

Conesus Lake Watershed Council – Invasive Species Prevention and Response Plan

(Approved by the Conesus Lake Watershed Council on May 10th, 2013)

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PURPOSE

The Conesus Lake Watershed Council (CLWC) Invasive Species Management Plan aims to facilitate effective and efficient collaboration between organizations and agencies to prevent new invasive species from entering Conesus Lake and to minimize the ecological, economical and recreational impacts of existing invasive species in the Conesus Lake watershed. The Plan will serve as a reference for problem solving and decision-making throughout the invasive species management process. Having a plan in place can also help engage citizens and stakeholders, and is useful as supporting material for writing grants and developing partnerships. The creation of an Invasive Species Management Plan for Conesus Lake will help reach both the main objective and the specific water quality goals outlined in the Watershed Management Plan.

GOALS

The CLWC Invasive Species Management Plan has three goals:

- 1.) Implement programming to prevent new invasive species from entering Conesus Lake.
- 2.) Create an early detection and rapid response system to detect new invasive species while they are at easily treatable levels.
- 3.) Realistically and efficiently manage existing invasive species infestations, both in-lake and in the watershed, to minimize impacts to the ecosystem, human health, recreation and economy given existing resources and funding opportunities.

These goals will be applied in context with the objective and water quality goals of the existing Conesus Lake Watershed Management Plan through invasive species related projects and programming. Focus will be given to species (both aquatic and terrestrial) and projects that most closely relate to and promote the goals and objectives that follow:

Objective: To ensure the sustainability of designated uses for Conesus Lake and its continued role as a positive influence on the social and economic well-being of watershed communities.

Water quality goals: To improve water quality conditions in Conesus Lake to ensure its continued use as a water supply and to make it more attractive for water contact recreation.

DEFINITIONS

For the purpose of this document, terms have the following meanings:

Native Species: With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem (Federal, Executive Order 13112, 1999).

Non-Native Species: Any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem (Federal, Executive Order 13112, 1999).

Invasive Species: Any species that is non-native to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. In the latter case, the harm must significantly outweigh any benefits (Federal, Executive Order 13112, 1999).

Nuisance Species: A native species that disrupts an ecosystem by a dominant colonization of a particular habitat from loss of natural controls.

Eradication: Eliminate all individuals and the seed bank from an area with low likelihood of needing to address the species again in the future (Zimmerman et. al, 2011).

Containment/Exclusion: Prevent infestations from spreading to uninfested areas (Zimmerman et. al, 2011).

Suppression: Reduce an invasive population in size, abundance, and/or reproductive output below the threshold needed to maintain a species or ecological process. Suppression is only feasible at the local scale due to resource constraints (Zimmerman et. al, 2011).

BACKGROUND

Problem

Invasive species, by definition, are non-native, introduced species that cause harm to the environment, human health, and/or economy. Natural migration and range extensions are common for many species, but humans have dramatically increased the rate and magnitude of this occurrence through increased international trade and travel. Some of these newly introduced species may be able to be assimilated into a new ecosystem with their appearance going unnoticed and with minimal effect on local ecology. Other species possess certain traits that allow them to out compete and displace native species in their new environment. In the absence of natural predators, an invasive population can grow relatively unchecked and disrupt the native ecosystem until the environment begins to evolve and adapt on its own.

Environmental impacts:

- Reductions in biodiversity and localized extinctions of native species
- Losses in ecosystem services such as erosion and flood control
- Changes in nutrient cycling patterns
- Food web changes
- Hydrological changes
- Establishment of dense monocultures that competitively exclude native species
- Replacement of forage food for native species

- Direct predation on native species including sport fishes
- Reduction of food sources for native species
- Negative impacts to the reproduction of native species
- Reductions in dissolved oxygen content in the water, which can lead to fish kills
- Competition with native species for habitat and resources such as food, sunlight and nutrients
- Decreases in ecosystem biodiversity, which can leave the ecosystem more vulnerable to future disturbances
- Changes in water clarity
- Changes in macrophyte abundance
- Physical destruction of food sources and habitat for native species

Recreational impacts:

- Reductions in game fish populations
- Creation of macrophyte beds impassable to boaters and swimmers
- Damage to boat engines, steering equipment and other parts
- Negative aesthetic impacts
- Sharp shells deter swimmers and divers
- Fouling of fishing equipment

Human Health impacts:

- The sap of Giant Hogweed (*Heracleum mantegazzianum*), in combination with moisture and sunlight, can cause severe skin and eye irritation, painful blistering, permanent scarring and blindness.
- The sharp shells of Zebra Mussels (*Dreissena polymorpha*) can potentially cut or scrape swimmers and divers.
- Feral swine (*Sus scrofa*) have razor sharp tusks and can be aggressive toward humans and their pets and can carry and transmit several diseases including swine brucellosis, *E. coli*, trichinosis, and pseudorabies to humans and/or livestock.
- Feral swine rooting and wallowing habits can disturb water quality in streams and their resulting waste can foul water supplies.

Economic impacts:

- Reductions in property values and tax base due to water quality problems (Conesus Lake residential and commercial waterfront property values are assessed, in total, at over \$364 million)
- Direct invasive species control and management costs
- Costs attributed to losses in ecosystem services such as erosion control and fisheries
- Economic losses to local businesses and tourism relating to impaired uses such as fishing, boating, swimming, navigation, ecological biodiversity, aesthetics, and other recreation uses
- Increases in operating costs of water treatment plants and dam maintenance

- Annual economic losses due to invasive species in the United States are estimated at over \$120 billion per year (Pimental et al 2005)
- In the Great Lakes region, direct costs attributed to aquatic invasive species accounts for over \$100,000,000 a year (Rosaen et al, 2012).

Infestation History

Six aquatic invasive species have been confirmed present in Conesus Lake:

- Zebra Mussel (*Dreissena polymorpha*)
- Alewife (*Alosa pseudoharengus*)
- Eurasian Watermilfoil (*Myriophyllum spicatum*)
- Curly-leaf Pondweed (*Potamogeton crispus*)
- Common Carp (*Cyprinus carpio*)
- Rudd (*Scardinius erythrophthalmus*)

Three out of six of these species (Eurasian watermilfoil, Alewife and the Zebra Mussel) account for the most prominent and ecologically significant impacts to Conesus Lake. In the early 1980's, the alewife was first detected in the lake. Zebra mussels followed a decade later in 1992. The exact arrival of Eurasian Watermilfoil is unknown. (Bosch et al, 2001).

In addition, the Conesus Lake watershed is home to a multitude of terrestrial and wetland invasive species. Of these, feral swine, giant hogweed, purple loosestrife and common reed have water quality impact potential.

A current list of species that are present in Conesus Lake will be maintained by the Conesus Lake Watershed Manager and updated as new detections arise (Appendix A). The following species are those that have been confirmed and have the most tangible effect on water quality and recreation in the watershed.

Eurasian Watermilfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil is an aquatic plant that can create dense mats and crowd out native aquatic vegetation resulting in decreased macrophyte biodiversity. A diverse macrophyte population provides shelter, spawning habitat and forage for many species of waterfowl, invertebrates and fish. Unlike most of the native aquatic plants in Conesus Lake, the branches of Eurasian watermilfoil can reach the surface of the water, which can be aesthetically unappealing and interfere with swimming and boating. Study on Conesus Lake has shown that reductions in nutrient inputs from the watershed through the installation of agricultural best management practices presented statistically significant decreases in macrophyte biomass in Eurasian watermilfoil dominated littoral beds at the mouths of subwatershed streams where BMP's were implemented (Bosch et al. 2009).

