) Regulatory Actions

A. Involvement of State and Federal Agencies

Which state and federal entities should be notified of this response option? (Individual agency contact information can be found in Appendix A, and Tables 1, and 2)

☐ EPA	☐ DCNR
☐ USFWS	☐ PDA
☐ NPS	☐ PGC
☐ USGS	☐ USDA APHIS
☐ PFBC	☐ PDH
☐ DEP	☐ Other: Click here to enter text.

Define the responsibilities of each individual agency involved during the response (consult with any developed or existing MOU's to reinforce understanding of these responsibilities):

B. Permitting

Are there any permits required for the planned response actions? (Emergency permits or executive orders may be in place, or required for the necessary response actions to take place):
☐ Yes ☐No

If yes, list the permits that need to be obtained:

C. Legal

Does the planned rapid response action conform to all pertinent Pennsylvania and federal regulations and laws? (Consult Appendix B for a summary of Pennsylvania AIS legislation).
☐Yes ☐No

If no, please revisit step 4B "permitting" to determine the appropriate permits necessary to allow the planned action to take place.

5.) Funding

What is the estimated level of funding needed to implement this rapid response?

What funding sources can be used to support this response effort?

Who will be responsible for securing funding for this response effort?

6.) Education and Outreach

A. Stakeholder Involvement

Create a list of stakeholders and concerned entities to contact with information about this incident and any actions planned:

Develop a communication strategy to ensure coordination with stakeholder groups remains intact throughout the duration of the response action. Be sure to list who is in charge of communications with stakeholders.

B. Public Involvement

The following checklist is a list of actions that should be taken to ensure education and outreach on the response is adequately disseminated to the public.

- ☐ Identify available resources to use for public education on AIS and the risks associated with their introduction- create new resources if gaps regarding this species exist
- ☐ Invite local watershed associations, environmental groups, and the general public to participate in the response action in order to promote citizen stewardship
- ☐ Develop news articles and press releases to be disseminated to the public
- ☐ Work with water conservation officers (WCOs) to distribute information to the public
- ☐ Hold public informational meetings

7.) Follow-up Actions

The following components of the action plan are vital and should be addressed as soon as possible after the response action has taken place.

A. Surveying and Monitoring

To determine accurate AIS population size and distribution information, create a monitoring plan for detection of recurring infestations and existing populations within the infested site.

B. Evaluation

Using the information obtained in the monitoring plan, what was the impact of the rapid response effort on the population?

What aspects of the response didn't go well and how could the process be improved for future response actions?

What aspects of the response worked well?

Use the information listed above to assist in making future decisions on addressing invasive species issues.

C. Restoration

If appropriate, develop a restoration plan.
Check any of the following restoration options that may be appropriate for the infestation site:

☐ Waterway survey
☐ Waterway quality assessment
☐ Waterway restoration projects
☐ Others:

List other restoration options for this infestation site:

Contact stakeholder groups and other interested entities

When a response action is being planned, it is important to identify and contact other agencies, organizations, commercial entities, and neighboring states who have a vested interest in the process. Timely information and a coordinated message should be dispensed to stakeholders, colleagues, conservation organizations, watershed associations, conservation districts, community groups, local police, municipalities, non-profits etc., as well as local, state, and federal agencies impacted by the infestation. Partnerships with these groups and organizations can help develop on-the-ground campaigns against the invader, which includes carrying out the developed action plan, monitoring results, and conducting education and outreach. Early warning and rapid response communication strategies will need to be developed between involved agencies, local officials, lake associations, stakeholders, and others to ensure easy flow of communication between all participating entities. Individual contact information for some (but not all) entities is also included below in Table 2, which acts as supplemental information to the above action plan.

Table 2: Action Planning- Interested entities that may be included in a rapid response

Interested Entity	Name	Telephone	Email Address
DCNR	Nick Decker	(717) 787-6674	ndecker@pa.gov
DEP	Jim Grazio	(814) 217-9636	jagrazio@pa.gov
PA Lake Management Society	Kate Harms	(484) 656-1649	kharms@palakes.gov
PDA Noxious Weeds Program	Trilby Libhart	(717) 787-7204	tlibhart@pa.gov
PDH	Dr. Ram Nambiar	(717) 787-3350	anambiar@pa.gov
PennDOT	Joseph Demko	(717) 783-9453	jodemko@pa.gov
Conservation Districts	Brian Pilarcik	(814) 763-1906	Brian@crawfordconservation.org
Penn State University	Julie Urban	(814) 863-4444	jmu2@psu.edu
Penn State Cooperative Extension	Jennifer Fetter Susan Boser	(717) 921-8803 (724) 774-3024	jrf21@psu.edu smw16@psu.edu
Pennsylvania Sea Grant	Sarah Whitney	(610) 304-8753	swhitney@psu.edu
PFBC	Sean Hartzell	(814) 359-5163	sehartzell@pa.gov
PGC	Tim Haydt	(717) 787-9613	thaydt@pa.gov
Pennsylvania Invasive Species Council (PISC)	Kris Abell	(717) 787-2227	krabell@pa.gov
Temple University Ambler Field Station	Amy Freestone	(215) 204-1826	amy.freestone@temple.edu
The Nature Conservancy	Keith Fisher	(717) 232-6001 ext. 213	keith_fisher@tnc.org
UPenn	Lisa Murphy	(610) 925-6217	murphylp@vet.upenn.edu
USDA APHIS	Coanne O'Hern	(717) 241-0143	cohern@aphis.usda.gov
Western PA Conservancy	Amy Jewitt	(412) 586-2305	ajewitt@paconserve.org
Local Governments	Reference the association of Township Supervisors to find yours	(717) 763-0930	https://www.psats.org/
Local and State Police			

Action 8: Conduct follow-up actions

Follow-up actions, such as evaluation, education and outreach, monitoring, and restoration are included as part of the incident response plan and will be completed during, or after completion of the response.

The jurisdictional agency will evaluate, at a minimum, the following components of the rapid response process:

- Successful areas of the response – were the response objectives met?
- What gaps or areas of improvement were needed in this response effort?
- What modifications are needed to the processes before the next effort?

This information may be obtained through monitoring, surveying, and evaluating response objectives defined in the action plan. Feedback from the evaluation process should then be used to improve and revise future rapid response efforts and enhance long term preparedness for responses to other AIS infestations.

Appendices

Appendix A: Authority

Agency contacts and information: State Agencies with Jurisdictional Authority over Invasive Species in Pennsylvania

TAXA	Jurisdictional Agency	Agency Contact	Address	Phone	E-mail
State noxious aquatic weeds and Federal noxious aquatic weeds	Pennsylvania Department of Agriculture (PDA)	Kris Abell Governor's Invasive Species Council Coordinator	2301 North Cameron Street Harrisburg, PA 17110	717-787-2227	krabell@pa.gov
Other non-regulated obligate aquatic plants, amphibians, reptiles, mollusks, crustaceans, and fish	Pennsylvania Fish and Boat Commission (PFBC)	Sean Hartzell Aquatic Invasive Species Coordinator	595 East Rolling Ridge Drive Bellefonte, PA 16823	814-359-5163	sehartzell@pa.gov
Other invertebrates	PDA (terrestrial)	Kris Abell	See above	See above	See above
	PFBC (aquatic)	Sean Hartzell	See above	See above	See above
Mammals	Pennsylvania Game Commission (PGC)	Tim Haydt Public Lands Section Chief	2001 Elmerton Avenue Harrisburg, PA 17110	(717) 787-9613	thaydt@pa.gov
Pathogens	PFBC	Sean Hartzell	See above	See above	See above
	PDA	Kris Abell	See above	See above	See above
	Pennsylvania Department of Health (PDH)	Dr. Ram Nabiar Director, Division of Infectious Disease Epidemiology	625 Forster Street, 9th Floor Harrisburg, PA 17120	717-787-3350	anambiar@pa.gov
AIS on State Park Lands	Department of Conservation and Natural Resources (DCNR)	Nick Decker PA Bureau of State Parks	400 Market Street Harrisburg, PA 17101	717-787-6674	ndecker@pa.gov
Permitting	Pennsylvania Department of Environmental Protection (DEP)	Jim Grazio Great Lakes Biologist	Peninsula Drive, Suite 4 Erie, PA 16505	814-217-9636	jagrazio@pa.gov

