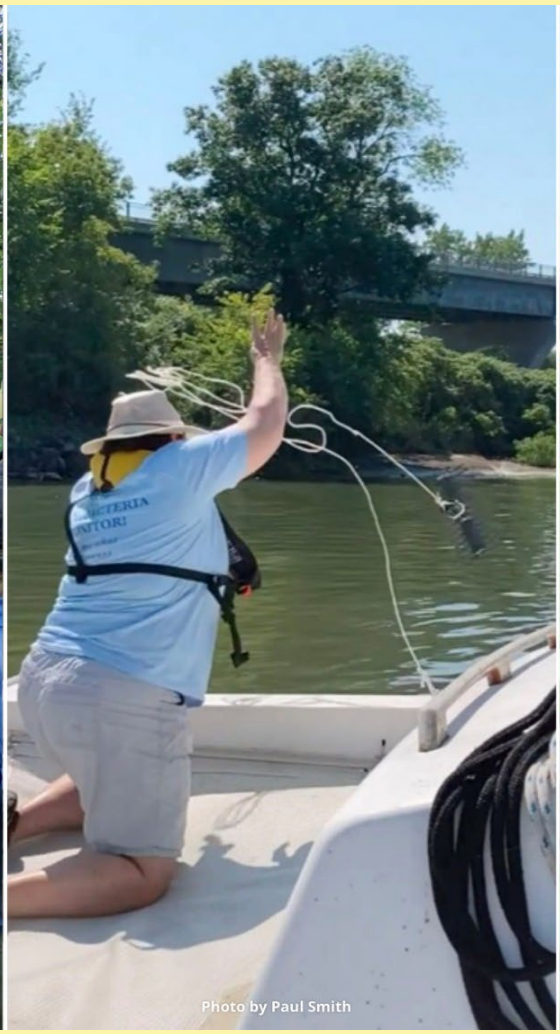
Champlain Aquatic invasive Monitoring Program

CHAMP Manual

2025 Edition


Photo by Guy Maguire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PATRICK LEAHY Lake Champlain Basin Program

NE IW PCC

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Introduction

Champlain Aquatic invasive Monitoring Program - CHAMP

CHAMP is a program that was piloted in 2023 by the Lake Champlain Committee (LCC). Lake Champlain currently has 51 known aquatic non-native and invasive species (AIS). However, many more are in nearby waterways that are connected to Lake Champlain. The Hudson River has more than twice as many aquatic nonnative and invasive species and the Great Lakes almost four times more. Invasive species are capable of causing extinctions of native plants and animals, reducing biodiversity, competing with native organisms for limited resources, and altering habitats. This can result in huge economic impacts and fundamental disruptions of the lake ecosystem. Humans have the greatest influence on the distribution of aquatic invasive species and therefore can play a key role in detection and spread prevention. While both Vermont and New York have strong volunteer AIS programs, such as the Vermont Invasive Patrollers (VIP) through the Vermont Department of Environmental Conservation (VTDEC) and the Adirondack Park Invasive Plant Program (APIPP) Lake Protectors through the Nature Conservancy, there is a gap for monitoring AIS in Lake Champlain that CHAMP fills.

Information from this manual is adopted from the VTDEC's VIP Training manual, from which LCC used AIS descriptions for most of the species as well as applicable guidance for CHAMP volunteers.

About LCC

LCC works toward clean, accessible water through science-based advocacy, education and collaborative action. With a history of nearly more than 60 years, LCC is the region's only bi-state non-profit organization dedicated to lake health and accessibility. We take a whole-lake approach to issues that affect this natural treasure, which boasts nearly 600 miles of shoreline in New York, Vermont and Quebec. Learn more about us here: https://www.lakechamplaincommittee.org/

Program Goals

CHAMP seeks to address the gap of AIS monitoring on Lake Champlain by recruiting volunteers to monitor sites throughout Lake Champlain's main sections: the Inland Sea, Main Lake Central, Main Lake North, Main Lake South, Mallets Bay, Missisquoi Bay, St. Albans Bay, and the South Lake. Monitoring efforts help improve understanding of the location and spread of aquatic invasive species (AIS) in Lake Champlain, enabling management professionals to respond more effectively. These surveys also support early detection efforts.

Responsibilities

CHAMP volunteers are encouraged to:

- Attend an in-person training on AIS identification, spread prevention, and CHAMP survey methods.
- Endeavor to conduct three surveys from their survey site over the course of July-October and submit data to LCC.

LCC staff support the efforts of CHAMP volunteers by:

- Conducting trainings that cover AIS identification and survey methodology with Lake Champlain Basin Program partners.
- Providing AIS identification resources, survey instructions and forms, sample submission instructions and forms.
- Being available for ongoing technical support over the course of the field season.