Alewife (*Alosa pseudoharengus*)

The alewife is a species of fish from the herring family. Its introduction into Conesus Lake has had a profound impact on species composition and food web dynamics. Prior to the

alewife, Conesus Lake's zooplankton community was dominated by *Daphnia pulex*. Selective predation of *Daphnia* and other larger zooplankton effectively eliminated them from the lake and shifted the zooplankton population towards smaller, less efficient zooplankton grazers.

The effect of the size and shift of the zooplankton community was dramatic. Algal abundance and turbidity increased due to the lower grazing efficiency of the shifted zooplankton community. *Daphnia pulex* is also an excellent prey source for fish. NYSDEC fisheries managers consider the alewife-induced loss of *Daphnia pulex* from Conesus Lake to be responsible for the collapse of the yellow perch fishery (EcoLogic, 2002).

In addition to its effect on the zooplankton community of the lake, the alewife directly competes with native fish species for food resources. Mature alewives also prey directly on young yellow perch and walleye. Fisheries surveys performed on Conesus Lake have shown that although initial natural walleye reproduction has been successful, the year class is eliminated by alewife predation before it reaches year one. To maintain a walleye fishery in the lake, fingerlings must now be stocked above this size (EcoLogic, 2002).

Zebra Mussels (*Dreissena polymorpha*)

The arrival of zebra mussels has also caused changes to the trophic interactions in the lake. Zebra mussels are efficient filter feeders and their establishment in the lake has caused a reduction in the biomass of phytoplankton. This reduces the available food for zooplankton and in turn reduces the food availability for fish that prey on zooplankton and fish that prey on these fish.

Zebra mussels also create an enriched benthic (lake bottom) community by feeding on phytoplankton in the water column and excreting waste (nutrients) into the lake floor. This transfer of resources from the water column increases the diversity of benthic macro invertebrates and fish often at the expense of the littoral and pelagic communities resulting in a shift in species composition and abundance between these communities.

The zebra mussel's ability to attach to hard surfaces causes a hazard to swimmers and divers and creates a nuisance for water intake pipes.

Giant Hogweed (*Heracleum mantegazzianum*)

Giant Hogweed is a terrestrial plant that can grow up to 14 feet tall or more. The plant's sap can cause burns and blistering when it comes into contact with human skin, making it a public health threat. Giant Hogweed is found throughout the watershed, but its highest concentrations are found in the southwestern portion. Giant Hogweed plants have been documented on the shores of Conesus Lake, illustrating a possible mechanism where Giant Hogweed seeds are traveling down streams from the upper watershed and into the lake where they wash up on shore and establish plants.

Purple Loosestrife (*Lythrum salicaria*)

Purple Loosestrife is an invasive perennial, wetland plant, characterized by vibrant purple flowers. The plant was introduced into North America and then adopted as an ornamental further facilitating its spread as an invasive species. Purple loosestrife can disrupt natural hydrologic flow patterns and out compete native wetlands plants such as cattails that provide suitable food, cover and nesting sites for native wetland animals, including ducks, geese, frogs, toads, and turtles.

Management History

A comprehensive watershed management plan for the Conesus Lake Watershed was completed in 2003. The plan includes the following high priority recommendations:

Recommendation G-1: Investigate and implement effective methods to control the spread of non-native (exotic) organisms.

The following implementation strategies are outlined in the Management Plan:

- Lobby New York State elected officials to pass effective laws aimed at preventing the introduction of invasive species to inland waterways.
- Coordinate with regional agencies to track ongoing efforts in the Finger Lakes, Great Lakes and other waterways.
- Develop an integrated plant management plan.
- Prepare public education and outreach materials aimed at the boating public to help prevent the accidental spread of invasive species through bait, boats, and trailers.
- Continue to track and report on efforts to control invasive species.

Recommendation E-2: Develop a public education campaign (or promote existing campaign, where applicable) including, but not limited to, the following issues:

- Effect of boat speed on weeds (creates weed-chop).
- Precautions to follow when discarding unused bait or transporting bait from one waterbody to another (exotic species introduction).
- Need to clean and inspect boat (body, bilge, coolant system, etc.) and trailer when transporting from one waterbody to another (exotic species introduction).
- Existing boat and personal watercraft laws.

Existing State Legislation

The Governor of New York State signed an invasive species transport law into effect in 2012. The law gives the NYSDEC and New York State Department of Agriculture and Markets the authority to regulate the sale, purchase, possession, introduction, importation, and transport of invasive species and established penalties for those who violate such regulations. The law takes effect on September 1, 2013.

The law establishes:

- A permit for prohibited species disposal, control, research, and education
- A list of prohibited species which shall be unlawful to knowingly possess with the intent to sell, import, purchase, transport, or introduce
- A list of prohibited species which shall be unlawful to import, sell, propagate, transport, or introduce except under a permit for disposal, control, research, or education; and
- A list of regulated species which shall be legal to possess, sell, buy, propagate, and transport but may not be knowingly introduced into a free-living state or introduced by a means that one knew or should know would lead to the introduction into a free living state

Penalties are as follows:

- First violation: A warning may be issued in lieu of a penalty. Educational materials may be issued. Any subsequent offense is subject to a fine of no less than \$250
- Nursery owners, any person who owns or operates a public vessel or commercial fishing vessel shall be subject to a fine upon first offense of no less than \$600. Upon subsequent offenses, a fine not less than \$2000 will be issued. Permits may be revoked.

ORGANIZATIONAL COLLABORATION

Conesus Lake Watershed Council Invasive Species Sub-Committee

A Conesus Lake Watershed Council Invasive Species Sub-Committee has been established as a sub-committee to the Conesus Lake Watershed Council Technical Committee. The Invasive Species Sub-Committee will set a regular, meeting schedule at the beginning of each year and will hold or cancel these meetings as necessary. The sub-committee may establish additional working meetings in response to specific project needs. The sub-committee will provide progress updates and project material to the Technical Committee for review.

The sub-committee membership is composed of the following individuals and groups:

- Conesus Lake Watershed Manager (Livingston County Planning Department)
- Conesus Lake Watershed Inspector (Livingston County Department of Health – Center for Environmental Health)
- Genesee/Finger Lakes Regional Planning Council
- Conesus Lake Association’s Water Quality Committee’s Invasive Species Project Team
- New York State Office of Parks, Recreation and Historical Preservation
- (Additional partners may be invited to participate in meetings in accordance to specific programmatic needs)

Roles and Responsibilities

- Conesus Lake Watershed Council (CLWC):
 - Review and approve the Invasive Species Management Plan and any revisions thereto