1. A list of terrestrial Pennsylvania state-listed noxious weeds can be found in Appendix B: Legislation (7 PA Code 110.1).
2. Please use this link < http://www.aphis.usda.gov/plant_health/permits/organism/federal_noxious_weeds.shtml> to access the most recent Federal Noxious Weed List.
3. Please refer to Appendix E for guidance on which regulatory agency should be contacted for aquatic invasive pathogen

Agency Descriptions

Pennsylvania Fish and Boat Commission: is charged with ensuring the protection, propagation, and distribution of game fish, fish bait, baitfish, amphibians, reptiles, and aquatic organisms and managing recreational boating in the Commonwealth. PFBC has the authority to do the following: promulgate regulations to manage fish species (legislatively defined as fin fish, amphibians, reptiles, and all other aquatic organisms) and fishing; issue lists of species approved for propagation, live bait operations, and transportation; prohibit transfer of fish into state watersheds; inspect for species composition and disease; permit tropical fish imports unless there is a perceived threat to native species; prohibit introduction of non-native reptiles and amphibians into the environment; issue a list of species (jointly with PDA) approved for open-system propagation and to license unlisted species if there is no threat of water discharge or release of live fish or eggs; issue permits (jointly with DEP) for use of algaecides, herbicides, and fish control chemicals that may cause disturbances to waterways and watersheds. PFBC also has developed regulations to address the potential risk of species introductions from bait and bait fish. In addition, PFBC has conducted educational and public information programs on aquatic invasive species in Pennsylvania, including surveys and outreach to boaters in cooperation with DEP and PASG (PA AISMP 2007).

Pennsylvania Department of Agriculture, in cooperation with PFBC, has regulatory authority for aquaculture facilities and issues permits for the artificial propagation and sale and distribution of live aquatic animals. PDA also is responsible for addressing federal and state noxious weeds; it prohibits the propagation, sale and movement of any plant on the Pennsylvania Noxious Weed Control List (currently 13 species). Although the list deals primarily with agricultural pests, aquatic species are eligible to be added to the list (PA AISMP 2007).

Department of Environmental Protection has authority to issue permits needed for pesticide or herbicide use in the Commonwealth. They work with networked agencies to assist in preventing AIS from being introduced into, spread within, or transferred out of the coastal zones to other waters/watersheds, and to facilitate eradication where environmentally appropriate through its Office for River Basin Cooperation and Coastal Zone Management Program (PA AISMP 2007).

Department of Conservation and Natural Resources has the authority to control invasive species in its natural areas if they threaten the feature for which the area is designated (PA AISMP 2007).

Pennsylvania Game Commission is authorized to adhere to USFWS guidance on mute swans and establishes a statewide maximum population goal of 250 mute swans. PGC also has the authority to prohibit the introduction, sale, and release of certain wildlife, for example nutria (PA AISMP 2007).

Appendix B: Legislation

This section provides a general summary for the specific legal information available concerning aquatic invasive species and is intended to be used as guidance. In the event of a rapid response event, **please reference the exact legislation.**

FEDERAL

1. EPA Authorities for Rapid Response Management Plans

Clean Water Act (CWA)

CWA Section 312(p)-Uniform Standards for Discharges Incidental to Normal Operation of Vessels: The Uniform National Discharge Standards (UNDS) set national performance standards that require the use of marine pollution control devices (MPCDs) to control discharges incidental to the normal operation of Armed Forces vessels. The EPA and the Department of Defense (DOD) are given authority, under Section 312 of the Clean Water Act, to develop these standards.

CWA Section 404 Permits to Discharge Dredged or Fill Material: establishes programs to regulate the discharge of dredged and fill material into waters of the United States, including wetlands.

Consult the appropriate USACE District office when planning AIS rapid response control actions to determine if these actions require a Federal Section 312 or 404 permit.

Amendments to CWA:
Clean Boating Act (CBA)

The CBA provides that recreational vessels shall not be subject to the requirement to obtain a Clean Water Act permit to authorize discharges incidental to their normal operation. It instead directs EPA to evaluate recreational vessel discharges, to develop appropriate management practices for the discharges and to promulgate performance standards for those management practices. The CBA then directs the U.S. Coast Guard to promulgate regulations for the use of the management practices developed by EPA. Finally, the law requires recreational boater compliance with such practices.

Federal Insecticide, Fungicide, and Rodenticide Act

FIFRA Section 18-Emergency Exemptions: allows states to use a pesticide for an unregistered use for a limited time if EPA determines that emergency condition exists.

FIFRA Section 24(c) –Special Local Need Registrations: authorizes states to register an additional use of a Federally-registered pesticide product or a new end use product to meet a special local need.

National Environmental Policy Act (NEPA)
The National Environmental Policy Act of 1970 (NEPA, 42 U.S.C. §§4321 et seq.), as amended, established a national policy to protect the environment. 29 Federal agencies are required to comply with NEPA and consider the environmental impacts, including invasive species, of an agency's actions.

2. National Oceanic and Atmospheric Administration (NOAA)

Nonindigenous Aquatic Nuisance Prevention and Control Act

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA; 16 U.S.C. § §4701, et seq.) established a federal program to prevent the introduction of, and to control the spread of, unintentionally introduced aquatic nuisance species,

3. U.S. Fish and Wildlife Service

Lacey Act
The Lacey Act of 1900 (18 U.S.C. §§42-43; 16 U.S.C. §§3371-3378) addresses illegal wildlife trade to protect species at risk and bars importing species found to be injurious to the United States. Under the Lacey Act, it is unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants that are taken, possessed, transported, or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken possessed or sold in violation of State or foreign law.

STATE

4. Pennsylvania Department of Agriculture (Bureau of Plant Industry)

Controlled Plants and Noxious Weeds, Act 46 (October 30, 2017)

This act establishes two broad categories of regulated and banned plants: controlled plants and noxious weeds.

Pennsylvania Aquatic Noxious Weeds –
Noxious weeds are identified as a plant that is determined to be injurious to public health, crops, livestock, agricultural land, or other property and cannot be sold, transported planted, or otherwise propagated in Pennsylvania. Weeds are placed within one of three classes, Class A, B, or C based on spread and eradication potential. The Pennsylvania Department of Agriculture maintains an updated list of Class A, B, and C noxious weeds in Pennsylvania. Class A noxious weeds are considered high priority for preventing new infestations and eradicating existing infestations. The department may require control of Class B weeds to contain an injurious infestation or may provide education or technical consultation. Class C noxious weeds are any federal noxious weeds listed in 7 CFR 360.200 (relating to designation of noxious weeds) not established in Pennsylvania which are not referenced above. To see the full listing of Pennsylvania noxious weeds, visit: https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/NIPPP/Pages/Controlled-Plant-Noxious-Weed.aspx

5. Pennsylvania Department of Agriculture (Bureau of Animal Health and Diagnostic Services)
   Act 100-Domestic Animal Act
   Provides authority to create programs to recognize, contain, and eliminate invasive species of diseases or pests that would adversely affect livestock health.
   Aquaculture Development Law, 3 Pa C.S. Chapter 42; 58 Pa Code 71.2
   The Bureau of Fisheries will maintain a list of species by watershed for which the Department of Agriculture may issue registrations for artificial propagation and registrations for dealers of live aquatic animals.
   MOU with USDA APHIS
   Provides authority to establish mutual cooperation on animal health issues

6. **Department of Conservation and Natural Resource**
   State Park Natural Areas Policy, 17 Pa Code 17.4
   Provides authority to administer and operate natural areas; to provide control if feature for which area is designated is in jeopardy; to manage insect pests and diseases on a case-by-case basis.

   Conservation of Natural Resources, 17 Pa Code 44.4
   Provides authority to actively manage conservation areas to protect natural resources

7. DCNR (Bureau of Forestry, Division of Forest Pest Management)
   Wild Resource Conservation Act, 32 P.S. 104, Sections 5301-5314
   Provides authority to protect native flora of Pennsylvania. DCNR with cooperation from taxonomists, biologists, botanists, and other interested persons conduct investigations on wild plants in order to ascertain information relating to population, distribution, habitat needs, limiting factors, and other biological and ecological data to classify plants and to determine management measures necessary for their continued ability to sustain themselves successfully.
   Conservation and Natural Resources Act, 71 P.S. 1340 Sections 101-1103
   Provides authority to survey and control forest pests

8. DCNR (Bureau of Forestry, Ecological Services Section)
   Conservation of Pennsylvania's Native Wild Plants, 17 Pa Code, Chapter 45
   Provides authority to protect vulnerable and endangered native wild plants from potential threats to habitat or self-proliferation.

