Introduction

The Lake Champlain Basin is home to a number of nonnative and invasive species that cause economic and ecological harm to our ecosystem. Federal, state, and provincial partners of the Lake Champlain Basin Program from New York, Vermont, and Québec have identified invasive species management as one of the highest priorities in Opportunities for Action, a management plan for Lake Champlain.

Policy makers and scientists often use the term ecological integrity when describing threats or stresses to ecosystems. When sufficiently stressed, aquatic ecosystems may lose their ability to support important fisheries and recreational activities, serve as drinking water sources, or process nutrients. One threat to aquatic ecosystem integrity is the cumulative impact of non-native invasive species. Invasive plants, invertebrates, and fish may divert food resources from native species, reduce light penetration, change habitats, impair water quality, interfere with recreational activities and reduce property values. Invasive pathogens (not included in this guide) also threaten the health of native and sport fisheries in the region. Fortunately, most “invasions” by introduced, non-native species fail. However, there continue to be spectacular “successes” (e.g. zebra mussels, water chestnut, white perch, spiny and fishhook water...
flea etc.) which produce widespread serious impacts that require significant resources and money to manage.

The Great Lakes have been colonized by over 188 non-native aquatic organisms. In comparison, Lake Champlain is home to approximately 51 non-native and invasive aquatic species. Protecting the Lake Champlain Basin from the introduction and spread of invasive species is an enormous environmental, social, and political challenge. Invasive species are spread in a number of unseen ways that are mostly unintentional. Movement of aquatic invasive species by a variety of vectors such as boat trailers, recreational equipment, canal systems, ballast water, aquarium trade, and the baitfish industry will no doubt continue, but human awareness and actions can significantly reduce the probability that new invasive species will spread and become established. To ensure that additional colonizations of the Lake Champlain Basin fail, managers will rely on early detection, spread prevention, and rapid response control efforts.

While eradication is theoretically possible, the ecological and economic costs are almost always too high. Management or control is achievable, but the costs are perpetual. The best “tool” with which to combat invasive species is avoidance— preventing their spread into areas not yet colonized. Anyone arriving at a lake with a boat trailer and equipment or purchasing live aquatic organisms may transport a new invasive species. Hence, use of spread prevention for aquatic invasive species management requires a knowledgeable public with the skills to identify potential problem organisms.

This guide highlights a number of high priority non-native invasive plants, animals, and invertebrates that are known to exist within the basin and introduces high-priority invaders that users should be on the lookout for when in the basin. Species inclusion in this guide was based on partner input, reviewed by the LCBP Aquatic Nuisance Species Subcommittee, and the Lake Champlain Basin Aquatic Nuisance Species Management Plan and does not include all known aquatic invasive species in or threatening the basin.

This booklet was developed to ensure that Lake Champlain stakeholders—
such as boaters and anglers, law enforcement staff, lakeshore property owner groups, park managers and others—have the skills to recognize potentially harmful non-native species in the field. It was compiled by the Lake Champlain Basin Program Aquatic Nuisance Species Subcommittee Spread Prevention Workgroup. Funding for this guide was supported by the National Aquatic Nuisance Species Task Force.

**How to use the guide:**

The aquatic invasive species guide is divided into two sections: one with fish, mollusks, and invertebrates, and one with plants. Fish, mollusc, snail, and plant anatomical keys are located at the front of each section. The species' common and scientific names are listed in the index in the back of the guide. Each species' page has a Lake Champlain Basin icon on the top corner; a red icon indicates species presence and a white icon indicates species absence. The common, scientific, and French names are provided for every species. The guide also includes the size of the species, defining characteristics, habitat description, and known distribution of the species within the basin or nearest to the basin. Multiple photos are provided to aid in species identification.

If you think you have found an invasive plant, animal, or invertebrate please contact one of the following agencies or organizations:

**Contacts:**

Lake Champlain Basin Program .......................... 1-800-468-5227
Lake Champlain Sea Grant ............................ 1-800-745-5520
Vermont Department of Environmental Conservation .... (802) 490-6120
New York State Department of Environmental Conservation
(Region 5) ........................................... (518) 897-1200
Ministry of the Environment and the Fight against
Climate Change (plants) .............................. 1-800-561-1616
Ministry of Forests, Wildlife and Parks (animals) ........ 1-877-346-6763
Help Prevent the Spread of Aquatic Invasive Species!