- Review and approve yearly invasive species work program tasks put forth by the Invasive Species Sub-Committee and as approved by the Technical Committee as part of Conesus Lake Watershed Management Program Work Plan
- Oversee CLWC funding sources
- Send letters of support
- Assist with applications for grant funding
- Receive reports on project progress
- Conesus Lake Watershed Council Technical Committee
 - Provide informational support in relation to member agencies or organizations' specific programmatic area of expertise
 - Make necessary changes to Plan for submittal to CLWC for approval
 - Review submitted material and oversee progress of the Invasive Species Sub-committee
 - Review terrestrial species water quality assessments from the IS Sub-committee
 - Receive reports on project progress
- Conesus Lake Watershed Council Invasive Species Sub-Committee:
 - Assess specific programmatic needs and develop a list of potential invasive species projects for Technical Committee review
 - Partner with the Public Education and Outreach Committee to implement invasive species related public education projects
 - Develop potential projects for funding applications
 - Prioritize species for monitoring and/or management focus
 - Ensure that information for invasive species related programming is kept up to date through evaluation of regional, state, and national data and programming designed by other agencies.
 - Assess the threat of reported terrestrial invasive species on water quality
 - Evaluate success of implemented projects
 - Provide monthly reports to the CLWC Technical Committee
 - Evaluate the response protocol following a major event
 - Propose updates to the Invasive Species Prevention and Response Plan as needed
- Livingston County Planning Department (LCPD):
 - Assist with applications for grant funding
 - Assist with project management
 - Assist with GIS and mapping items
 - Provide informational support
 - Oversee annual CLWMP monitoring program
 - Act as liaison to Livingston County Government
 - Serve as media contact (Planning Director)
 - Coordinate the formation of case specific response teams
 - Receive incident response reports
- Conesus Lake Watershed Manager (CLWM):
 - Chair the Invasive Species Sub-Committee
 - Coordinate programming between partners and agencies
 - Update appendices to the approved invasive species plan

- Provide public education and outreach assistance and material
- Respond to invasive species incident reports and provide preliminary identification
- Maintain a library of relevant invasive species resources
- Report on invasive species programming and invasions occurring throughout the state
- Assist the Conesus Lake Association with volunteer invasive species programs
- Report on sub-committee projects to the Conesus Lake Watershed Council and CLWC Technical Committee
- Follow Finger Lakes PRISM events
- Coordinate data from incident reports
- Notify partners as outlined in the response protocol
- Draft and compile information for media relations
- Coordinate preliminary surveys and update resource assessments in response to new infestations
- Livingston County Department of Health – Center for Environmental Health – Conesus Lake Watershed Inspector (CLWI):
 - Take programming lead on projects involving invasive species that are a threat to public health
 - Assist with invasive species monitoring and response while on routine watershed surveillance
 - Provide public education and outreach assistance
 - Provide informational support for invasive species programming/treatment that may have an effect on public health
 - Use existing contacts to assist with any needed lab sampling
 - Continue existing procedures for incoming Giant Hogweed reports
 - Respond to incidents reports in the event of a Watershed Manager absence greater than two days following receipt of report
- Conesus Lake Association (CLA):
 - Lead and coordinate volunteer monitoring outreach efforts
 - Provide public education and outreach assistance and material
 - Distribute public education and outreach information using the CLA Email News system
 - Apply for funding sources unattainable to Livingston County and CLWC municipalities
 - Serve as a contact to Finger Lakes Regional Watershed Alliance
 - Provide informational support
- Genesee/Finger Lakes Regional Planning Council (G/FLRPC):
 - Provide information on invasive species programming occurring across the Genesee Finger Lakes region
 - Provide public education and outreach assistance and material
 - Provide additional informational support
- New York State Office of Parks, Recreation and Historical Preservation (NYSOPRHP):
 - Assist with programming at NYSOPRHP Boat Launch facilities
 - Provide informational support

- Provide public education and outreach assistance and material
- New York State Department of Environmental Conservation (NYSDEC):
 - Region 8 Office:
 - Assist with any necessary permits
 - Assist with programming at DEC operated car top boat launches
 - Provide public education and outreach assistance
 - Provide informational support
 - Receive and/or redirect feral swine and forest pest reports in accordance with existing protocol
 - Invasive Species Coordination Unit:
 - Assist with rapid response protocol
 - Assist with expert invasive species confirmation
 - Provide information on invasive species programming occurring across the state
 - Provide public education and outreach assistance

The following agencies will provide informational support in relation to their agency or organization's specific programmatic area of expertise:

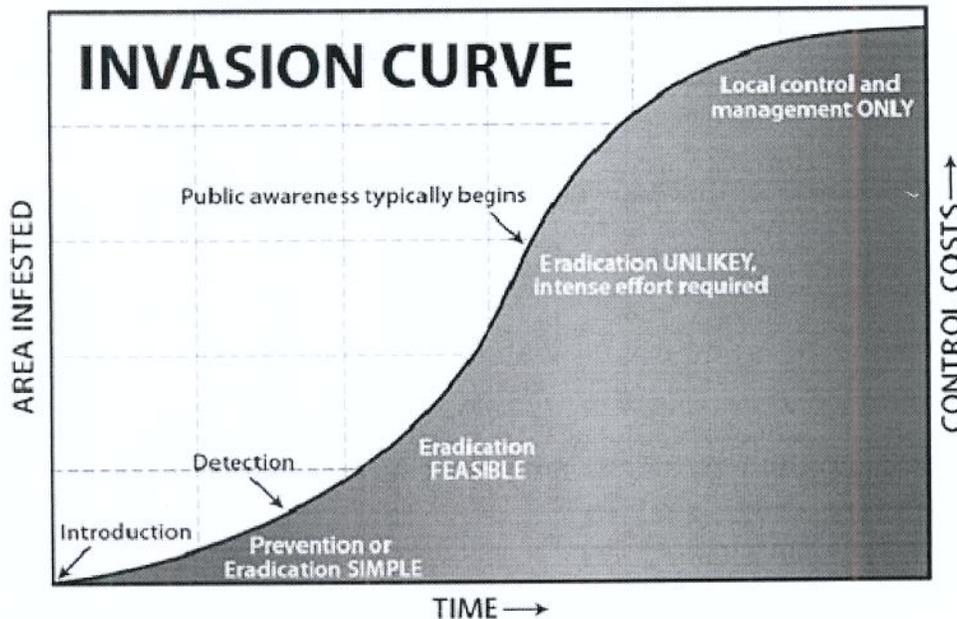
- Town and County Highway Departments
- New York State Department of Transportation
- Livingston County Emergency Management Services
- Dr. Sid Bosch, SUNY Geneseo
- Dr. Joe. Makarewicz, SUNY Brockport

Evaluation:

Changes may need to be made to organizational collaboration as the relationships between agencies and their scopes of work develop over time. In addition, new partnerships may be developed between organizations and agencies not currently included in the plan (i.e. future Finger Lakes PRISM). As these new partnership opportunities arise, the Invasive Species Sub-Committee will evaluate roles and relationships and recommend to the Technical Committee and CLWC changes to the organizational collaboration as necessary and appropriate.

PREVENTION

Prevention is the most cost effective management strategy for the control of invasive species. Increasing awareness levels of invasive species issues and educating the public on prevention best management practices are key. Once a species is established in an ecosystem, direct costs associated with management and indirect economic losses can spiral out of control.



(Figure 1: Prevention is key to managing invasive species infestations)

Invasive Species Awareness

The Invasive Species Sub-Committee and Public Education and Outreach Committee will develop information on invasive species and their impacts and preventative best management practices. Species-specific campaigns may be enacted if the Technical Committee and the Sub-Committee decides attention should be focused on an individual species of concern. These decisions will be based upon invasiveness, maximum impacts, proximity of nearby invasions, and ability for the public to spot and identify the selected species.

More work needs to be done, however, to identify educational needs, develop targeted programs (i.e. a series of educational activities or products) and measure changes in stakeholder behavior as a function of this outreach. Existing educational materials predominantly focus on invasive plants, and additional attention needs to be given to other aquatic nuisance species (ANS). Special attention is needed at boat launch locations to increase voluntary public compliance with spread prevention techniques and practices, and to raise support for ANS management activities.

Identification of Pathways and Vectors

Non-native species have many *vectors* or pathways for introduction. Most invasions are associated with human activity, but naturally occurring biogenic vectors also exist. Natural extensions in range are common for many species, but the rate and magnitude of range expansion is increased by human activities, as these activities typically carry organisms greater distances than natural forces.