9. DCNR (State Parks)
   State park waters
   17 Pa Code Section 11.203
   Describes the jurisdiction of DCNR over bodies of water such as lakes, impoundments, and other bodies of water that are wholly owned by the Department or completely surrounded by State park land; Presque Isle State Park, and Pymatuning State Park.

   Application of Fish and Boat Commission rules and Game Commission

rules 17 pa Code Section 11.204
Title 58 Pa. Code Parts II and III (relating to Fish and Boat Commission; and Game Commission) applies in State parks to activities under the jurisdiction of the Fish and Boat Commission and the Game Commission. To the extent that this chapter is more restrictive than 58 Pa. Code Part II or III, this chapter applies.

Miscellaneous activities 17

pa Code Section 11.209
Describes activities that are prohibited without written permission of the Department, including Bringing an animal, other than a pet as provided in § 11.212 (relating to pets), and other than a horse as provided in § 11.216 (relating to general recreational activity; horses; snowmobiles; all terrain vehicles; mountain bikes), into a State park.

Natural resources
17 pa Code Section 11.211
Describes activities that are prohibited except with written permission of the Department, or except as provided in subsection (b) such as releasing an animal that was brought into a State park.

10. Department of Environmental Protection (Office of Watershed Management)
Clean Streams Law, 35 P.S. 691.1 et seq
Provides authority to protect water supply for consumption, recreational use, and aquatic life; prohibits pollution of state waters that alters biological properties

Water Resources, 25 Pa Code 91.38
Provides authority, with joint approval by PFBC and DEP to control aquatic plants and manage fish populations with approved algicides, herbicides, and piscicides.

11. DEP (Office for River Basin Cooperation , Coastal Resources Management Program)
Program Policy in CRM's FEIS; Interagency MOU with PFBC
Provides authority to work with networked agencies to assist in preventing ANS from being introduced into, spread within, or transferred out of the coastal zones to other waters/ watersheds, and to facilitate eradication where environmentally appropriate; to provide funding and technical assistance

12. Federal Highway Administration (Environmental Quality Assurance Division, District offices)
Executive Order 13112; DOT Policy on Invasive Species from Federal Highway Administration (FHWA)
Provides guidelines from FHWA to prevent introduction and control spread of invasive plants in highway rights-of-way during construction and maintenance programs; requires NEPA analysis to identify invasive animals or plants (terrestrial or aquatic) based on PA Noxious Weeds list; recommends that state DOTs participate in state interagency invasive species councils as they are established.

13. Department of Transportation (Bureau of Project Delivery)
Design Manual
Prohibits use of noxious weed seeds in roadside mixes; recommends use of regionally native

plants for landscaping.

Publication 408-Section 800
Roadside development information.

Publication 756- Invasive Species Best Management Practices
Covers best management practices for design, construction, and maintenance of the transportation system.

14. Department of Transportation (Bureau of Maintenance)

    Publication 23-Maintenance, Chapter 13

    Provides the right to retain research to manage and control noxious and invasive weeds.

    Act of June 1, 1945, P.L. 1242 (36 P.S. 670-410) as amended July 7, 1972 P.L. 738 Act No. 173

    Provides the right to control noxious and invasive weeds from state right-of-ways especially where traffic safety is an issue.

    Maintenance Manual and the Act of June 1, 1945, P.L 1242 (36 P.S. 670-410)

    Provides the right to remove hazardous trees from the right-of way.

    Publication 461-Roadside Planting Guidelines

    Roadside planting guidelines.

15. Pennsylvania Fish and Boat Commission

    58 Pa Code 71.6 & 73.1

    List of aquatic species banned in Pennsylvania (sale, barter, possession or transportation)

    1. Bighead carp (*Hypophtalmichtys nobilis*)
    2. Black carp (*Mylopharyngodon piceus*)
    3. European rudd (*Scardinius erythropthalmus*)
    4. Quagga mussel (*Dreissenabugensis*)
    5. Round goby (*Neogobius melanostomus*)
    6. Ruffe (*Gymnocephalus cernuus*)
    7. Rusty crayfish (*Orconectes rusticus*)
    8. Silver carp (*Hypophtalmichtys molitrix*)
    9. Snakehead (all species)
    10. Tubenose goby (*Proterothinus marmoratus*)
    11. Zebra mussel (*Dreissena polymorpha*)

    58 Pa Code 63.44
    Prohibits use or possession of Goldfish, comets, koi, or common carp as baitfish while fishing

    58 Pa Code 63.46

    Prohibits sale, purchase, offer for sale, or bartering of live snakehead species, asian carp species (Black, bighead, silver), zebra and quagga mussels, round and tubenose gobies, rudd, rusty crayfish, and Eurasian ruffe.

    58 Pa Code 65.25
    Executive order banning the transfer of live fish out of the PA portion of the Lake Erie watershed.

58 Pa Code 71.2
Prohibits grass carp or white amur introductions without triploid certification; provides authority to issue list of species approved for propagation, live bait operations, and transportation permits

58 Pa Code 71.3
Authorizes introduction, importation, or transportation of USFWS approved grass carp with permit; prohibits propagation

58 Pa Code 71.6
Prohibits grass carp (except for research purposes), and tilapia introductions in state waters; prohibits possession, introduction, or importation of live snakeheads, asian carp species (Black, bighead, silver), zebra and quagga mussels, round and tubenose gobies, rudd, rusty crayfish, and Eurasian ruffe.

58 Pa Code 71.7
Provides authority jointly with PDA to list species approved for closed system propagation, and to license unlisted species if no threat of water discharge, or release of live fish or eggs

58 Pa Code 73.1
Provides authority to prohibit transfer of fish into state or non-native watersheds, to inspect for species composition and disease, and to permit tropical fish imports unless perceived threat to native species. Prohibits transport of live snakehead species, asian carp species (Black, bighead, silver), zebra and quagga mussels, round and tubenose gobies, rudd, rusty crayfish, and Eurasian ruffe.

58 Pa Code 73.2
Provides authority to issue a list of species authorized for transport permits

58 Pa Code 77.7
Prohibits introduction of non-native reptiles and amphibians

58 Pa Code 51.61
Provides authority to issue permits (jointly with DEP) for use of algicides, herbicides, and fish control chemicals that may cause disturbances to waterways and watersheds

Fish and Boat Code, PA CS 21 Chapter
Authorizes PFBC to make regulations managing fish and fishing, transport, etc.

12. Game Commission (Bureau of Wildlife Management)

Game and Wildlife Code, PA C.S. 34 Chapter 1.103

Provides authority to manage wild birds and mammals

Atlantic Flyway Management Plan

Authorizes PGC adhere to USFWS guidance on migratory birds (mute swans). Authorizes depredation permits; establishes statewide maximum population goal of 250 mute swans

58 Pa Code 137.1

Provides authority to prohibit introduction, sale, and release of certain wildlife, e.g. nutria

58 Pa Code 137.2

Prohibits the release of any animal" that is a member of the Family *Suidae* into the wild

13. Game Commission (Bureau of Land Management)
    Game and Wildlife Code, PA C.S. 34 Chapter 7
    Provides authority to manage SGL's and manipulate vegetation for propagation and management of game, wildlife, and habit

Appendix C: Protocols for Reporting and Collecting Specimens

Reporting a sighting

Take the following steps to ensure proper early detection and response for potential new AIS discoveries:

Carry documentation tools to accurately document your finding in the field:

a. Digital camera
b. Map, GPS, or other method to identify the latitude/longitude of the location
c. Notebook and pen
d. Identification guides such as “Pennsylvania’s Field guide to Aquatic Invasive Species”, and “Plant Invaders of Mid-Atlantic Natural Areas”, etc.