Contacts for CHAMP

Lake Champlain Committee – Contact for all general CHAMP inquiries

- Eileen Fitzgerald – Education & Outreach Associate; CHAMP Coordinator
  - eileenf@lakechamplaincommittee.org
  - (802) 658-1461
- Lindsey Carlson – Science & Water Program Coordinator; CHAMP Manager
  - lindseyc@lakechamplaincommittee.org
  - (802) 200-3560

Lake Champlain Basin Program – Contact for AIS Support

- Meg Modley - Healthy Ecosystems & AIS Management Coordinator
  - MModley@lcbp.org

Aquatic Invasive Species: Biology and Identification

Defining Invasive

Often the terms nuisance, exotic, and invasive are used interchangeably, however these terms are not synonymous. A nuisance species is one that has adverse ecological or economic impacts. An exotic species is one that has been purposefully or accidentally introduced to an area outside its natural geographic range but may not pose any threat to the natural communities in which they are introduced. An invasive species is an organism that has been introduced to an area outside its natural range, which causes ecological and economic harm.

Aquatic invasive species share several common characteristics. They reproduce rapidly – for example, aquatic invasive plants can often form a whole new plant from just a fragment – and they often lack natural predators or other control mechanisms. AIS are also skilled hitchhikers, spreading by attaching to boats, fishing gear, and other recreational equipment as people travel from one lake to another.

Once established, these species can reduce biodiversity, outcompete native organisms that provide essential fish habitat, and disrupt the balance of aquatic ecosystems. They can also be hard on our pocketbooks: for example, zebra mussels can attach to and clog intake pipes, while dense growths of

water chestnut can make boating nearly impossible, impacting recreation and tourism.

Priority Species of Concern

State partners with VTDEC and NYSDEC identified the following as key AIS for CHAMP training and surveying:

Target AIS already established in Lake Champlain

- Brittle naiad (*Najas minor*)
- Curly-leaf pondweed (*Potamogeton crispus*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- European frogbit (*Hydrocharis morsus-ranae*)
- Golden clam *(Corbicula fluminea)*
- Water chestnut (*Trapa natans*)
- Variable-leaf watermilfoil (*Myriophyllum heterophyllum*)
- Zebra mussel (*Dreissena polymorpha*)

AIS Watch list (*species not detected in Lake Champlain as of 2025*)

- Brazilian waterweed *(Egeria densa)*
- Carolina fanwort *(Cabomba caroliniana)*
- Hydrilla *(Hydrilla verticillata)*
- Parrot feather *(Myriophyllum aquaticum)*
- Starry stonewort *(Nitellopsis obtusa)*
- Water Soldier *(Stratiotes aloides)*
- Round goby *(Neogobius melanostomus)*
- Quaqqa mussel *(Dreissena bugensis)*

Any photos and illustrations for the following species that does not have a photo credit are courtesy of LCBP and VT DEC.

Brittle naiad (*Najas minor*)

There are several naiad species in New York and Vermont, but only one that is invasive. Brittle naiad prefers primarily alkaline waters of streams, ponds, and lakes and is tolerant of eutrophic conditions and high turbidity. The plant stems and parts are very brittle and fragment easily, contributing to its spread. *This plant can be differentiated from its native relatives by its easily visible serrations along the leaf margin.*

Identification

- Submersed annual plant
- Visibly serrated leaf margin, leaves Subopposite ly arranged
- Leaves are often recurved, stiff and bristly
- Leaves are 0.3-0.5 mm wide, finely pointed
- Flowers grow along the leaf axils
- Fragments easily when handled

Distribution & Spread

Brittle naiad is native to South America and spread rapidly throughout eastern North America, including Lake Champlain in 1960. Fragmentation of its brittle leaves is the primary means of spread, but mass seed production contributes to overwintering success.

Native lookalike

Slender naiad (*Najas flexilis*)

- Paired flaccid leaves with hard-to-see serrations

Quick ID Guide

- Visibly serrated edges
- Stiff steel wool-type feel

Curly – leaf pondweed

(*Potamogeton crispus*)

Curly-leaf pondweed is a distinctive plant that is easily identified by its noticeably wavy leaf edge that has finely-toothed serrations. It is a submersed perennial plant, found in freshwater lakes, ponds, rivers, streams, and slightly brackish waters. It is tolerant to low light and low temperatures. This species gets a jumpstart on the growing season, growing in the spring and early summer before conditions are favorable for most other species. By mid-July, it begins to die back.

Identification

- Submersed plant, no floating leaves
- Alternate leaf arrangement along stem
- Serrated leaf margin
- Leaf has a wavy curling edge and a blunt tip
- Each leaf is approximately 0.5" wide and 2-3" long

Distribution & Spread

Curly-leaf pondweed is native to Eurasia, Africa, and Australia and was introduced to Lake Champlain in the early 1900s. It spreads primarily by hard burr-like winter buds called turions—a single plant can produce hundreds of turions that are capable of germinating the following spring.

Native lookalike

Clasping-leaf pondweed
(*Potamogeton perfoliatus*)

- Base of leaves fully engulf stem
- Leaves are wavy, not curly

Quick ID Guide

- Visibly serrated edges
- Lasagna-like leaf edges
- More common early in the season

Eurasian watermilfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil is one of eight watermilfoil species in Vermont; six of these are native and very similar in appearance. Therefore, the best way to identify the species is to observe a segment of a whorled leaf and count the leaf divisions. Its ability to survive throughout cold temperatures provides a quick growth start in spring.