Anthropogenic vectors for the transport of aquatic invasive species are listed below with mode of prevention and recommended actions. The Conesus Lake Watershed Council, its Technical Committee and Invasive Species Sub-Committee will use these recommended actions as a guide for future projects and programming.

Vector: Boats/Trailers

A boats, any motorized or non-motorized craft, is often used in multiple water bodies during a single boating season. Some areas on a boat may harbor invasive species upon exiting a body of water. These boats can then carry and transfer new species from one body of water to another that may otherwise have been unconnected.

Areas on a motorized boat where invasive species may attach or be stored include the prop, propeller, trailer, bilge, live wells and on fishing equipment. Boaters are advised to remove all visible mud, plants, fish, and animals and eliminate water from all equipment before leaving any body of water. Equipment that has come in contact with water should be cleaned and dried prior to entering another body of water.

Recommended Actions:

- Place boat launch stewards at public boat launches.
- Educational Pamphlets and temporary signage at the NYS Boat Launch.
- Place educational/awareness signage in yards along East Lake Road and West Lake Road.
- Provide state boat launch attendants with educational information and materials.
- Publish the bathymetric survey map accompanied by clean boats procedures and invasive species awareness.
- Create permanent educational signage at the boat launch.
- Organize workshops and lectures to general audiences and target groups such as anglers and paddlers.
- Write newspaper and newsletter articles.
- Address invasive species removal requirements in NYSOPRHP permits for fishing tournaments.
- Use a television message/ILIDS automatic audio messaging system at boat launches.

Vector: Aquarium and Pet Trade

Many non-native and potentially invasive species are kept as pets or used in aquariums. When these pets and aquariums are no longer wanted, they are often released into the

environment. Aquarium owners are advised not to release the contents of an aquarium into or near any body of water or storm drain.

Recommended Actions:

- Generate awareness on any laws or regulations regarding transport, buying or selling of invasive species that may be present in the aquarium and pet trade.
- Provide pet stores with educational materials.
- Create public educational information on the danger of improper disposal and release of aquariums organisms and pets.

Vector: Landscaping with non-natives

Some invasive species are commonly available for use in landscaping. Educating landscapers and gardeners on the consequences of using known invasive species and promoting the availability of native landscaping options can help reduce the impact of this vector, and also helps to ensure compliance with state regulations.

Recommended Actions:

- Develop awareness for landscaping as a potential vector for invasive species into the watershed.
- Create educational material (pamphlets, website material, lectures) advocating use of natives in landscaping.
- Facilitate awareness of any laws or regulations regarding transport, possession, buying, or selling of invasive species that may be common landscaping plants. Outreach will include coordination with both gardeners and nurseries.

Vector: Movement through inter-connected waterways

Mobile invasive species, which include fish species like Asian carp can travel from one body of water to the next using existing, interconnected waterways such as streams, rivers, lakes and canals. Barriers such as dams may halt migration of invasive species into Conesus Lake from the Genesee River and the Great Lakes.

Recommended Actions:

- Address the feasibility of the water control structure on the Conesus Lake Outlet or any additional mechanisms to act as a barrier to fish species such as Asian Carp.

Vector: Baitfish

The release of baitfish non-native to a body of water can facilitate the spread of invasive species. Anglers are advised not to release unused baitfish into the waters they are fishing. In New York State, carp, goldfish, lamprey larvae and round goby may not be collected or used for bait.

Recommended Actions:

- Make NYSDEC educational resources on baitfish regulations available at locations where fishing licenses may be obtained and other facilities anglers may frequent.

Vector: Seaplanes

Seaplanes can transport aquatic invasive species between separate bodies of water similar to the transport of aquatic invasive species through boats and trailers.

Recommended Actions:

- Make best management practices for seaplanes available to the target audience.

MONITORING

CLWC Water Quality Monitoring Program

The Conesus Lake Watershed Council funds an annual water quality monitoring program. Lake-wide macrophyte vegetation and other species surveys are a component of the multi-year, rotating monitoring schedule. Contracted agencies will be watchful for new species while performing other sampling protocols during non survey years.

Volunteer Monitoring Program

A volunteer monitoring program will be developed by the Invasive Species Sub-Committee and coordinated by the Conesus Lake Association. Lake residents and users, the Sheriff's Marine Patrol Deputies and Invasive Species Sub-Committee Members will be invited to take part in the program. Volunteers will be educated on invasive species identification techniques and sighting reporting procedures. The volunteer monitoring team will be coordinated by the Conesus Lake Association. The Watershed Manager and other members of the Invasive Species sub-committee will help provide training and educational technical assistance. The Invasive Species Sub-Committee will be responsible for evaluating this program. Progress will be reported to the Technical Committee.

Additional Monitoring Opportunities:

Additional agencies and organizations outside of the Conesus Lake Watershed Council program (i.e. NYSDEC and Finger Lakes Institute) may perform invasive species monitoring in Conesus Lake as a part of their ongoing, existing monitoring protocols or as funding and grant opportunities arise. The Conesus Lake Watershed Manager will communicate with these agencies and organizations to coordinate and share data.

Data Coordination and Management:

The Conesus Lake Watershed Manager will coordinate with monitoring organizations to maintain a database of monitoring records for Conesus Lake. Incident report records will be

entered into a mapping database. The Watershed Manager will update the CLWC on new invasive species data as part of the CLWMP Work Program.

EARLY DETECTION AND RAPID RESPONSE:

The following detection and response protocol is based heavily on the “NYSDEC Rapid Response Framework for Invasive Species” and will provide the preparation and planning needed to undergo a rapid response to a newly detected invasive species infestation. This protocol is not intended to be a detailed process as the details of each response will be case specific. The response framework is designed to establish a process that will guide the decision-making and response actions for future situations. The proactive establishment of a response protocol will provide us with the knowledge of potential actions and constraints relating to response, and establish the necessary communication networks and partnerships for an effective, professional, and swift response.

Early Detection:

The most critical step to any rapid response is to identify new invasive species populations while they are still of manageable size. The monitoring program outlined earlier in the Plan will provide a network of professionals and trained volunteers to carry out surveys and monitoring with a goal of early detection of new invasions.

The benefits of an early detection and rapid response system are illustrated through contrasting case studies of hydrilla (*Hydrilla verticillata*) management in Florida and California. Florida took a passive approach to addressing its growing hydrilla problems by postponing management action until the size and range of infestation was well beyond a feasible control level. Hydrilla is now found in over 80% of the state’s public lakes and rivers and it costs upwards of \$30 million a year for the state to maintain navigable pathways for boats through the hydrilla infestations. Upon discovery of hydrilla in California, the state enacted an early detection and rapid response program focusing on a goal of eradication. California spends about \$7 million on hydrilla management annually and has successfully eradicated 22 out of the 30 known hydrilla infestations in the state (Schutt 2012).

Reporting and Species Verification:

The response process begins once a potentially new invasion has been reported to an agency. Local agencies, organizations, and volunteers are directed to notify the Planning Department/Watershed Manager by phone if they obtain a potential invasive species sample from Conesus Lake. The Watershed Manager will serve as a preliminary filter for observations and samples that remain suspect will be forwarded to experts for identification and confirmation. The reporting and verification procedure will proceed as outlined in the Incidence Response Protocol attached in Appendix B.