Gather and document information accurately:

- Note the exact location of the discovery and include information about the habitat andenvironmental conditions of the discovery site.
- Take note of species size, the number found or estimated, or the extent of the area it covers.
- Write down a detailed description of unknown specimen(s).
- Take detailed, close-up, digital photographs from different angles of the unknown specimen(s) as well as general photos of the immediate environment where the specieswas found. Include key landmarks to assist in finding the site. Ensure photos taken are not blurry.
- Include commonly known items (coins, eyeglasses, or a camera lens cover etc.) in thephoto to provide scale.
- Use identification guides to help identify the species

Verify identification and submit report:

- Collect as much information as possible and report the sighting by calling 1-888-Invasiv; or submitting the Pennsylvania Fish and Boat Commission AIS reporting form (Appendix D).
- Remember, the more detailed you can be, the easier it will be for others to locate yourfind.

Collecting a Specimen

Detailed (high resolution) close-up digital photos often are sufficient for experts to make preliminary specimen identification. Before collecting a specimen, always consult with the jurisdictional agency for instructions. When a sample specimen is needed to assist in identification, it is important to keep the specimen secure to avoid spreading the collected species, or any organism that might be attached to it. Please keep a record with the specimen of the location and date that it was collected. Be aware that animal specimens may carry diseaseorganisms. Use appropriate prophylactic measures (gloves, handling with forceps, etc.).

Pennsylvania law defines "fishing" as the act of angling, which includes catching, taking, killing, or removing any aquatic organism (including aquatic macroinvertebrates) from any waters in or bordering the Commonwealth for any purpose. Therefore, you are fishing if you collect fish (gamefish, panfish, etc.), bait-fish (minnows, darters, sculpins, madtoms, etc.), and fish-bait (aquatic insects and other macroinvertebrates).

Collecting aquatic organisms which are considered Fish, Baitfish, or Fish-bait, including potential aquatic invasive species in these categories, requires a valid fishing license if the individual is 16 years or older. In addition, collection activities must follow current Fish and Boat Commission regulations. Regulations protecting these organisms can be found in the Summary of Pennsylvania Fishing Regulations and Laws (https://pfbc.pa.gov/fishpub/summaryad/summbook-table-contents.htm).

Collecting organisms beyond the regulation limits detailed in the Summary of Pennsylvania Fishing Regulations and Laws; as well as certain live "banned" aquatic invasive species (listed at https://www.fishandboat.com/Resource/AquaticInvasiveSpecies/Pages/default.aspx) would typically require a scientific collector's permit issued by the Pennsylvania Fish and Boat Commission. For more information on the categories of scientific collectors' permits and how to obtain one, please visit the following website: https://www.fishandboat.com/Resource/Pages/ScientificCollector.aspx

Aquatic and terrestrial vascular plants:

- Specimens should include the stem with intact leaves, and if available, intact flowers and/or fruits and roots.
- Be very careful when collecting a plant specimen, as fragmentation could result in spreading the plant to other areas.
- Take care to not allow the plant to dry out.
- Keep the specimen cool to prevent the plant from degrading: place in a cooler with an ice pack (taking care not to put the ice pack directly on the plant) or place the sample in a refrigerator until the specimen can be mailed.
- Use care when handling, as some plants may cause skin and other ailments.
- Fill out specimen label with date, location, collectors name, etc. (If possible, put decimal degree coordinates on back of label).

Didymo (and other algae) non-vascular plants:

- Pinch off a small amount of alga- for didymo, try to get the outer part of the mass containing the cells which are crucial for identification.
- Place in a small vial containing formalin (Note: alcohol destroys the cell structure). Formalin is a potential carcinogen and should only be used by those experienced withits proper usage. For others, algae samples may be carefully dried flat on an absorbent material such as paper towels (use caution, bright light and high heat can deteriorate the specimen). Dried specimens will be easier to ship if necessary and will not require the precautions in the next step below.
- Place small vial in larger containment jar and insert paper toweling to absorb any stray formalin.
- Fill out specimen label with date, location, collectors name, etc. (If possible, put decimal degree coordinates on back of label).
- For Didymo specifically, samples can be preliminarily screened by a "squeeze" test. Didymo will feel rough to the touch when squeezed (similar to wool), while most native algal blooms will feel slimy. Suspected Didymo blooms that feel rough when squeezed should then have samples taken using the protocol outlined above for ID confirmation by an expert.

Invertebrates (shellfish, worms, or insects):

- Store specimens in a closed vial or jar with enough rubbing alcohol to keep the tissues moist. If alcohol is not available, freeze the specimen in a tightly closed plastic bag.

- For suspected New Zealand mudsnails, if possible, keep the snails alive in a screw-capped container filled with water and refrigerate. Preserve in alcohol if this is not possible.
- For crayfish, freeze the specimen and collect a series of specimens to freeze if possible. This is preferred over preservation in alcohol.

Vertebrates (fish):

- Seal securely in double plastic bags and freeze

Shipping Specimens:

When instructed to do so, refer to the following guidelines for shipping. Note these are general guidelinesand may need modification under certain circumstances.

Vascular Plants:

- Place the plant in a water-tight plastic bag (such as a Ziploc bag) with enough water to cushion the plant and keep it wet.
- Place the tightly sealed bag in a small box with an ice pack, taking care not to put the ice pack direction on the plant.
- Keep thing the sample cool will prevent the plant from degrading by the time it reaches its destination.
- Add newspaper packing to the box to keep the sample secure.
- Padded envelopes do NOT work well.

Non-vascular Plants

- Dried specimens can be shipped in a padded envelope with cardboard to stiffen the sides of the envelope.
- Wet specimens should be packaged securely in a small box with plenty of packing materials to ensure the jars or bags are not broken. Packing materials should be absorbent in case of leakage.

Invertebrates and Vertebrates:

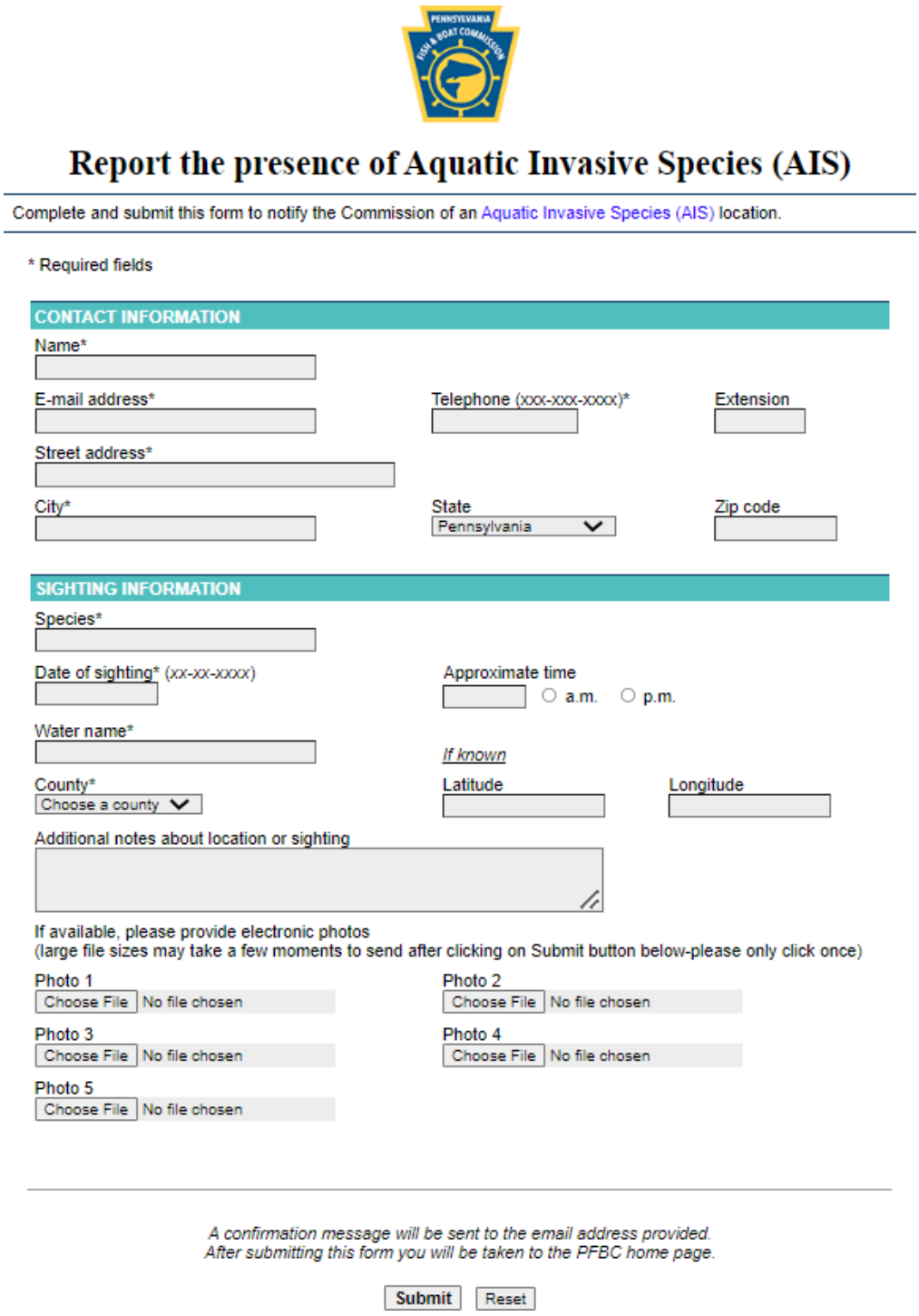
- The United States Postal Service has specific standards and requirements regarding the shipment of hazardous materials such as alcohol, formalin, and dry ice. If shipment to a taxonomic expert is necessary for identification, work with the recipient and the postal service to determine the best and safest method for shipping the specimen.