Aquatic invasive species – plants, fish, crustaceans, mollusks, amphibians, diseases, or pathogens – can be found in bilge water, bait buckets, and livewells and can adhere to boats, trailers, motors, paddles, hipwaders, apparel, and fishing tackle. Some species can survive for several days or weeks out of water. Small plant fragments, fish eggs, or microscopic organisms may hitch a ride unbeknownst to you.

In order to reduce the spread of all aquatic invasive species, please follow these procedures whenever you leave a body of water:

- Remove all visible mud, plants, fish, or animals from your boat or other gear. Use the Watercraft Check Points guide (right) to help you inspect your boat.
- Eliminate water from all equipment before transporting anywhere.
- Clean and dry anything that came in contact with the water.
- Never release plants, fish, or animals into a body of water unless they came out of that body of water.
Fish

Barbels – a slender, whiskerlike tactile structure near the mouth. Fish that have barbels include catfish, carp, and sturgeon. They are used to search for food on bottom substrates.

Gill rakers – bony or cartilaginous structures which protrude from the gill arch.

Otoliths – “ear bones” or hard structures in the inner ear. They resemble opaque white crystals.

Viscera – internal organs.

Mollusks/Snails/Crustaceans:

Byssal threads – The long, fine, silky filaments excreted by several mollusks by which they attach themselves to the substrate.

Carapace – in crayfish, the largest segment of the shell around the forward part of the body.

Cardinal teeth – primary “teeth” in bivalve shells, found as small projections on the hinge of the shell.

Dextral – a dextral, or right-handed snail can be distinguished from a sinistral, or left-handed snail, by looking at the shell opening: if a shell is dextral, a right hand could be placed inside the shell with fingers curled around the inside of the shell and the thumb pointed upward toward the spire. If the opening is to the left, the shell is sinistral.

Opercula/operculum – a lid that closes the opening of the shell in some gastropods.

Sinistral – see dextral.
Alewife
(Alosa pseudoharengus)
French: Gaspareau

Size: 5-6 inches long (13-15 cm)

Characteristics:
- Silvery scales with a blue/green luster on dorsal portion
- Large black spot behind gill cover
- Lining of abdominal cavity is silver rather than black like the blueback herring
- Lower jaw protrudes past upper jaw
- Belly has a serrated edge where scales from each side meet and overlap
- No lateral line on body
- Deeply forked tail

Look Alikes: Other herring and pseudo herring species.

Habitat: Deep, open waters of lakes for most of the year; move inshore to spawn in spring and early summer. Native to the Atlantic Ocean and the spawning rivers of the Northeastern and Mid Atlantic Slope. Confirmed in Lake Champlain in 2003.

Distribution: Lake Champlain, Lake St. Catherine (VT), Lake Carmi (VT), and Green Pond (NY)

Lake Champlain alewife die-off.
Fish

Bighead Carp
(Hypophthalmichthys nobilis)
French: Carpe à grosse tête

Size: Typically identified by weight, up to 100 pounds (45 kg) and 4 feet long (1-2 m)

Characteristics:
• Deep bodied, laterally compressed fish
• Top of fish is dark gray which fades into an off-white color on the lower sides and belly
• Dark splotches cover body unlike the silver carp
• Scales are small like a trout, while head lacks scales
• Lower jaw protrudes past upper jaw
• Hooked anal fin
• Eyes closer to lower that upper side of head

Look Alikes: Most like silver carp. Minor resemblance to other carp and sucker species

Habitat: Prefer large rivers but can live in ponds and lakes. Native to Southern and Central China

Distribution: Not yet found in Lake Champlain Basin; present in the Mississippi River Drainage
**Common Carp**  
*(Cyprinus carpio)*  
French: *Carpe*

**Size:** Up to 4 feet long (1.2 m) and 80 pounds (36 kg)

**Characteristics:**
- Two barbels on each side of the mouth
- Serrated first dorsal and anal fin spines
- Goldish yellow color with a white belly

**Look Alikes:** Somewhat similar to native sucker species and nonnative tench

**Habitat:** Warm estuaries, lakes, water courses, or wetlands rich in organic matter to feed on; prefers water bodies with stagnant and slow-moving waters with sand and/or silt bottoms. Native to the Caspian, Black, and Aral Seas. Established in Lake Champlain 1980

**Distribution:**  
Throughout Lake Champlain and lower sections of tributaries and common throughout North America
Grass Carp
(*Ctenopharyngodon idella*)
French: *Amour blanc* or *carpe herbivore*