Aquatic Invasive Species Watch List:

For aquatic species, notification and response actions will be dependent on the invasiveness of the non-native species in question. The Invasive Species Sub-Committee is tasked with maintaining an aquatic invasive species watch list. Listing will be based on invasiveness, geographic proximity of the nearest existing invasions, potential effects on water quality, and existing regulations (Appendix C). Inclusion on this list will determine whether a species is invasive enough to warrant notification and response under the scope of this Plan. The Technical Committee will review updates made to the Aquatic Invasive Species Watch List.

Terrestrial Species Water Quality Assessment:

Invasive terrestrial species may merit a management response within the scope of this Plan if they threaten the objectives and water quality goals of the Conesus Lake Watershed Management Plan (CLWMP). Terrestrial invasive species incident reports will be reviewed by the Invasive Species Sub-Committee and Technical Committee using the Terrestrial Species Water Quality Assessment (Appendix D) to guide the decision making process. If a significant water quality threat is determined, a response team will be coordinated and the incident will proceed to the assessment phase.

Local Partners Notification:

CLWC members and relevant resource managers will be notified once a report has been verified as a new invasive aquatic species. The list of local partners included in this initial notification is outlined in Appendix E. Additional state and regional partners may be notified as directed by the NYSDEC Invasive Species Coordination Unit.

Public Communications:

Notification of the news media and the public will occur following expert species confirmation and notification to local partners. The Planning Director will serve as the media contact .

The Watershed Manager will be responsible for drafting a press release. Additional information may need to be gathered under the assessment phase before a proper press release can be drafted. Based on the sufficiency of available information, the Planning Director will submit the press release for approval and posting. Following the publication of the first press release, the Conesus Lake Association (CLA) will send out an alert via its Email News distribution system.

The Watershed Manager will maintain a document that outlines the most current information surrounding the discovery of the new invasive species. This document will be updated as new information becomes available and may include a list of talking points and anticipated FAQ's. The document will be made available to the Response Team and will serve as a reference document for future communications.

The press release will be posted to the Livingston County Website and sent to the press release recipient agencies on file with the Planning Department.

Planning:

The Planning Department will initiate the identification of local and state partners that will be relevant for the project Response Team. The Watershed Manager will contact these individuals, and coordinate next steps as appropriate.

Rapid Assessment:

Rapid assessment will be coordinated through the following steps:

1. Survey Assessment:

The Watershed Manager will coordinate a preliminary visual assessment or delimitation survey to determine the geographic extent of the invasion as the first step in the assessment. Having a clear picture of the size of the invasion will inform management choices. A small invasion may lend itself to complete elimination of the invasive population. If an invasion is determined to be widespread or found in multiple locations, a complete elimination may be cost prohibitive or unfeasible. A strategy of spread prevention and control should be recommended. Response actions will vary depending on the size and geographic location of the infestation; therefore, decisions cannot be made until survey information is available.

2. Resources Assessment:

The Watershed Manager will perform a resource assessment (personnel, funds, equipment, supplies, etc.). Information gained during the survey and resources assessments will be used to inform response goals and strategies.

3. Response Strategy Selection:

The Response Team will utilize the Invasive Plant Management Decision Analysis Tool (IPMDAT), developed by The Nature Conservancy, to guide the decision making process for whether the team should attempt a goal of eradication, containment/exclusion, suppression, or decide to take no action.

The IPMDAT employs an objective, strategy-selection based, decision tree and three control-strategy decision trees (eradication, containment/exclusion, and suppression) to determine if a potential project will be successful at carrying out its goals (Appendices F, G, H, I). The decision tree process accounts for project feasibility factors such as socio-political environment, species biology, control method effectiveness, risk of non-target impacts and available resources. The IPMDAT will help the response team “utilize limited resources most effectively by evaluating the feasibility of control strategies and identifying a clear conservation outcome” (Zimmerman et. al, 2011). A current copy of the full IPMDAT report will be maintained on file in the Planning Department.

Case-Specific Management Plan:

If a management action has been selected, the Response Team will address roles and responsibilities, coordination, internal and external communications, marshalling resources, spread prevention, decision-making and implementation. The Response Team may decide it needs to bring on additional partners and refine its membership.

The Response Team will develop a case-specific management plan. In accordance with resource availability and constraints, rapid response, monitoring and evaluation and restoration actions will be outlined in the case-specific project response plan. The Response Team will use the NYSDEC Rapid Response Framework for Invasive Species to guide development of the case-specific management plan.

CONCLUSION:

The Conesus Lake Watershed Council's Invasive Species Prevention and Response Plan facilitates collaboration between watershed partners to progress towards the prevention and effective and efficient management of invasive species. The Plan establishes the framework for a multifaceted prevention approach that targets multiple pathways, vectors and key stakeholders for invasive species transport. A coordinated monitoring program comprised of agency partners and volunteers and a proactive response protocol work in tandem as an early detection and rapid response system that aims to act on new invasive species or infestations before they progress beyond local means of eradication or control. Through its prevention and management goals, the Invasive Species Prevention and Response Plan aims to ultimately advance the overarching water quality goals and objectives of the Conesus Lake Watershed Management Plan.

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Species of macrophytes reported present in Conesus Lake 1926-2012 (EcoLogic, LLC, 2013)

<u>Scientific Name</u>	<u>Common Name</u>
<i>Ceratophyllum demersum</i>	Coontail
<i>Chara</i> spp.	Muskgrass
<i>Elodea Canadensis</i>	Common waterweed
<i>Heteranthera (Zosterella) dubia</i>	Water stargrass
<i>Myriophyllum exalbescens</i> *	Common watermilfoil
<i>Myriophyllum sibiricum</i> *	Common watermilfoil
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil
<i>Najas flexilis</i>	Slender naiad
<i>Nymphaea odorata</i>	White water lily
<i>Potamogeton amplifolius</i>	Large-leaf pondweed
<i>Potamogeton angustifolius</i>	Illinois pondweed
<i>Potamogeton crispus</i>	Curly-leaf pondweed
<i>Potamogeton epihydrus</i>	Ribbon-leaf pondweed
<i>Potamogeton diversifolius</i>	Water thread pondweed
<i>Potamogeton foliosus</i>	Leafy pondweed
<i>Potamogeton gramineus</i>	Variable-leaf pondweed
<i>Potamogeton natans</i>	Floating pondweed
<i>Potamogeton nodosus</i>	Long-leaf pondweed
<i>Potamogeton pectinatus</i> **	Sago pondweed
<i>Potamogeton pusillus</i>	Small pondweed
<i>Potamogeton richardsonii</i>	Richardson's pondweed
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed
<i>Ranunculus longirostris</i>	Stiff water crowfoot
<i>Ranunculus trichophyllum</i>	Thread-leaf crowfoot
<i>Ruppia</i> sp.	Ditch grass
<i>Utricularia vulgaris</i>	Common bladderwort
<i>Vallisneria Americana</i>	Wild celery

*In 2002 version of this table, *Myriophyllum exalbescens* and *Myriophyllum sibiricum* were listed as separate species. According to the ITIS database, *Myriophyllum exalbescens* is a synonym for *Myriophyllum sibiricum*, which is the accepted name. Retrieved 5/29/2012 from the Integrated Taxonomic Information System online database, <http://www.itis.gov>.

** In 2002, this species was listed in the table as *Potamogeton pectinatus*. Currently, the accepted name is *Stuckenia pectinata* (per USDA Plant Fact Sheet published 2010).