BE SURE TO PROVIDE CONTACT INFORMATION

With the package, always include your name, address, E-mail address, telephone number, and a copy of the notes you made when collecting the specimen in the mailed package.

Appendix D: AIS Sighting Report Form

https://pfbc.pa.gov/forms/reportAIS.htm



Report the presence of Aquatic Invasive Species (AIS)

Complete and submit this form to notify the Commission of an Aquatic Invasive Species (AIS) location.

* Required fields

CONTACT INFORMATION

Name*

E-mail address*

Telephone (xxx-xxx-xxxx)*

Extension

Street address*

City*

State
Pennsylvania

Zip code

SIGHTING INFORMATION

Species*

Date of sighting* (*xx-xx-xxxx*)

Approximate time
a.m. p.m.

Water name*

If known

County*
Choose a county

Latitude

Longitude

Additional notes about location or sighting

If available, please provide electronic photos
(large file sizes may take a few moments to send after clicking on Submit button below-please only click once)

Photo 1
Choose File No file chosen

Photo 2
Choose File No file chosen

Photo 3
Choose File No file chosen

Photo 4
Choose File No file chosen

Photo 5
Choose File No file chosen

A confirmation message will be sent to the email address provided.
After submitting this form you will be taken to the PFBC home page.

Submit Reset

Appendix E: Pathogens

Pennsylvania Department of Health should be contacted in the instance that the pathogen has a direct or indirect effect on human health. Example: West Nile virus.

Pennsylvania Department of Agriculture should be contacted in the instance the pathogen has a direct or indirect effect on agriculture, aquaculture, or the artificial propagation, sale, or distribution of live aquatic mammals in the Commonwealth. Example: Viral Hemorrhagic Septicemia.

Pennsylvania Fish and Boat Commission should be contacted in the instance the pathogen has a direct or indirect effect on the protection, propagation, or distribution of fish, fish bait, baitfish, amphibians, reptiles, and aquatic organisms, or managing recreational boating in the Commonwealth. Example: Spring Viremia of Carp, Viral Hemorrhagic Septicemia

Appendix F: Incident Command System for Invasive Species Rapid Response

The Incident Command System (ICS) is a standardized, on-scene, all-hazards incident management approach that:

- Allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.
- Enables a coordinated response among various jurisdictions and functional agencies, both public and private.
- Establishes common processes for planning and managing resources.

Certain AIS response scenarios may benefit from a highly coordinated and structured format, such as ICS. It is flexible and allows users to adopt an integrated organizational structure to match the complexities and demands of single or multiple incidents at varying scales. In AIS rapid response situations, ICS provides a systematic approach to guide departments and agencies at all levels of government, NGOs, and the private sector to work together.
This section of the Pennsylvania AIS rapid response plan will give a brief overview of the organizational structure and function of the ICS process. If it is determined that ICS is appropriate for an AIS incident in Pennsylvania, please visit **http://www.fema.gov/incident-command-system** for more information.

The ICS organizational structure has five major functional elements—command, operations, planning, logistics, and finance and administration. As deemed necessary, the Incident Commander (IC) may appoint "Command Staff" which may consist of a Legal Advisor, Science Advisor, Safety Officer, Liaison Officer, and Public Information Officer (PIO). The "General Staff" may consist of an Operations Chief, a Planning Chief, a Logistic Chief, and a Finance\Administrative Chief, or any necessary combination of these positions. The IC is ultimately responsible for establishment and expansion of the ICS organization, based on needs and requirements of the response.
Incident command is accomplished using one of two approaches. For example, when a new priority AIS invasion occurs within a single jurisdiction, and without jurisdictional or functional agency overlap, a single IC is designated with overall incident management responsibility by the appropriate jurisdictional authority. However, when a rapid response involves multiple jurisdictions, a single jurisdiction with multiagency involvement, or multiple jurisdictions with multiagency involvement, establishment of a Unified Command (UC) allows agencies with different legal, geographic, and functional authorities and responsibilities to work together without affecting individual agency authority, responsibility, or accountability. A UC is essentially the shared responsibility of command among several Incident Commanders.

If the following questions can be answered with "yes", then a UC is appropriate:

- Does my organization have jurisdictional authority or functional responsibility under a law or ordinance for this type of incident?
- Is my organization specifically charged with commanding, coordinating, or managing a major aspect of the response?
- Does my organization have the resources to support participation in the response or organization?
- Does the incident or response operation impact my organization's area of responsibility?

The systematic operation of AIS rapid response actions may require a repetitive schedule to promote internal and external continuity during and following staffing transitions. During each operational period, situation reports (SITREP) help staff understand the incident situation and responders' efforts. The Incident Action Plan (IAP) establishes goals for future operational periods. Figure 1 illustrates the initial typical ICS initial operational cycle ("Planning P"). Subsequent cycles skip the initiation procedures and resources are continuously identified and distributed based on guidance from the IC, Operations Section Chief, and the IAP.

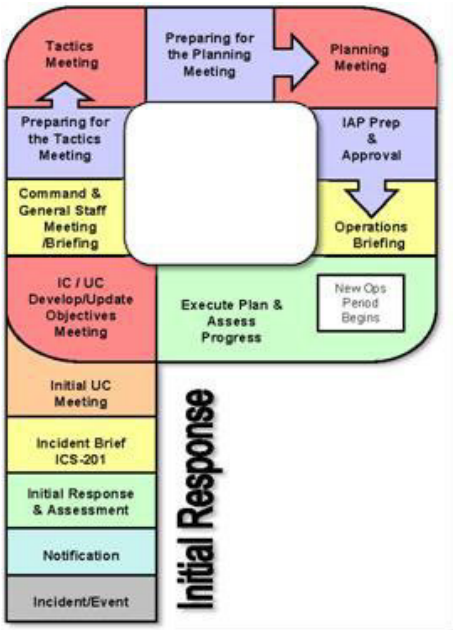


Figure1: ICS "Planning P"

An IAP is the central tool for conveying planning and operational instructions for all response participants and should provide a clear statement of objectives and actions, a basis for measuring work effectiveness and progress, and a record of accountability.

For more information on the ICS please go to: http://www.fema.gov/incident-command-system

Appendix G: Funding

Currently in Pennsylvania, there does not exist a consistent, dedicated stream of funding devoted to AIS rapid response. This section provides information on commonly available grants and funding sources to aid responders in identifying support for prevention, control, and management of AIS associated with rapid response. It is intended solely to be used as a resource and a starting point. This list may not be all encompassing, and the status of grants and funding pools frequently changes. Please refer to this list but also be aware of other opportunities that may arise.

*This table outlines grant opportunities available that may be used to support AIS rapid response and that have invasive species management as a priority focus. For more information on the grant, use an online search to find the opportunity through either the grant name or the funder, as weblinks may quickly go out of date.