Identification

- Submersed though often branches near surface
- Whorls of 4-6 finely divided, featherlike leaves
- Each leaf contains 12 - 21 leaflets along the stem
- Bottlebrush appearance underwater
- Grows in up to 20 feet of water

Native lookalike

Northern watermilfoil (*Myriophyllum sibricum*)

- 5-15 leaflets
- Remains stiff out of water

Distribution & Spread

Eurasian watermilfoil is native to Europe and Asia and was first ID-ed in St. Albans Bay in 1962. It reproduces almost exclusively by fragments which can drift, sink, develop roots, and grow into new plants. Wind and waves may break plants loose; and boating activity through dense watermilfoil beds also contributes to fragmentation and spread.

Quick ID Guide

- 12-21 leaflets
- Limp when out of water
- Red-tipped in spring and fall

European frogbit

(*Hydrocharis morsus - ranae*)

This free-floating aquatic plant has a well-developed root system, yet it does not anchor itself in the sediment. It moves around a water body by wind and wave action. As a result, the plant is often found in quiet still waters, such as wetlands and coves. Plants are typically connected together by a runner, creating a dense surface mat.

Identification

- Free-floating perennial; roots are not anchored in the sediment
- Small white flowers have three petals just above the water surface
- Small, round heart-shaped leaf 0.5-2.5" long, purplish underside
- Plants are often connected to each other by irregular underwater runners

Native lookalike

Little floating heart
(*Nymphoides cordata*)

- Heart-shaped leaves with greenish underside
- White 5-petaled flower
- Roots anchored in sediment

Distribution & Spread

Eurapean frogbit is native to Eurasia and was first discovered in Lake Champlain in 1993. Spread can occur rapidly in a growing season through vegetative reproduction, sometimes forming dense mats. As a free-floating plant, it can become tangled with other plants and spread to other waterbodies.

Quick ID Guide

- Free-floating kidney-shaped leaves with purple underside
- Small white 3-petaled flower blooms in summer

Variable - leaf watermilfoil

(*Myriophyllum heterophyllum*)

Like Eurasian watermilfoil, variable-leaf watermilfoil grows aggressively and rapidly in a wide variety of environmental conditions. It is a rooted plant that can grow in water up to five meters deep. When left on land it develops "terrestrial morphs", which look like small trees, to allow the plant to survive out of water.

Identification

- Rooted, submersed, perennial aquatic plant
- Underwater leaves are finely divided into segments giving them a feather-like appearance
- Densely packed whorls of four to six leaves with seven to eleven paired leaflets
- On more mature plants, blade-like leaves with serrated edges appear above the water's surface; flowers develop at the base of these emergent leaves forming a stiff spike

Distribution & Spread

Variable-leaf watermilfoil is native to the Southeast region of the US and was first discovered in Missisquoi Bay and South Bay in Lake Champlain in 2009. It spreads via stem fragments, winter buds, roots, & sometimes seeds, and can hitchhike.

Quick ID Guide

- Bottle brush appearane
- 4-6 feather-like leaves. With 7-11 paired leaflets, in a dense whorl around the stem

Native lookalike

Northern watermilfoil (*Myriophyllum sibricum*)

- 5-15 leaflets
- Remains stiff out of water

Water chestnut (*Trapa natans*)

Water chestnut is one of the few invasive plant species that only reproduces by seed (as opposed to fragmentation). If the plant is harvested before it drops mature seeds, it can be eradicated. However, if it becomes established in a water body, it rapidly reproduces. It grows on and below the water's surface; the distinct spiky seeds lodge in sediment and anchor it to the lakebed. Thriving at the water's edge, it is often a nuisance at boat launches.

Identification

There are two types of leaves:

- *Submerged leaves* are feather-like and oppositely paired along the stem
- *Floating leaves* on the water's surface collectively form a circular rosette; each surface leaf is triangular in shape and has a serrated margin; the petiole of a floating leaf has a bladder- like swelling filled with air and spongy tissue that provides buoyancy
- Plant stems are long and cord-like, sometimes resembling milfoil, and can attain lengths of up to 16 ft.

Distribution & Spread

Water chestnut is native to Europe and Asia. It was initially brought to the United States as an ornamental plant in the late nineteenth century and by the 1940s had spread to Lake Champlain. If left unharvested after maturing, seeds drop to the sediment bottom or are carried to new locations by currents where they remain viable for five or more years, although viability of up to 12 years has been reported. The spiky seeds can also be dispersed as they cling to ropes, to feathers and webbed feet of wildfowl, and to the fur of animals.

Quick ID Guide

- Triangular floating leaves with serrated margins form circular rosette.
- Feathery submersed leaves

Zebra mussel

(*Dreissena polymorpha*)

The zebra mussel is a small freshwater mollusk. Adult zebra mussels attach themselves to firm surfaces with strong hair-like fibers called byssal threads. Efficient filter-feeders, they consume large portions of microscopic life that forms the base of the food web. This has the potential to impact populations of species that depend on the same food source. They attach to shells of native mussels, impeding their movement and threatening their survival; several native mussels are now listed as endangered or threatened in Vermont and New York due to the introduction of zebra mussels.