Zooplankton Species reported present in Conesus Lake - 1910-2009

(Makarewicz & Lewis, 2009), (EcoLogic, LLC, 2002)

Cladocera

Bosmina longirostris
Bosmina sp.
Ceriodaphnia reticulata
Ceriodaphnia sp.
Chydoridae sp.
Daphnia galeata-mendota
Daphnia hyaline
Daphnia pulex
Daphnia retrocurva
Diaphanosoma birgei
Eubosmina coregoni
Leptodora kindtii

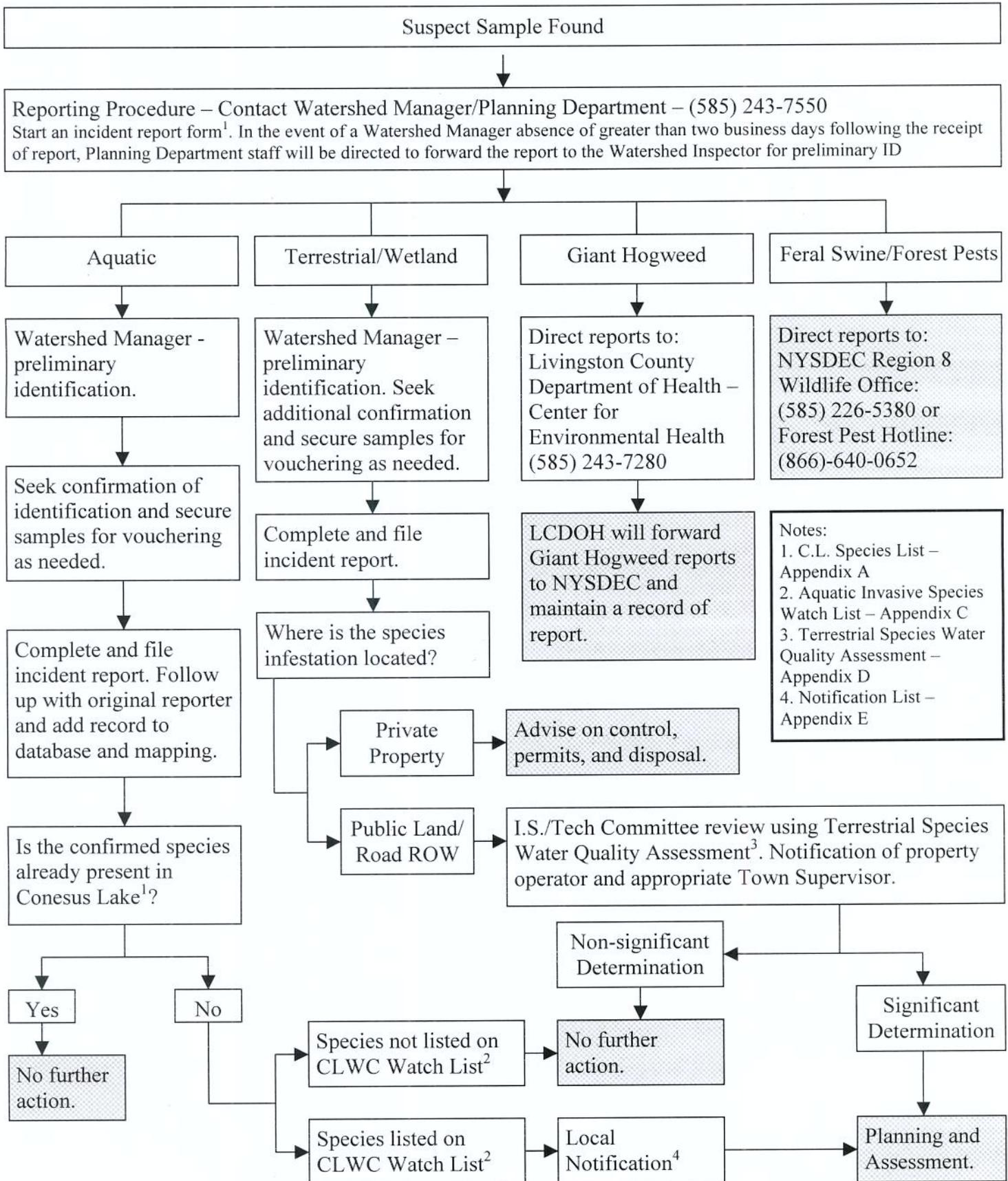
Copepoda

Acanthocyclops vernalis
(Cyclopoid Copepodid)
Copepod nauplius
Cyclopoid copepodid
Cyclops bicuspidatus -
thomasi
Cyclops vernalis
Diacyclops thomasi
Diaptomus minutus
Diaptomus pallidus
Diaptomus sicilis
Eucyclops agilis
Mesocyclops edax -
nauplii
Tropocyclops prasinus
Tropocyclops
prasinusmexicanus

Rotifera

Ascomorpha sp.
Asplanchna priodonta
Brachionus sp.
Collotheca sp.
Conochilis unicornis
Filinia longiseta
Filinia terminalis
Gastropus sp.
Hexarthra sp.
Kellicottia bostoniensis
Kellicottia longispina
Keratella cochlearis
Keratella crassa
Keratella earlinae
Keratella hiemalis
Keratella quadrata
Lecance tenuiseta
Notholca acuminata
Ploesoma hudsonii
Polyarthra dolichoptera
Polyarthra eurypta
Polyarthra major
Polyarthra remata
Polyarthra vulgaris
Pompolyx sulcata
Synchaeta sp.
Trichocerca multicroinis

Early Detection and Rapid Response Protocol



Aquatic Invasive Species Watch List

Common Name	Scientific Name	Principle Vectors	Probability*	Damage*
Plants				
Fanwort	<i>Cabomba caroliniana</i>	aquarium, boat (fragmentation)	2	2
Pond water starwort	<i>Callitriche stagnalis</i>	boat (fragmentation)	2	2
Brazilian Elodea	<i>Egeria densa</i>	aquarium, water garden, boat (fragmentation)	3	4
Water Hyacinth	<i>Eichhornia crassipes</i>	aquarium, water garden, waterfowl	2	4
Hydrilla	<i>Hydrilla verticillata</i>	aquarium, horticulture, waterfowl, boat	4	5
European Frogbit	<i>Hydrocharis morsus-ranae</i>	Cultivation, water gardens, boat	4	3
Parrot Feather	<i>Myriophyllum aquaticum</i>	aquarium, water garden, boat (fragmentation)	2	2
Variable Water milfoil	<i>Myriophyllum heterophyllum</i>	boat (fragmentation), aquarium, waterfowl	4	3
Brittle Naiad	<i>Najas minor</i>	boat (fragmentation), waterfowl	4	2
Watercress	<i>Nasturtium officinale</i>	cultivation, intentional release	2	2
Starry Stonewort	<i>Nitellopsis obtusa</i>	ballast, boat (fragmentation)	1	2
Yellow Floating Heart	<i>Nymphoides peltata</i>	water garden, boat (fragmentation)	1	2
Water Lettuce	<i>Pistia stratiotes</i>	ballast, aquarium, boat	2	2
Water Chestnut	<i>Trapa natans</i>	boat (fragmentation)	4	4
Invertebrates				
Chinese Mystery Snail	<i>Bellamya chinensis</i>	aquarium, food, bait, intentional, boat	3	2
Spiny Waterflea	<i>Bythotrephes longimanus</i>	ballast, fishing gear, bait, boats	4	3
Fishhook Waterflea	<i>Cercopagis pengoi</i>	ballast, fishing gear, bait, boats	4	3
Asian Clam	<i>Corbicula fluminea</i>	food, aquarium, intentional, boat, aquaculture, watergardens	3	4
Quagga Mussel	<i>Dreissena rostriformis bugensis</i>	ballast, boat, bait, plant fragments	5	2
Hemimysis	<i>Hemimysis anomala</i>	ballast, bait, boat	4	3
Rusty crayfish	<i>Orconectes rusticus</i>	bait, school supply kits	2	2
New Zealand Mudsnail	<i>Potamopyrgus antipodarum</i>	fishing gear (mud), ballast, waterfowl, boats	1	2
Banded Mystery snail	<i>Viviparus georgianus</i>	aquarium, food, bait, boat	3	2
Fish				
Northern snakehead	<i>Channa argus</i>	aquarium, food, intentional release, interconnected waterways	2	5
Eurasian ruffe	<i>Gymnocephalus cernua</i>	ballast water, interconnected waterways, bait	2	2
Silver carp	<i>Hypophthalmichthys molitrix</i>	aquaculture, interconnected waterways, intentional release	1	5
Bighead carp	<i>Hypophthalmichthys nobilis</i>	aquaculture, interconnected waterways, intentional release, bait	1	5
Round goby	<i>Neogobius melanostomus</i>	ballast water, interconnected waterways, bait, aquariums	4	3
Sea Lamprey	<i>Petromyzon marinus</i>	interconnected waterways	1	3