Grant Name	Agency/ Orgs	Funding Amount	Match	Notes
		State Grants		
Coastal Zone Management Program	PA DEP	Up to $75,000	1:1	Projects that benefit coastal wetlands, plan special area management, and protect Great Lakes resources. Projects must be located along the 112- mile stretch of the Delaware Estuary or the 77 miles along Lake Erie.
Community Conservation Partnership Program (C2P2)	DCNR Bureau of Recreation and Conservation	Funding levels change yearly Up to $500,000	unknown	Projects that include recreational planning and development; invasive species management would need to be a component of a development project.
Growing Greener	PA DEP	Average award $250,000	10-15%	Projects that help reduce nonpoint source water pollution through local, watershed-based planning, restoration, and protection efforts.
Environmental Education Grants	DEP	up to $85,000	20%	Formal and informal education projects for youth and adults.
Erie Access Improvement Program	PFBC	No amount listed	50%	Projects that improve angler access and habitat improvement project in the Lake Erie Watershed. Would need to demonstrate a significant impact to the fishery/watershed.
PFBC Boating Facilities Grants	PFBC	Separated into grants greater or less than $100,000	50%	Funds the planning, acquisition, development, expansion, and rehabilitation of public boating facilities located on the waters of the Commonwealth. Opportunity for boat wash station funding.
PA Farm Bill Grants	PDA, USDA APHIS PPQ	none listed	unknown	Funding for quick response to agricultural disasters, including animal health, plant health, or foodborne illness.

PA Lake Management Society (PALMS) grants	PALMS	Up to $24,000	15%	Funds implementation of lake best management practice projects across the Commonwealth, including invasive species management.
Watershed Restoration Protection Program	Commonwealth financing authority	$300,000	15%	Projects focusing on water quality and invasive species restoration; comes from Act 13 Marcellus Shale Legacy Fund.
		Regional Grants		
Mid-Atlantic Panel on AIS	Mid-Atlantic AIS panel	$5,000-$10,000	none	Must be used to protect the Mid-Atlantic Region. Can include education, outreach, control, and management.
		Federal Grants		
AIS Management Plan implementation Funding	USFWS/ANS Task Force	$30,000-$93,000	25%	Must be used to implement PA AIS Management Plan. PFBC is designated applicant.
Boat U.S. Grassroots Grants	Boat U.S. Foundation	Up to 10,000	unknown	Projects that promote safe and clean boating on your local waterway, including outreach to recreational boaters and changing boating behavior.
Cooperative Weed Management Area Grants	U.S. Forest Service	$15,000-$50,000	20%	Funds invasive species treatments; must have an established CWMA.
Five Star and Urban Waters Restoration program	NFWF, WHC, EPA, USFS	$20,000-$50,000	2:1	Develops community capacity to sustain local natural resources for future generations; focused on improving water quality, watersheds, and the species and habitats they support.
Great Lakes Restoration Initiative	U.S. Fish and Wildlife Service	$100,000-$800,000	none	Must be used to protect the Great Lakes. Can include education, outreach, control, and management.
Reservoir habitat partnership	National Fish Habitat Partnership	$10,000-$75,000	1:1	Projects that promote. the protection, restoration, and enhancement of habitat for fish and other aquatic species and communities in reservoir systems through cooperative and voluntary actions.
		Foundation Funding		
Foundations for Pennsylvania Watersheds	Foundations for Pennsylvania Watersheds	$2,000	unknown	Provides funding to non-profits from the Ohio border to the Susquehanna River main stem
Watershed Protection Grants	William Penn Foundation	May request funds over $110,000	unknown	Focus on the Delaware watershed. Science and monitoring projects that close the gaps in existing science and connect research, policy, and public outreach efforts to build an integrated body of work for the benefit of clean water.

Appendix H: Pesticide Permit Requirements in Pennsylvania

In some cases, a rapid response to an aquatic invasion may require the application of a chemical pesticide to suppress or eliminate the invading species. In these cases, permits must be obtained prior to the application of chemical pesticides to Pennsylvania's surface waters.

There are two different permits which may be required based on the extent of the proposed project and the nature of the applicant.

1. Joint DEP-PFBC Permit. DEP's 25 Pa. Code 91.38 regulations require that *all* persons using chemicals (herbicides, algicides or fish control chemicals) to control aquatic plants in surface waters or to manage fish populations obtain a Joint permit from DEP and PFBC prior to applying these chemicals to the Waters of the Commonwealth. These permits are administered by DEP's Regional Offices and can generally be issued within a matter of days to weeks. A $250 fee is required for a new or renewal Joint Permit application and a $100 fee is required for permit amendment applications.
2. NPDES Pesticides Permit. In addition to the Joint Permit, a National Pollution Discharge Elimination System (NPDES) permit is also required in certain cases. These permits are administered by DEP's Central Office and fees vary based on the type of NPDES permit. In general, an NPDES Permit is required when:
    a. Any *state* or *federal* government agency applies pesticides- *regardless of the extent* of proposed pesticide application.
    b. For *local governments* and *all other entities* when the following application thresholds are met:
        i. For flying insect pest control and forest canopy pest control pesticide use patterns over an area of at least 6,400 acres during a calendar
        ii. For weed and algae control and animal pest control pesticide use patterns over an area of at least 80 acres of water or 20 continuous linear miles on water's edge during a calendar year.

    NPDES Pesticide Permits may be in the form of a General Permit (PAG-15) for pesticide applications that meet the eligibility requirements of the General Permit. The NPDES General Permit requires the applicant to file a Notice of Intent (NOI) for coverage under the permit prior to application and has an annual $500 fee. If the applicant is not eligible for PAG-15 they must apply for an Individual NPDES Permit, which has a lengthier review process an application fee of
    $1000 and an annual renewal fee of $500.

Note that many Pennsylvania resource management agencies currently hold statewide individual NPDES Pesticides Permits which can be quickly updated to add new *treatment areas or new pesticides with a request for approval to DEP's Central Office, Bureau of Clean Water, (717) 787-5017.*

Applicants should contact their local PADEP office early in the process to determine which permit(s) are applicable. More information about the Commonwealth's permitting requirements for pesticide application can be found here:
https://www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Pages/Pesticides.aspx

Other Permit Requirements in Pennsylvania related to Aquatic Invasive Species Control

In addition to or in place of chemical pesticides, other options for rapid response measures may include the stocking of Triploid Grass Carp to control aquatic vegetation, or preforming drawdowns to control invasive aquatic vegetation or sessile invertebrates (e.g., Zebra Mussels).

1. Triploid Grass Carp are sterile, herbivorous fish that typically prefer submerged leafy vegetation and can provide a form of biological control for abundant native and non-native submerged aquatic vegetation. It should be noted that Triploid Grass Carp are non-specific in the vegetation they consume and may not be an ideal control option for aquatic invasive plants in certain situations. While it is unlawful to stock, possess, or transport Diploid (non-sterile) Grass Carp in Pennsylvania under 58 Pa. Code Chapter 71.7, Triploid Grass Carp may be stocked in some situations under a permit obtained from the Pennsylvania Fish and Boat Commission. The current permit fee is $85, and the permit must be obtained from the Pennsylvania Fish and Boat Commission before Triploid Grass Carp can be purchased or stocked. Permit conditions require the installation of a containment device such as an outlet screen to prevent Triploid Grass Carp from escaping into other waters. Additionally, Triploid Grass Carp as a biological control are typically best suited for smaller water bodies. Triploid Grass Carp may live for over a decade and the stocking of 5 to 15 fish per acre is typically recommended. A permit application is available online at: https://www.fishandboat.com/Transact/Forms/CommercialPropertyWater/Documents/pfbc_tg c002.pdf.

2. Drawdowns occur when the water level of an impoundment is intentionally reduced for a period of time. Often, drawdowns are utilized to repair dams or perform other forms of maintenance on impoundments, but also may be employed as a means to control aquatic invasive species (typically submerged aquatic invasive plants, but also sessile mollusks such as Zebra Mussels). Partial drawdowns of impounded waters can be done during the winter months to expose the littoral zone to freezing temperatures and reduce populations of sessile aquatic organisms occupying this limnological zone. Often, drawdowns are done in combination with other managed techniques (such as chemical pesticide applications) to control certain aquatic invasive species. In Pennsylvania, drawdowns of impoundments greater than one acre in size require a joint permit from the Pennsylvania Fish and Boat Commission and the Pennsylvania Department of Environmental Protection under 58 Pa. Code Chapter 51. The permit be obtained prior to initiating a drawdown. There is no fee for a drawdown permit. A permit application is available online at: https://www.fishandboat.com/Transact/Forms/CommercialPropertyWater/Documents/drawdown.pdf

Other activities for AIS control in Pennsylvania, such as (but not limited to) the installation of benthic barriers, dredging activities, or other modifications to aquatic ecosystems may require special permitting. Please contact applicable the regional PA DEP office to evaluate if such permitting may be required.