Identification

- Adult zebra mussels are around one inch in length, and juveniles can be smaller than a pinky nail
- Shell forms the shape of a "D," with a flat side. Usually able sit upright on flat side (unlike Quagga mussels)
- Can form dense colonies of up to 700,000 individuals/square meter on firm surfaces

Distribution & Spread

Zebra mussels are native to southern Russia and the Ukraine. First identified in the United States in 1988 in the Great Lakes, they were confirmed in Lake Champlain in 1993; since then they have been found throughout much of Lake Champlain. Each female mussel can lay up to *one million eggs* during the summer months when water temperatures rise above 50°F. Fertilized eggs hatch into microscopic juveniles called veligers, which can travel great distances on water currents or when transported on boats and trailers.

Golden Clam (*Corbicula fluminea*)

The golden clam is a freshwater bivalve filter feeder that can be found at the surface of the sediment or slightly buried in sandy areas. They usually dominate the benthic community through dense growth and crowd out native burrowing mussels, resulting in a loss of biodiversity. They can also clog water intake pipes and are associated with promoting an abundance of algae growth.

Identification

- Triangular shape
- Prominent concentric rings
- Straw yellow on the outside and white on the inside
- Anterior and posterior lateral teeth have many fine serrations

Distribution & Spread

- Native to temperate and tropical southern Asia, west to the Mediterranean
- Discovered in Lake George in 2010, which is a part of the Lake Champlain Basin
- In 2016, VTDEC confirmed the arrival of this species in Lake Bomoseen
- Infests many of the major waterways in North America
- Ability to reproduce rapidly while tolerating a wide range of temperatures (2-30°C)
- Can reproduce through self-fertilization

Similar Species

European fingernail clam (*Sphaerium corneum*)

- Oval shaped and flatter in comparison
- Less prominent rings, smooth to the touch
- Shells are thin and brittle, easy to fracture

Photo by Francisco Welter Schultes, CC BY-SA 2.5

WATCH LIST

Brazilian Waterweed *(Egeria densa)*

Brazilian waterweed is much larger than native look-alikes. The leaves on the top grow densely around the stem. This submersed aquatic perennial is typically found in slow moving shallow waters that are somewhat acidic and enriched. It can also be found in lakes, ponds, and rivers, where it can grow in waters up to 6.5 meters deep.

Identification

- Leaves arranged in whorls around the stem
- Short internodes give the plant a full appearance
- Typically four leaves per whorl, but can range from three to six
- Leaves entire, linear shape, typically under one inch long
- Small white male flowers rise above the water's surface

Native lookalike

Common waterweed (*Elodea canadensis*)

- Leaves are firmer and stouter; blunt tip, strictly whorls of 3 leaves

Distribution & Spread

Brazilian waterweed is native to South America and was first recorded in Long Island, New York in 1893. It has widespread distribution throughout the U.S. but has not been documented in Lake Champlain. As an aquarium species, it is thought that dumping of aquariums contributes to its movement. Only male flowers have been found in North America, indicating that it spreads only through fragmentation. It overwinters primarily from root crowns.

Quick ID Guide

- 4-6 leaves per whorl
- Very finely serrated leaves 1-3 cm long, densely packed with short internodes between whorls

WATCH LIST

⚠ Carolina Fanwort (*Cabomba caroliniana*)

Carolina fanwort is a perennial aquatic plant that looks similar to several native species though the double fan-like submersed leaves are an instant identifier. More closely related to Water shield *(Brasenia schreberi)*, it shares the characteristic mucous covering of the Cabombaceae Family.

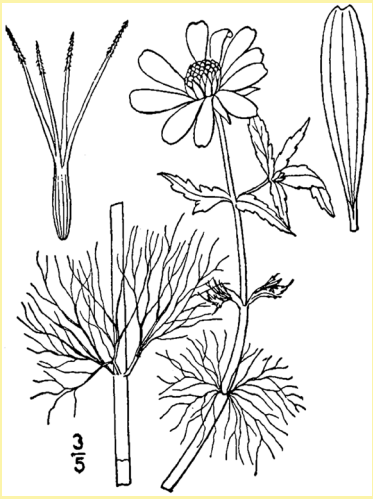
Identification

- Mostly a submersed species, also produces floating leaves
- Underwater leaves are branched divided and opposite along the stem which creates a fan shaped appearance
- Each underwater leaf has a distinct leaf stem (petiole)
- White flower with 6 petals

Distribution & Spread

Carolina fanwort is native to sub-tropic regions of South America and eastern North America. It has been found as an invasive in Massachusetts, Michigan, New Hampshire, New York, Oregon, Pennsylvania, and Washington. It spreads primarily through fragmentation, and sometimes through seeds. As an aquarium species, it is thought that dumping of aquariums contributes to its movement.

Native lookalike



Water marigold (Bidens beckii)

- Submersed leaves whorled around stem
- Leaves have no stalks
- Yellow, daisy-like flower

Quick ID Guide

- Finely divided fan-shaped submersed leaves
- Leaves on short stalks oppositely arranged
- Small white flower

WATCH LIST

⚠ Hydrilla (*Hydrilla verticillata*)

One of the most invasive species internationally, hydrilla tolerates a wide range of environmental conditions, including low light, high or low nutrient levels, and temperate or tropical temperatures.