**Size:** Up to 39 inches long (100 cm); typically reaches 65-85 pounds (30-39 kg)

**Characteristics:**
- More slender than other carp
- Resembles common carp, but lacks a sucker-like mouth and barbels at the corner of its mouth
- Silvery white instead of yellowish brown like the common carp

**Look Alikes:** Non-native common carp

**Habitat:** Vegetated areas; reproduces in swift-moving, well-oxygenated waters

**Distribution:** Not yet found in Lake Champlain Basin; sterile population stocked in Augur Lake (NY). Native to Eastern Asia
Silver Carp
(*Hypophthalmichthys molitrix*)
French: *Carpe argentée*

**Size:** Up to 3 feet long (0.9 m)

**Characteristics:**
- Eyes point downward
- Up to 85 pounds (38.5 kg)
- Deep body that is laterally compressed
- Olive colored back and upper sides which fade to silver below the lateral line
- Small scales like a trout
- Stiff, serrated pectoral fins
- Dorsal fin is hooked and not serrated
- Lower jaw lacks teeth

**Look Alikes:** Most closely resembles the bighead carp

**Habitat:** Prefers rivers and streams where it swims close to surface and jumps out of water when startled

**Distribution:** Not yet found in Lake Champlain Basin; present in the Illinois River and throughout the Mississippi Drainage. Native to the East Asian Pacific Drainage (Russia to Vietnam)
Blueback Herring  
(*Alosa aestivalis*)  
French: *Alose d’été*

**Size:** 5-12 inches long (13-30 cm)

**Characteristics:**
- Looks similar to alewife, but has smaller eyes and blue dorsal fin
- Lining of abdominal cavity is black rather than silver like the alewife
- Black spot behind the gill cover
- No lateral line on body
- Forked tail
- Anal fin is longer than the dorsal fin

**Look Alikes:** Other herring and pseudoherring species

**Habitat:** Deep, open waters of lakes for most of the year; move inshore to spawn in spring and early summer

**Distribution:** Mostly found in southern Lake Champlain and in the Champlain Canal. Native to the Atlantic coast of North America. Found in Lake Champlain in 1978
Eurasian Ruffe
*(Gymnocephalus cernuus)*
French: *Grémille*

**Size:** Reaches 4-6 inches long (10-15 cm)

**Characteristics:**
- Olive brown or golden brown color on its back; whitish yellow belly
- Fused dorsal fins with 12-19 spines
- Dark spots between spines on front dorsal fin
- Sharp spines on pelvic and anal fins
- Looks similar to young walleye and yellow perch but lacks scales on its head
- Mouth turns down

**Look Alikes:** Young walleye and yellow perch but lacks scales on its head

**Habitat:** Turbid lakes with soft bottoms and little (or no) vegetation or rivers with slow-moving waters

**Distribution:** Not yet found in Lake Champlain Basin; present in the Upper Great Lakes. Native to Northern Europe and Asia
European Rudd  
*Scardinius erythrophthalmus*  
French: *Rotengle* or *gardon rouge*

**Size:** 12-18 inches long (30-45 cm)

**Characteristics:**
- Stout, deep-bodied fish with a forked tail and large scales
- Keel-like belly has 6-9 scales, unlike naked belly of the golden shiner
- Lower lip is sharply angled with a protruding lower jaw
- Back is a dark olive brown color
- Sides are brassy yellow, which fade into a silvery belly
- Pectoral, pelvic, and anal fins are a vivid reddish orange color
- Dorsal and caudal fins are reddish brown
- Eyes are often red or have a red spot

**Habitat:** Variety of habitats: slow streams, rivers, and vegetated areas of lakes and ponds

**Look Alikes:** Young rudd often resemble golden shiners

**Distribution:** Throughout Lake Champlain and several other lakes in the basin. Native to Western Europe and to the Caspian and Aral Sea basins. In Lake Champlain 1991
Gizzard Shad
(Dorosoma cepedianum)
French: Alose à gésier

Size: Up to 20 inches long (50 cm)

Characteristics:
• No lateral line on body
• Deeply forked tail
• Dorsal fin has a whip-like filament in the rear
• Juveniles have a large purple-blue spot just behind gill cover, faint or absent in adults
• Sides are silvery and may have blue, green, or red tints
• Rounded snout with blunt downward turned mouth