Appendix I: Rapid Response Case Studies


Water hyacinth

WATER LETTUCE AND WATER HYACINTH

Lead Organization: Department of Conservation and Natural Resources, Bureau of State Parks

Main Contact: Nick Decker, Resource Manager

Response Cost: No direct funding was allocated for this response; all costs were indirect through labor and equipment provided by supporting organizations.

Overview

Water lettuce is a floating aquatic plant that resembles an open head of lettuce. It is a popular plant in aquariums, ponds, and water gardens, and when released into waterbodies it can form dense groups of rosettes that blanket the water's surfaces.

Water hyacinth an emergent aquatic plant that spreads quickly and has a complex interlocking root system that forms dense mats in the water. A single acre of water hyacinth produces as much as 500 tons of decaying plant material per year, causing decreased oxygen and light levels, and impacting native plants and animals.

Case Study Location: Presque Isle State Park, Lagoon System

Presque Isle State Park is a 3,200-acre sandy Peninsula that arches into Lake Erie. It includes an extensive lagoon system that connects Marina Lake with Misery Bay. Presque Isle State Park is heavily used for its beaches, boating, and other outdoor recreational activities. The water lettuce and water hyacinth infestation were found near an area called "low-bridge" at the south end of the lagoon system where other invasive species such as starry stonewort have also been found.

In July of 2020, specialists from the Regional Science Consortium and the University of California were conducting a survey for aquatic plants when they discovered and confirmed the identity of water lettuce and water hyacinth in the lagoons. An image of the invasive plants was shared on the Regional Science Consortium social media account. This photo was later noticed by Pennsylvania Sea Grant Staff, who submitted it to Nick Decker as the lead contact for aquatic invasive species infestations on State Park lands.

Response Objectives Implementation

- Identify any new specimens
- Eliminate identified specimen
- Limit probability of the infestation as an AIS pathway

Implementation

A highly organized effort following the Pennsylvania Aquatic Invasive Species Rapid Response plan step by step was undertaken. Multiple collaborators were identified in the response with specific roles and areas to lead. This allowed for one general organizer, but no one single task fell on one person. Implementation of the response included a comprehensive survey effort was executed 3 weeks from the initial finding and additional plants that were found were hand-removed. Due to the density of the infestation being relatively low, the hand-pulling response was deemed sufficient; however, additional response options were identified to prevent additional introductions, and ensure the existing infestation was suppressed. These actions included continued monitoring of the site, education and outreach activities and development of "do not release" signage for the Low Bridge area, evaluation of potential legal changes to limit the sale and distribution of these species in Pennsylvania and preparing for future responses with possible herbicide use.

LESSONS LEARNED

1. Being familiar ahead of time with the rapid response process and those involved is helpful. Look into in-person trainings and ways to get familiar with the plan itself.

2. While gathering information, be sure to reach out to partners for support and to secure the needed resources.

Rapid Response Case Study:

INVASIVE CARP

Lead Organization: Pennsylvania Fish and Boat Commission (PFBC) (Somerset Office)
Main Contact: Mike Depew, Fisheries Biologist II/Asian Carp Coordinator
Response Cost: All materials used for this response were purchased/rented by the owner of 84 Lakes

Overview

In 2010, a seasonal biologist from the PFBC noticed a grainy photograph posted on the 84 Pay Lakes Facebook page of what looked like an invasive carp; however, it was difficult to identify the species. In 2014, on the same Facebook page, another clearer picture of a large bighead carp was posted. Concerned citizens had also called to report the species there. Law enforcement conducted an undercover investigation by fishing the lake and confirmed the carp posted on social media was caught in the lower lake. This species may have been introduced from a load of common carp and channel catfish stocked in the lakes from a midwestern commercial fisherman.

Invasive carp include species of Bighead, Silver, Grass, and Black carp. These carp are large with a voracious appetite. The bighead carp can consume 40 percent of its body weight per day in plankton and detritus, threatening the food web and trophic structure of infested water bodies.

Case Study Location: 84 Pay Lakes, Washington County

The 84 pay lakes consist of three small, nutrient-rich lakes, all under 2 acres in size, in a rural area east of the City of Washington. It is a popular fishing location with easy access, plenty of parking, benches for seating, and a little restaurant nearby. Fishing tournaments have been held here in the past. The lakes are fed by a feeder creek that comes into the Lake and the receiving waterways eventually run into the Ohio River.

Response Objectives Implementation

• Eradication to ensure they could not be transported or spread to other waters in the Commonwealth

Implementation

Once identification of the bighead carp was confirmed, PFBC law enforcement and fish management staff worked with the lake owner to conduct electrofishing surveys on the lakes for additional injurious species. Two additional bighead carp and a triploid grass carp were captured, and a third bighead carp was spotted but unable to be captured. Upon further investigation it was found the owner did not carry a permit for the grass carp, so that became an additional illegal species possessed. They also did not carry a valid license to operate a pay fishing lake, causing law enforcement to shut down the lakes while legal proceedings commenced. In 2016, all three lakes were completely drained, non-native injurious species were removed, and hydrated lime was spread on fish unable to be recovered. No additional invasive carp were confiscated during the drawdowns and the removal was considered complete.

LESSONS LEARNED

To further reduce the risk of spread from the pay lakes, it would have been better to confirm the species earlier and have the ponds drained within a few weeks of the second photo posted on social media; however, the law enforcement aspect was the sticking point as it took a while for the legal process to move through.

Rapid Response Case Study:
EUROPEAN WATERCHESTNUT *(TRAPA NATANS)*

Lead Organization: Mercer County Conservation District
Main Contact: Nick Trivelli, Agricultural Resource Conservationist
Response Cost: $11,346.00

Overview

In June 2018 during routine maintenance, an unusual plant species was discovered covering about 6 acres of the water body. A specimen was later identified as European water chestnut by contacts at the Crawford County Conservation District. While it's unclear how this plant entered the impoundment, healthy osprey and duck populations may have introduced water chestnut seeds that were stuck to their feathers.

Water chestnut is a rooted aquatic plant, very different from the one you find in Chinese take-out. It can dominate ponds, shallow lakes, and rivers because it grows in thick, dense colonies and can grow as much as 4.8 m (16 ft) in length.

Case Study Location: Pine Run Impoundment, Mercer County

Pine Run is an isolated flood control impoundment located within central Mercer County. It is located 4-10 miles from other water bodies including Lake Wilhelm, Sandy Lake, Lake Latonka, and the Shenango River. While there is limited access, Pine Run Reservoir is open to the public for fishing, and hunting takes place in the surrounding area.

Response Objectives Implementation

- Eradication
- Education and Outreach

Implementation

Three possible control strategies were identified: hand pulling, aquatic plant harvest, and chemical control. Hand pulling was the initial strategy chosen for being the easiest and quickest response. In July 2018, MCCD staff Pymatuning State Park Staff and public volunteers organized a 2-day hand pulling event with kayaks and canoes. The event cleared less than a quarter of an acre of the six-acre infestation and it was deemed that hand pulling wasn't a viable option. Next, the use of an aquatic plant harvester was considered; however, this option was not financially feasible and there were no access areas to launch the harvester. MCCD decided the best possible option was chemical control. They began by reaching out to the Crawford County Conservation District, the PA Lake Management Society (PALMS), and other individuals to get recommendations on aquatic herbicide control within the state and obtaining the necessary permits. The treatment consisted of one gallon of Reward and one pound of Clipper per acre. While the infestation has decreased significantly from 2018 to 2020, this is an ongoing effort.

Education and outreach efforts included news and media blasts about the infestation to inform the public about the infestation, the process, and the response. An article was published in the iMapInvasives newsletter and presentations were given at local meetings. Educational signage will also be posted at the location.

LESSONS LEARNED

Partnership with other organizations who have previously dealt with water chestnut such as other conservation districts, Sea Grant, DCNR and PALMs was integral for obtaining information and resources. Without the use of these resources and partnerships involved, this process would have been much more difficult.