Identification

- Submersed perennial
- Typically five to eight leaves per whorl
- Each strap -like leaf is visibly serrated
- Pointed tip on leaf
- Distinct tubers and turions are produced

Distribution & Spread

Hydrilla is native to Australia, Asia, and central Africa and was released from aquarium trade in Florida in the 1950s. It's invasive in parts of New England and New York. It's not yet found in Lake Champlain—LCBP Boat Stewards prevented a potential entry in 2019. It is primarily spread by stem fragments, and tubers and turions contribute to overwintering.

Native lookalike

Common waterweed (*Elodea canadensis*)

- Leaves are firmer and stouter; blunt tip, strictly whorls of 3 leaves

Quick ID Guide

- 5-8 leaves per whorl
- More visibly serrated leaf edges

WATCH LIST

Parrot feather (*Myriophyllum aquaticum*)

Parrot feather is a perennial aquatic plant with both submersed and emergent leaves. When emergent, the plant's growth may appear like small fir trees or club mosses. Stems rarely branch and plants can grow along the banks and shores of water bodies.

Identification

- Four to six leaves per whorl around the stem, each leaf is finely divided
- Submersed leaves are limp and appear decaying
- Emergent leaves are rather stiff with a waxy gray-green color
- Growth along shorelines and in the shallows have stems growing up to a foot above the water level

Distribution & Spread

Native to South America, it is now found on every continent excluding Antarctica from aquarium trade, and populations are established in New York and Southern New England. In North America, it reproduces exclusively from plant fragments.

Native lookalike

Water mermaid
(Proserpinaca palustris)
Lance-like emergent leaves arranged alternately

Quick ID Guide

- 4-6 feather-like leaves whorled around stem
- Short leaflets
- Emergent portion pops up to 1 ft. above water level

WATCH LIST

Starry stonewort (*Nitellopsis obtusa*)

Starry stonewort is a non-native invasive species of large algae in the Characeae or muskgrass family. It is more robust than most members of the family, and can grow to over 2 meters tall. This species is found in alkaline waters of shallow to deep lakes and slow-moving streams. Only male starry stonewort exists in the U.S..

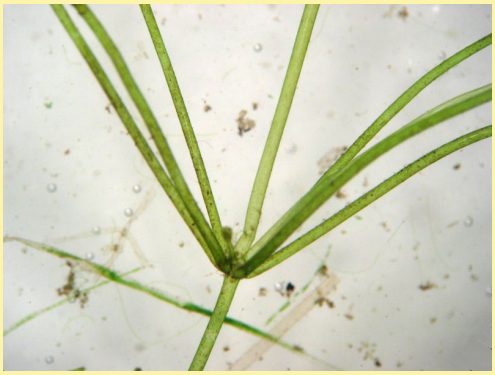
Identification

- Submersed perennial, often encrusted with lime deposits
- Branchlets five to eight per whorl, each with one to two long bracts, giving the branchlet the appearance of being forked
- White, star-shaped bulbils, one to two mm long, produced on colorless rhizoids

Distribution & Spread

Native to Europe and western Asia, it was first introduced in the St. Lawrence River and is found in the Great Lakes, New York, and parts of New England including Vermont. It spreads via fragmentation and the star-shaped bulbils are seed-like in that they are reproductive vegetative material.

Native lookalike



Nitella species

- Smooth, green, semi-translucent branches

Quick ID Guide

- Visibly serrated edges
- Stiff, steel-wool type feel
- White, star-shaped bulbil

WATCH LIST

Water soldier *(Stratiotes aloides)*

Water soldier is a submersed perennial non-native aquatic plant that becomes buoyant in the summer—every fall, it secretes calcium bicarbonate and sinks back down to the bottom of the water to re-emerge in spring. As an invasive species, it can form dense mats and block out light for other aquatic plants. It is the only species in the genus Stratiotes.

Identification

- Submersed plant that floats to the surface in summer
- Leaves are about 15 inches long, sword-shaped, sharply serrated edges, bright green, and form a large rosette
- Produces stolons, or connective vertical stems
- Sometimes produces a small white flower

Distribution & Spread

Native to Europe and northwest Asia, it has been reported in Ontario. It reproduces asexually by way of vegetative offsets and spreads with its stolons.

Quick ID Guide

- Long, pointy leaves forming a large rosette
- Sharply serrated leaf edges

WATCH LIST

⚠ Quagga mussel (*Stratiotes aloides*)

The Quagga mussel is a small freshwater mollusk. They are similar to zebra mussels in their impact on aquatic systems as invaders: they consume large portions of microscopic life that forms the base of the food web, alter water chemistry, and grow prolifically on a variety of substrate. Quagga mussels have been found to be able to survive and colonize in areas of soft substrate, such as sandy or silty lake bottoms, which zebra mussels are less apt to do; in North American waterbodies where both zebra mussels and quagga mussels are introduced, Quagga mussels have been observed outcompeting zebra mussels.