* Probability and damage rankings are based on a 1-5 scale with 5 conveying the highest probability or damage potential

Terrestrial Species Water Quality Assessment

Purpose: To determine if a terrestrial invasive species found within the watershed boundaries threatens the objectives and water quality goals of the Conesus Lake Watershed Management Plan (2003) and thus may warrant a response under the CLWC Invasive Species Prevention and Response Plan.

Water quality goals: To improve water quality conditions in Conesus Lake to ensure its continued use as a water supply and make it more attractive for water contact recreation.

Objective: To ensure the sustainability of designated uses for Conesus Lake and its continued role as a positive influence on the social and economic well being of watershed communities.

§701.5 Class AA fresh surface waters: The best usages of Class AA waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

<u>Yes</u>	<u>No</u>	<u>Undeter- mined</u>	<u>Given the size, location and species in question, can the infestation...</u>
___	___	___	Significantly decrease lakeshore and/or watershed-wide property values?
___	___	___	Increase the frequency and/or severity of Harmful Algal Blooms?
___	___	___	Increase public infrastructure maintenance (ex. water, sewer, R.O.W.) costs?
___	___	___	Increase phosphorus and nitrogen inputs from the watershed into the lake?
___	___	___	Increase erosion and sedimentation near tributaries and drainage ditches?
___	___	___	Replace native species that currently provide ecosystem services without replacing these services?
___	___	___	Increase the occurrence of pathogenic bacteria in tributaries and in-lake?
___	___	___	Promote excessive macrophyte or macroalgae growth?
___	___	___	Decrease fish reproductive success and survival?
___	___	___	Decrease water clarity?
___	___	___	Threaten the public health of the watershed community?
___	___	___	Increase propensity towards flooding?
___	___	___	Harm agricultural resources?
___	___	___	Impair recreational enjoyment?

Aquatic Invasive Species Local Partner Notification List

Local Partners:

- Conesus Lake Watershed Council
- Technical Committee and Invasive Species Sub-Committee
 - Livingston County Planning Department
 - Livingston County Department of Health
 - Livingston County Water and Sewer Authority
 - Livingston County Soil and Water Conservation District
 - Natural Resource Conservation Service
 - Conesus Lake Association
 - Genesee/Finger Lakes Regional Planning Council
 - Finger Lakes Institute
 - New York State Department of Environmental Conservation - Region 8
 - New York Office of Parks, Recreation and Historical Preservation – Genesee Region
- Finger Lakes PRISM
- NYSDEC – Office of Invasive Species Coordination
- Cornell Cooperative Extension Local Office
- Cornell Cooperative Extension – Statewide Invasive Species Program
- Scientific Partners:
 - EcoLogic, LLC
 - SUNY Brockport
 - SUNY Geneseo

Additional partners if applicable (aquatic vs. terrestrial):

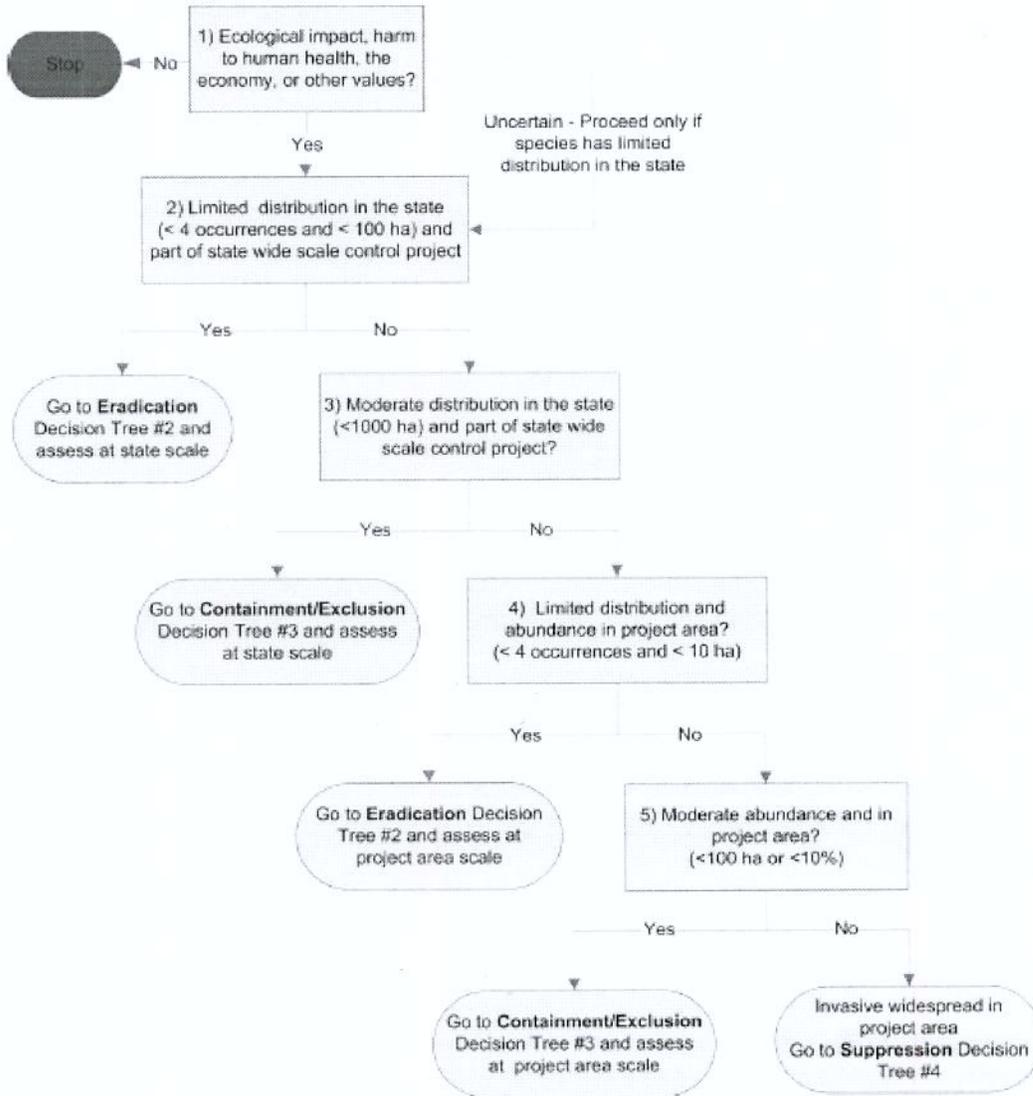
- CLWC Agricultural Committee
- Sheriff's Marine Patrol
- State, County and Town Highway Departments
- City of Rochester Hemlock Water Treatment Plant

Appendix F

DECISION TREES

Tree 1. Strategy Selection Decision Tree.