Appendix J: Control and Management Best Practices

This table provides examples of potential aquatic invasive species control methods that may be selected for a rapid response. It is necessary to carefully consider the target organism, site conditions, expected results of using each method, and unexpected/non-target ecological consequences when deciding what combination of methods may be most appropriate for use.

Control Method	Description of Control Method	Cost ($, $$, $$$)	Examples of Species Managed	Timing	Comments
Eradication					
Chemical	**Pesticides/Biopesticides** Used to remove and/or deter unwanted insects, fish, invertebrates, etc. Pesticide choice depends on the species being managed. May impact non-target species, though more targeted methods such as pesticide pellets for invasive fish are being developed. **Some (bio)pesticides for AIS control include** Rotenone, TFM, Antimycin A, Niclosamide, Zequanox, etc.	**$$$**	Mainly aquatic fishes including invasive carps, northern snakehead, and Eurasian ruffe as well as aquatic invertebrates such as zebra and quagga mussels.	Several factors may influence when pesticides are most effective including identity of target fish, environmental conditions such as pH, and risk of harm to non-native fish	**Permit Required (Appendix H)** Product labels contain important information on use and safety precautions. Some chemical agents are broad spectrum and can impact species other than intended target. Some chemicals have both terrestrial and aquatic formulations.
	Herbicides Chemicals used to control/kill unwanted invasive plants. Herbicide choice depends on the plant being managed. Contact herbicides kill only the area in contact with the chemical. Systemic herbicides are absorbed and transported through the plants vascular system, killing the entire plant. Herbicides can be selective or non-selective. **Some herbicides include** Glyphosate, Triclopyr, 2,4-D, fluoridone, endothall, etc.	**$-$$**	Most aquatic and facultative invasive plants.	**Pre-emergent:** Applied right before a plant emerges from soil. **Post-emergent:** Applied after plant has emerged. Often applied multiple times after emergence (early, mid, late emergence).	

Containment					
Barriers	**Dams** Acts as a physical barrier preventing invasive species (particularly invasive fishes) from getting into a new body of water. Dams may impact non-target species	**$$$**	Invasive fish and sea lamprey.	Variable	**Permit Required (appendix H)** **May need to consult PA Division of Dam Safety.**
	Electrical Barriers Submerged electrodes create an electrical field that impacts the fish's muscular system, preventing it from moving forward. The size of the target fish, upstream versus downstream movement, and conductivity of waterbody are some factors to be considered for this strategy.	**$$$**	Attempted with invasive fish including invasive carp and round gobies.	Some are operated seasonally to target adults in spawning season, though barrier operation may depend on target species, environmental conditions, or management goals.	**May require permits.** Can impact non-target species. At times, can injure fish.
	Antifouling Paint/Boat Bottom Paint Aids in preventing aquatic hitchhikers from latching onto watercrafts. May not prevent all AIS from latching on and may require reapplication.	**$$** (Depends on size of water craft)	Zebra and Quagga Mussels as well as aquatic plants.	Ideally done proactively before entering a body of water that is known to contain AIS. Specific instructions for application will be found on product label.	There is an active area of research looking at which formulation works the best for specific invasive species.
Management					
Capture	**Electrofishing/ Controlled Harvest** Manually removing invasive fish from a body of water. **Electrofishing** uses electric currents to stun fish for collection. It can be done with an electrofishing backpack for smaller areas or an electrofishing boat for larger areas. Encouragement of large-scale commercial **overfishing** may also reduce density of some invasive fish.	**$$-$$$**	Northern snakehead and invasive carp.	Ideally done proactively before entering a body of water that is known to contain AIS. Specific instructions for application will be found on product label.	Electrofishing may require special permits and may be restricted to only trained individuals. Electrofishing may not be effective in all locations. Non-target species may also be impacted. Encouraging recreational fishing as a control strategy may lead to transport to new waters for increased fishing or to maintain a market.

Capture	**Nets/Seine/Traps** This method physically captures invasive species. Some traps require manual operations while others can operate with less supervision.	**$**	Red-eared slider, rusty crayfish, red swamp crayfish, and certain invasive fish	Timing largely depends on the specific invasive species. May require repeated effort.	Non-target species may also be captured. May require training and certification.
Biological	**Grass Carp** Grass carp act as a biocontrol agent by heavily feeding on invasive plants.	**$**	Hydrilla, Brazilian Elodia, and several pondweeds.	Fall and Spring when temperatures are ideal for stocking grass carp.	**Permit required** and can be accessed through the Pennsylvania Fish and Boat Commission. Only triploid (sterile) grass carp are allowed as biological controls.
	Insect Biocontrol Typically controls invasive plants by feeding on various parts of the plant (shoot/root system, leaves, etc.). This helps to lessen the density of the invasive plant, but eradication from this method alone is less likely. Many insect controls are selective and do not harm native plants.	**$$**	Mile-a-minute (controlled by mile-a-minute weevil: ***Rhinoncomimus latipes***) Purple loosestrife (controlled by ***Galerucella spp***.)	Usually released in spring-summer timeframe, especially for annual invasive plants.	**Permit may be required from USDA Animal and Plant Health Inspection Service (APHIS) and state agencies (PA Dep. Of Agriculture / PA Fish and Boat Commission / PA Dep. Of Environmental Protection).** Active area of research.
Manual Removal	**Manual removal** **I**ncludes pulling, digging, or drawing out the invasive plants. Pulling may be sufficient for plants with shallow roots, but plants with deeper or more extensive root systems may require more effort or tools. Manual removal is usually suggested for small areas or in conjunction with other methods.	**$-$$**	Japanese stilt grass, flowering rush, water hyacinth, frog bit, etc.	Mostly is done in the Spring/Early summer period when plants have emerged but have not built a strong root system/have not gone through seed production.	**Permit may be required in some cases for fish and aquatic invertebrates. Consult local and relevant agencies.** Personal protective equipment (gloves, long-sleeved shirts, long pants) may be required. Soil disturbance may also allow for other invasive plants to come in. It is important to have a plan of disposal away from a body of water after manual removal is complete.
Mechanical Harvesting	**Mechanical harvesting** Covers a larger area than manual harvesting through using specialized tools. It helps reduce the biomass and...	**$$**	Oriental bittersweet, Japanese hop, water chestnut, etc.	Annual plants are typically managed before seed production.	**Permit may be required in some cases for fish and aquatic invertebrates. Consult local and relevant agencies.**

Mechanical Harvesting	...seed production of invasive plants. May require multiple attempts before results are apparent. Often used in conjunction to herbicide.				Sometimes leads to further spread through fragmentation. It is important to have a plan for disposal of harvested materials. Soil disturbance may also allow for other invasive plants to come in.
Benthic Barriers / Shading	**Benthic barriers** Anchored covers that prevent invasive plant growth by inhibiting sunlight from reaching the area. For invasive fish and invertebrates, barriers impact respiration. Benthic barriers may be more suited to smaller infestations and slower moving waters due to anchoring difficulty.	**$$-$$$**	Most often used with aquatic invasive plants such as curly-leaf pondweed and reed canary grass. Also possible for implementation with invertebrates and fish.	Before or during the early portions of the growing season (typically spring or summer) is most effective.	**May require permit** May impact non-target species. May require periodic inspection if used long-term.
Drawdowns	**Drawdowns** Remove water from a system until substrate and organic matter are exposed. Biota are impacted through desiccation/freezing resulting chemical changes, and changes to their typical seasonal patterns. Drawdown can also allow for easier mechanical collection or follow through with chemical options. May require multiple applications.	**$** (costs may increase if pumping of water is necessary)	Mostly used with invertebrates such as zebra mussels and invasive plants such as Brazilian elodea.	Depends on target species, non-target species, and environment. Late summer drawdowns often occur; fall/winter drawdowns may be highly effective by freezing invasive species.	**Requires permit from Department of Environmental Protection and Fish and Boat (Appendix H)** May have several ecological impacts and may impact non-target species. Some species increase in density after drawdowns.
Dredging / Diver Dredging	**Dredging** Use of machinery that removes sediment, aquatic vegetation, and some aquatic species from the bottom layer of the waterbody through suction. It may also indirectly impact species through changes in water chemistry.	**$$$**	Aquatic plants such as water chestnut, curly leaf pondweed, and Eurasian watermilfoil	Timing may depend on the spawning/life history of non-target species to minimize harm while also considering growth pattern of invasive species.	**May require permit**

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