Identification

- Adults are 1-1.5 inches long
- Colors range from almost white to tan or brown. Shells may have dark concentric rings and be paler towards the narrow end
- Shells typically are without a ridge, more rounded or fan-shaped and will fall flat when placed on a hard surface (Zebra mussels will stand upright on its flattened underside)

Distribution & Spread

Native to Ukraine, quagga mussels can be found in the Great Lakes and the St. Lawrence River and was first introduced in 1989 from ballast water discharge. The microscopic larvae can be carried in live wells or bilge water on boats and in bait buckets, and adults attach themselves to boat hulls and trailers. Quagga mussels also stick to vegetation, which can be transported by boats.

WATCH LIST

⚠ **Round goby** (*Neogobius melanostomus*)

Native to Eurasia, the round goby (*Neogobius melanostomus*) is considered one of the greatest invasive species threats to the Lake Champlain ecosystem. The goby is gray, four to ten inches in length, and is physically similar to other species native to U.S. waters, including the slimy sculpin. They area bottom-dwelling fish that outcompete native species like sculpin for food and habitat and prey on eggs and juveniles of other fish like largemouth bass. They thrive in poor water conditions and spawn multiple times each season. They eat zebra mussels—seemingly a benefit to the Lake—but in the process, ingest toxic substances like PCBs that bioaccumulate in predators like bass and walleye, posing a threat to other fish and potentially humans. *(Lake Champlain Basin Program).*

Identification

- four to ten inches long, cylindrical body, rounded snout
- Juveniles are solid slate grey while older fish are blotched with black and brown and have a white to greenish dorsal fin with a black spot at the posterior base
- Similar to native sculpins but can be distinguished by the presence of fused pelvic fins

Distribution & Spread

Native to the Black and Caspian Seas, round goby are invasive in waterbodies throughout the Northeastern US and have been reported south of the Champlain Canal and north of the Richelieu River in Quebec. They spread by hitchhiking in bait buckets and water-holding compartments of boats, and by swimming through rivers and canals.

Helpful Resources

Aquatic Invasive Species Keys and Guides

A Key to Common Vermont Aquatic Plant Species: https://dec.vermont.gov/sites/dec/files/wsm/lakes/AIS/GreeterPage/Key%20to%20Vermont%20Aquatic%20Species%202021.pdf

The Lake Champlain Basin Aquatic Invasive Species Guide: https://lcbp.wpenginepowered.com/wp-content/uploads/2023/02/6-9-2022-Invasive-Species-Guide- HR.pdf

Borman, Susan, and Robert Korth, and Jo Temte. 2014. *Through the Looking Glass: A Field Guide to Aquatic Plants.* 2nd ed. Wisconsin Lakes Partnership. University of Wisconsin- Extension Lakes, College of Natural Resources, Stevens Point, Wisconsin. Reindl Printing Inc., Merrill, WI.

Online resources on AIS

- Cornell University Cooperative Extension and New York Sea Grant – NYS Invasive Clearinghouse https://nyis.info
- New York Department of Environmental Conservation Invasives – Speaker Series (YouTube channel): https://www.youtube.com/@NYinvasives/videos
- USGS Nonindigenous Aquatic Species: https://nas.er.usgs.gov/
- Vermont Department of Environmental Conservation Aquatic Invasives Species: https://dec.vermont.gov/watershed/lakes-ponds/aquatic-invasives
- Vermont Invasives Gallery of AIS: https://www.vtinvasives.org/gallery-of-aquatic-invasives

AIS Spread Prevention

Stop the spread of
aquatic invasive species!

Clean. Drain. Dry.

- ☑ **Clean** off mud, all plant material, and any animals from your kayak, including the rudder, hull, cockpit, and hatches, and associated gear. Dispose of it on dry land. If possible, wash kayak and gear with pressurized water.
- ☑ **Drain** your hatches and cockpit away from water.
- ☑ **Dry** anything that comes into contact with water.

For more information, visit:
www.watershedmanagement.vt.gov/lakes.htm

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
LAKES & PONDS PROGRAM

CHAMP Survey Guidance

Submitting data

Follow this link: https://www.lakechamplaincommittee.org/get-involved/volunteers/ais-work/champ-survey-data- submission-form to transcribe data from your survey data sheet and submit it online. If possible, please also mail your data sheet to LCC's office at 208 Flynn Ave., Bldg. 3 Suite 3F, Burlington VT05401 OR email photos of your data sheet to eileenf@lakechamplaincommittee.org with the subject line "[DATE OF SURVEY] [INITIALS] CHAMP Survey Data Sheet" for data comparability.

Recommended materials

- AIS survey rake
- Survey data sheet
- Pencil or pencil
- Phone – for camera and GPS points
- Loupe
- Plastic freezer bag – for specimen
- White bucket - for viewing specimens in contained area

Optional materials

- Boat, paddle(s), and PFD (if surveying from boat)
- Cooler – for storing specimen collection
- View scope
- Polarized sunglasses, other sun protection measures
- Pocket knife

Choosing a CHAMP Site

Survey areas should be less than 0.25 miles long along the shoreline; however, every site is different so report the start and end points of the area that works best for you to survey. The start and endpoints in the survey refer

to the length of shoreline you surveyed within. If you survey from a dock, part of your survey will run perpendicular into the water – note this in the Survey Area Description line of your survey sheet.