Look Alikes: Non-native alewife and other herring-like species

Habitat: Fresh water near the bottom; can be found in brackish water

Distribution: Mostly found in southern Lake Champlain. Northern range limited by cold water; natural range expansion has occurred into northern Massachusetts due to warming coastal waters. Native to Southern Great Lakes Region, Mississippi, Atlantic, and Gulf Slope drainages. Found in Lake Champlain 1993
Northern Snakehead
(*Channa argus*)
French: *Poisson à tête de Serpent*

**Size:** Up to 33 inches long (84 cm)

**Characteristics:**
- Sharp teeth, like a pike
- Pelvic fins are below pectoral fins and gills
- Anal fin extends from middle of body almost to the tail
- Light brown with dark brown patches covering the body
- Capable of breathing out of water (in moist environments) for up to seven days while searching for other bodies of water

**Look Alikes:**
Native bowfin and burbot

**Habitat:** Shallow, vegetated waters

**Distribution:** Not yet found in Lake Champlain Basin; present in the Delaware and Potomac River. Native throughout Asia and parts of Eastern Russia. drainages
Round Goby  
(*Neogobius melanostomus* [*Apollonia melanostomus*])  
French: *Gobie à taches noires*

**Size:** 4-9 inches long (10-23 cm)

**Characteristics:**
- Often confused with sculpins, but round gobies have a single, round pelvic fin, instead of a slender pair.
- Typically gray with brown or black spots covering them; young gobies lack these spots.
- In spring, may be black with yellow spots and fin margins.
- Front dorsal fin has a black spot on it and sometimes bears green tints.
- Often caught by hook and line.

**Look Alikes:** Native sculpins.

**Habitat:** Shallow, rocky substrate; deep water in fall and winter.

**Distribution:** Not yet found in Lake Champlain Basin; present in the Great Lakes, St. Lawrence River, and eastern Erie Canal. Native to the Black, Caspian, and Sea of Azur.
**Tench**
(Tinca tinca)
French: Tanche

**Size:** Range from 8-25 inches long (20-64 cm)

**Characteristics:**
- Resembles carp but has smaller scales
- Flat, stocky body covered with numerous deeply embedded scales which are smaller than pupil of eye
- Covered in thick coating of mucus
- Single pair of barbels (whisker-like organ) at mouth, instead of double pair like the common carp
- Fins are dark and rounded
- Olive colored with red eyes

**Look Alikes:** Non-native common carp

**Habitat:** Bottom feeder that lives in slow-moving waters that are rich in organic matter

**Distribution:**
Mostly found in northern Lake Champlain.
Native to Europe and parts of Western Asia.
Found in Lake Champlain 1999
Tubenose Goby
(Proterorhinus marmoratus [P. semilunaris])
French: Gobie à nez tubulaire

Size: Up to 4.5 inches long (11.5 cm)

Characteristics:
- Has a single, round pelvic fin, instead of a slender pair
- Often confused with round gobies, but tubenose gobies have long anterior nostrils that extend beyond lower lip and light black stripes rather than a black spot on dorsal fin
- Brown in color

Look Alikes: Similar to native sculpin species

Habitat: Shallow, rocky substrate; deep water in fall and winter

Distribution: Not yet found in Lake Champlain Basin; present in St. Lawrence River, and Great Lakes
**White Perch**  
*(Morone americana)*  
**French:** *Baret*

**Size:** 9-10 inches long (23-25 cm)

**Characteristics:**
- Body is deepest just ahead of dorsal fin
- When the spiny dorsal fin is pulled upright, the soft dorsal fin will also become erect
- First and second dorsal fins are the same length
- Thick spines on first dorsal fin
- Large, silver scales, outlined with darker pigment

**Look Alikes:** Non-native white bass, young striped bass (lateral stripes), and native freshwater drum

**Habitat:** Shallower waters of lakes, bays, and inshore areas

**Distribution:** Throughout Lake Champlain and lower sections of tributaries. Native to Atlantic Slope drainages from St. Lawrence-Lake Ontario drainage, Quebec, south to South Carolina. Found in Lake Champlain 1984
Sea Lamprey
(Morone americana)
French: Lamproie marine

Size: 30-70cm long (12-30 inches)

Characteristics:
- Greyish blue to dark brown body; large adults may be marbled; darker back with lighter belly
- Long, cylindrical, flexible body shape
- Two separate dorsal fins; no other fins
- Large, round, jawless mouth is a sucking disk filled with hard, hooked, sharp teeth