Use with associated worksheet.



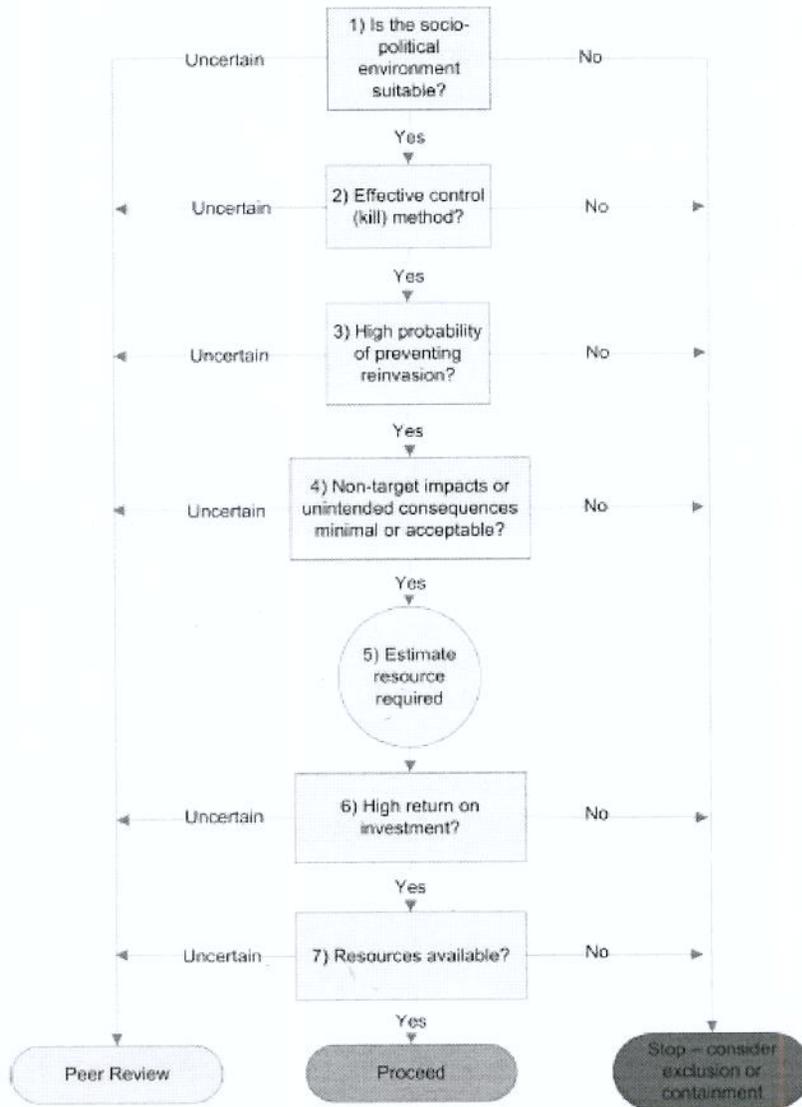
* Project area is defined as local, landscape, or PRISM scale.

Appendix G

Tree 2. Eradication Decision Tree - State and Project Scale Assessments

(Adapted from Panetta and Timmins, 2004). Use with associated worksheet.

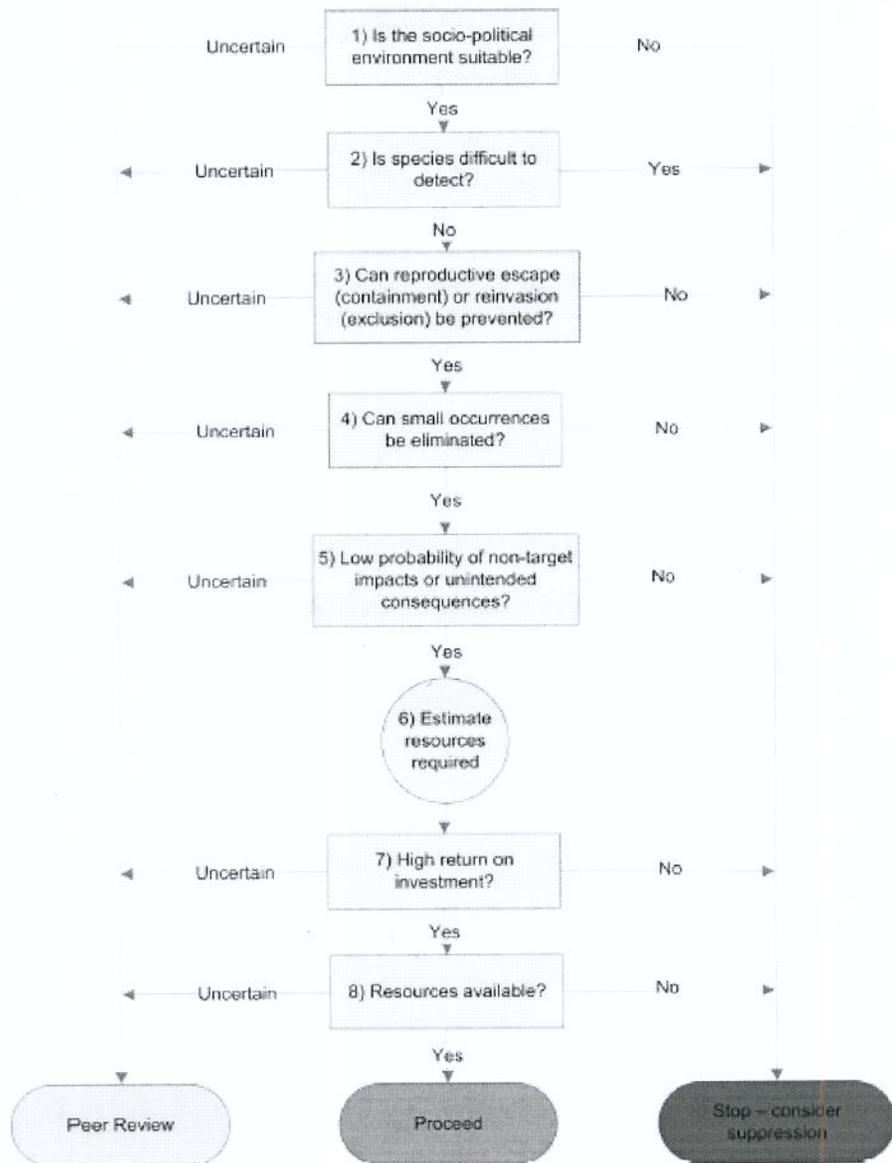
The goal of eradication is to eliminate all individuals and the seed bank with the low likelihood of needing to address the species in the future.



Appendix H

Tree 3. Containment/Exclusion Decision Tree - State and Project Scale assessments
Adapted from Panetta and Timmins, 2004). Use with associated worksheet.

The goal of containment or exclusion is to prevent infestations that cannot be eradicated from spreading into the uninvaded areas.



Appendix I

Tree 4. Suppression Decision Tree.

The goal of suppression is to reduce the cover and/or density of an invasive plant below a threshold that mitigates ecological impacts or other harm.