If surveying from the shore, the survey should extend roughly 25 feet from the shore into the water (the length of the rope on the provided AIS rake)

If surveying from a boat, the survey should extend to the end of the littoral zone (where plant growth is inhibited by a lack of sunlight reaching through deeper water and plants are no longer visible underwater). This is a subjective parameter and should be applied as is reasonable. Many bays in Lake Champlain are shallow enough for plants to grow for hundreds of meters past the shoreline. In these cases, survey what is reasonable to cover in 10 rake tosses and report an estimated distance from shore in the survey data sheet. Littoral zone distance from shore varies throughout Lake Champlain—if your site is shallow for a long distance, keep the distance from shore within approximately 1,000 feet. The distance from shore you survey will vary depending on site. Please estimate the distance from shore you surveyed out to and record it in the Survey Area Description.

"Survey Area Description" Directions

- Survey sites should be between the shoreline and about 15 feet in water depth (or the maximum depth of rooted aquatic plant growth). This area is referred to as the *littoral zone,* which is defined by where sunlight reaches the lake bottom sediments and enables aquatic plants to grow.
- On your survey sheet in the "Survey Area Description" line, indicate the edges of your survey area by describing a landmark or providing an address. Aim to choose permanent and easily identifiable edges to your survey area, so they are easy to find the next time you survey, and so the reviewer can locate your survey area. Include an estimate of how far out your survey extended from land.

For example: Facing land, the left (west) boundary is where West Shore Road intersects with Hathaway Point Road. The right (east) boundary is where land slightly juts out into the lake, about 100 feet beyond the end of the right (east-pointing) dock. I surveyed the entire area from east to west; my survey extended approximately 400 feet from shore.

"Survey Start Point and End Point" Directions

This field refers to the GPS points between which you conducted your survey.

If you have a smart phone with location services turned on with you in the field:

- Open the Compass app on your phone and record the coordinates of your start and end points.

If you have a smart phone with navigation apps (Google or Apple Maps):

- Open your navigation app of choice.
- Toggle to your location and drop a pin by tapping your location – the GPS points will appear in the dropdown menu.
- Record these coordinates for your start and end points.

If you do not have a device with GPS capabilities:

- Go to Google Maps on desktop after your survey and click on the area of your first rake toss. When you click, a pin icon will appear. Google will generate GPS points in the pop-up box. Record this and replicate for your end point.

CHAMP Survey Directions *from shore*

1. Fill in all Background Information and Water Conditions on your survey data sheet.
2. Determine the starting point of your survey and record the GPS point
3. At the starting point, do the first rake toss (see the CHAMP Toolkit for more instructions on rake tosses). Record findings in the survey table.

4. Do another eight rake tosses spread out as evenly as possible over the survey area and record findings cumulatively in the survey table. Make sure to also observe the water from shore, as species like Round Goby are not likely surveyed through rake tosses.
5. The tenth and final rake toss should be done at the endpoint of the survey area, where you will record another GPS point and the end time of the survey.

CHAMP Survey Directions *from a boat*

1. Fill in all Background Information and Water Conditions on your survey data sheet.
2. Determine the starting point of your survey and record the GPS point.
3. With PFD and other safety measures, enter the water. Starting as close to where you marked your starting point within boat draft limitations, take your first rake toss (see the CHAMP Toolkit for more instructions on rake tosses). Record findings on data sheet.
4. After your first toss, meander from the shallows to the end of the littoral zone (generally a point where the lake bottom is no longer visible). Paddle or boat in a snake-formation back and forth from shallower to deeper water as you work your way to the end of your survey area. Over this path, take another eight rake tosses. Try to space out rake tosses so they are evenly spaced within the survey area—that means some tosses close to shore, some closer to the edge of the littoral zone, and plenty in-between as you paddle between the start and end points.
5. At the tenth and final toss, exit the water and mark your GPS endpoint and end time of the survey.

"AIS Distribution" Definitions

This parameter looks at what is captured in your rake toss rather than what is observed in the water.

- Trace – fingerful; one to two individuals on one to two rake tines
- Sparse – handful; under ten individuals on three to six rake tines
- Moderate- covers most of the rake; over ten individuals on seven to thirteen rake tines
- Dense – large mass over entire rake; over twenty / uncountable population on fourteen rake tines.

Tips on rake tosses

- Secure the end of the rope to your watercraft or body.
- Toss the rake the length of the 25-foot rope or as far as you can throw it within that range.
- Use the white bin provided with your CHAMP Toolkit to examine what you collect from each rake toss. *Be thorough—small clams and mussels can attach to plants.*
    - If you collect AIS in rake tosses from a boat, keep it in your boat while you complete the survey, bring it to shore to photograph it, and dispose of the specimen(s) away from the water.

Quality Assurance Sample Collection

For at least one of your surveys over the course of the season, you must collect a Quality Assurance (QA) Sample for review by LCC and LCBP personnel. To do this:

1. Label a plastic, sealable, gallon-sized freezer bag (provided by LCC) using a permanent marker with your full name, the date, the name of their survey site, and "QA SAMPLE".
2. During the survey, bag the entire biomass (or what fits in the bag) of a single rake toss that is representative of the AIS reported in your survey (if Eurasian watermilfoil and zebra mussels are reported in the survey, the rake toss used for the QA Sample should contain both).
3. Seal the bag and store the QA Sample in a cooler or refrigerator until sample exchange.
4. Coordinate QA Sample exchange, options including:
    a. Dropping off or mailing to LCC's office;
    b. Dropping off with a LCBP Boat Launch Steward, who will deliver the sample to LCBP Project Officer or;
    c. Coordinating a pickup time and location with LCC personnel.