Look Alikes: Native American eel and silver lamprey

Habitat: Fresh water near the bottom; can be found in brackish water

Distribution: Throughout Lake Champlain and lower sections of tributaries. Marine, but ascends freshwater to spawn along the U.S. Atlantic coast as well as Atlantic coast of Europe and Mediterranean Sea. Present in Great Lakes and Lake Champlain. Found in Lake Champlain 1929
Generalized Clam Anatomy

- **Outer Shell**
  - Shell ridges

- **Inner Shell**
  - Umbo
  - Cardinal teeth
  - Adductor muscle scars
  - Ventral edge
  - Pallial Line

Generalized Snail Anatomy

- **Right-handed spiral**
  - Spirals forming whorls
  - Body whorl
  - Lip
  - Apex
  - Spire
  - Sutures
  - Aperture (operculum covers if present)

- **Left-handed spiral**

LCBP
Asian Clam
(Corbicula fluminea)
French: Petite corbeille d’Asie

Size: Up to 2 inches long (5 cm)

Characteristics:
• Shells are typically greenish-yellow or brown with thick concentric rings running around them
• Inside of shell is smooth and polished with a light purple tinge
• Three cardinal teeth (see photo) in each valve (native unionid mussels have none)
• Thick symmetrical shell

Look Alikes: Native pea and fingernail clams

Habitat: Prefer sandy lake and river bottoms but may be found mixed in with plant growth

Distribution: Native to Southern Asian, Africa, and parts of Australia. Found in the Mississippi drainage, and present in Lake George, NY (2010), Lake Bomoseen (2016), and the Champlain Canal
Banded Mystynasnail
(Viviparus georgianus)
French: Vivipare géorgienne

Size: 0.75 to 1.75 inches long (1.9-4.4 cm) and approximately .75-1.5 inches wide (1.9-3.9 cm)

Characteristics:
- 0-4 dark red spiral bands on shell
- Shell color varies from yellow to olive in color
- Bear live young instead of eggs
- Has a calcareous plate that covers the opening of the shell (operculum)

Look Alikes: Non-native Chinese mystery snail

Habitat: Flowing rivers and streams or in proximity to flowing water, such as river mouths

Distribution: Native to southeastern and midwestern United States. Found in the Hudson drainage and detected in Lake Champlain in 1962. Present in many waters throughout the Lake Champlain Basin
Chinese Mystereysnail
(Cipangopaludina chinensis malleata)
French: Vivipare chinoise

Size: Can reach 2.5 inches (64 mm)

Characteristics:
• Shell has up to seven whorls
• Females are livebearers giving birth to crawling young
• Has a calcareous plate that covers the opening of the shell (operculum)

Look Alikes: Native snails may appear similar

Habitat: Slow-moving freshwater rivers, streams, and lakes with soft, muddy or silty bottoms

Distribution: Native to Southeast Asia, Japan, and eastern Russia. Found throughout the Northern Mississippi drainage, rivers of the Pacific slope drainage, and the Northeastern United States with pockets throughout the United States. Detected in Lake Champlain in 2002 and present in many waters throughout the Lake Champlain Basin.
**Mud Bithynia, Faucet Snail**
*(Bithynia tentaculata)*
French: Bulime or Bithynie impure

**Size:** Up to 0.5 inches long (13 mm)

**Characteristics:**
- Smooth shells that taper to a point
- Shell has five whorls

**Look Alikes:** Many small native snails appear similar

**Habitat:** Shallow waters, often attached to rocks and other objects; commonly found in freshwater ponds, shallow lakes, and canals

**Distribution:** Native to Europe. Found throughout the Great Lakes Basin and parts of Montana. Detected in Lake Champlain in 1883 and later found in Arrowhead Mountain Lake (VT)
New Zealand Mudsnail
(*Potamopyrgus antipodarum*)
French: *Nase de Nouvelle-Zélande*

**Size:** 0.2-0.3 inches long (5-8 mm)

**Characteristics:**
- Right-handed spiral with 7-8 whorls in shell
- Light to dark brown shell

**Look Alikes:** Many small native snails as well as the nonnative faucet snail already present in the basin

**Habitat:** Prefers shallow slow-moving, fresh water streams, rivers, and lake habitat with silt and organic matter substrates

**Distribution:** Native to New Zealand and adjacent small islands. Found throughout the western United States and in limited locations in the Lake Erie and Ontario watersheds. Not yet found in Lake Champlain Basin
Quagga Mussel