VERMONT – Suspicious Aquatic Specimen Submission Form

Keep the sample in a cool place until it is mailed, then follow the directions below to mail this completed form with the sample (*Monday – Wednesday only*) at the address below.

ATTN: Plant Sample, VTDEC – Watershed Management Division 1 National Life Drive, 2 Main, Montpelier, VT 05620-3522.

Questions? Call (802) 828-1535.

Name:_____Phone:_____
Email Address:_____
Are you a: X CHAMP volunteer □ VIP □ Other
Site Name:_____
Waterbody: Lake Champlain
Town:_____
Suspected Species ID:_____
Date Collected:_____
Have you contacted VTDEC? □ Yes □ No
If yes, with whom did you speak:

Sample Packaging Directions:

1. Please wrap a representative piece (collect 8 – 12 inches of a plant specimen, including any flowers or fruit, if possible) in a wet paper towel and place it into a sealable plastic bag.
2. If there is more than one species obtained per survey, individually wrap them.
3. Place the plastic bags in a manila envelope and mail the sample with this form to the address above or use the mailing label below.

Mailing label – cut along the line

ATTN: Aquatic Specimen
VTDEC – Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

NEW YORK - Suspicious Aquatic Specimen Submission Protocol

1. Choose samples of the plant that have key identification features, including stems, leaves, fruits, and/or flowers if present.

2. Take a high-quality photo of the samples and include an object in the photo for scale (e.g. ruler or coin). The photo should include clearly visible key identification features like flowers, fruit, or leaf structures.

3. Contact Adirondack Park Invasive Plant Program (APIPP)'s Program Director Brian Greene (brian.greene@tnc.org; (518) 576-7251) as soon as possible and submit photos and site information upon request.

4. If sample collection is requested, wrap the collected plant material in a slightly damp paper towel and place in a sealed plastic bag.

5. Label bag with the site name, "Lake Champlain", town name, your name, "CHAMP volunteer" your email address, and date.

6. Keep the samples refrigerated until the APIPP AIS Coordinator indicates if you need to send it in for closer inspection.

7. If told the specimen needs further inspection, mail or bring to:

Mailing label – cut along the line

APIPP Program Director
c/o Adirondack Chapter of The Nature Conservancy
P.O. Box 65
Keene Valley, NY 12943

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Champlain Aquatic invasive Monitoring Program (CHAMP) Survey Data Sheet

Lead Surveyor Name: _____ **Phone Number:** _____ **Email Address:** _____
Site Name: _____ **Survey Method** (shoreline or boat): _____
Survey Start Point (GPS Coordinates): _____ **Survey Start Time:** _____ _____
Survey End Point (GPS Coordinates): _____ **Survey End Time:** _____
Relative Water Level (*circle one:* high, normal, low) **Water Clarity** (*circle one:* good, fair, poor)
Light Conditions (*circle one*: clear, partly cloudy, overcast) **Surface Conditions** (*circle one:* calm, rolling, white caps)
Survey Area Description: _____

_____

_____

Target Species (species already reported in Lake Champlain as of 2025)

Species Name *check if present*	**AIS Distribution** *trace, sparse, moderate, or dense*	**Notes**
Brittle naiad (*Najas minor*)		
Curly-leaf pondweed (*Potamogeton crispus*)		
Eurasian watermilfoil (*Myriophyllum spicatum*)		
European frogbit (*Hydrocharis morsus-ranae)*		
Golden clam (*Corbicula fluminea*)		
Water chestnut (*Trapa natans*)		
Variable-leaf watermilfoil (*Myriophyllum heterophyllum*)		
Zebra mussel (*Dreissena polymorpha*)		

Watchlist Species (species not reported in Lake Champlain as of 2025)		
Species Name *check if present*	**AIS Distribution** *(trace, sparse, moderate, or dense)*	**Notes**
Brazilian waterweed (*Egaria densa*)		
Carolina fanwort (*Cabomba caroliniana*)		
Hydrilla (*Hydrilla verticillata*)		
Parrot feather (*Myriophyllum aquaticum*)		
Starry stonewort (*Nitellopsis obtusa*)		
Water Soldier (*Stratiotes aloides*)		
Round goby (*Neogobius melanostomus*)		
Quagga mussel *(Dreissena bugensis)*		

Suspicious (unknown or potential watchlist) species encountered? (Yes / No)

Notes: _____

Photo Sent (Yes / No)

Subsample Sent (Yes / No)

Quality Assurance Sample Collection (Yes / No)

Notes: _____

_____

Please transcribe this data sheet and include photos of observed AIS on LCC's survey data submittal form

www.lakechamplaincommittee.org/get-involved/volunteers/ais-work/champ-survey-data-submission-form

Contact Eileen at eileenf@lakechamplaincommittee.org and Lindsey at lindseyc@lakechamplainommittee.org with any questions about CHAMP or your survey!