*{Dreissena bugensis}*

French: *Moule quagga*

**Size:** Up to 1.5 inches long (4 cm)

**Characteristics:**
- Small freshwater bivalve, often confused with zebra mussel
- Topples over when placed on flat surface because of its convex ventral side, unlike the zebra mussel
- Usually attached to objects, surfaces, or other mussels using byssal threads on the bottom of shell
- Rounder than zebra mussel
- Color bands vary from black, cream, to white
- Typically has dark rings over its shell that lighten near hinge

**Look Alikes:** Non-native zebra mussels

**Habitat:** Hard or soft substrates of freshwater lakes, rivers, and reservoirs to depths of 130 meters, avoiding direct sunlight; overlaps with and extends below depths preferred by zebra mussel

**Distribution:** Native to the Dneiper River drainage of Ukraine and Ponto-Caspian Sea. Found in limited locations throughout the United States, although more prevalent in the Great Lakes extending into the Erie Canal and St. Lawrence River. Not yet found in Lake Champlain Basin
Zebra Mussel
(Dreissena polymorpha)
French: Moule zébrée

Size: Less than 2 inches long (5 cm)

Characteristics:
- Small shellfish with a striped pattern on shells
- Color patterns can vary greatly: light to dark colored shells with many or no stripes at all
- Usually attached to objects, surfaces, or other mussels using byssal threads on the bottom of shell
- Often confused with the quagga mussels, but the zebra mussel is stable on a flat surface, while the quagga mussel will topple over when laid down

Look Alikes: Non-native quagga mussel

Habitat: Hard or soft substrates of freshwater lakes, streams, and reservoirs, avoiding direct sunlight

Distribution: Native to the Black, Caspian, and Azov Seas. Found throughout the Mississippi, Great Lakes, and Saint Lawrence River drainage systems and in limited bodies of water in the western United States. Detected in Lake Champlain in 1993, also found in limited sites in Lake George (NY) and Lake Bomoseen (VT)
Generalized Crustacean Anatomy

- Dactyl (thumb)
- Palm
- Rostrum (top plate)
- Areola (if present)
- Carapace
- Abdomen
- Telson (tail)
- Antenna
- Claw
Bloody-red Shrimp
(*Hemimysis anomala*)
French: *Hemimysis anomala*

**Size:** Generally less than 0.5 inches (1.2 cm)

**Characteristics:**
- Telson or ‘tail’ has flat end with two prominent terminal spines (photo A), unlike telson of native *Mysis diluviana* which is forked (photo B)
- Spends daylight hours hiding in rocky crevices, but occasionally swarms near the surface

**Look Alikes:** Native mysis species such as the opossum shrimp (*M. diluviana*)

**Habitat:** Slow moving water over hard substrates, including rocks and shells; usually found near shore (unlike native *M. diluviana* which is found in pelagic environments) but can be found to depths of 165 feet (50 m)

**Distribution:** Native to freshwater margins of the Black Sea, the Azov Sea and the eastern Ponto-Caspian Sea. Not yet found in Lake Champlain Basin; present in the Great Lakes, Erie Canal, and Montreal Harbor near the St. Lawrence River
Chinese Mitten Crab  
(Eriocheir sinensis)  
French: Crabe chinois à mitaine

Size: Up to 3 inches long (7.5 cm)

Characteristics:
• Dense patches of hair on white tipped claws
• Claws are equal in size
• Shells have four spines on each side
• Legs are typically twice as long as width of carapace
• Light brown

Look Alikes: None

Habitat: Juveniles are born in brackish water in late spring and move to fresh water

Distribution: Native to the Pacific coast of China and Korea. Not yet found in Lake Champlain Basin; present in the Chesapeake Bay, Delaware Bay, Hudson River as far north as Albany, Eastern Great Lakes, the St. Lawrence River, and a few locations along the Western US Coast
Fishhook Waterflea
(Cercopagis pengoi)
French: Puce d’eau en hameçon

Size: Less than 0.5 inches at maturity (12 mm)

Characteristics:
• Long barbed tail filament which makes up 80% of total body length
• Tail can have between 1-4 pairs of barbs running down it
• Four pairs of legs, the first being the longest
• Often collect on fishing lines and downrigger cables
• Unique loop at the end of the tail

Look Alikes: Spiny waterflea

Habitat: Cold, open (pelagic) waters

Distribution: Native to the Black, Caspian, Azov, and Aral seas of Europe and Asia. Found in Lake Champlain in 2018; present in the Great Lakes, Finger Lakes, and the St Lawrence River
Rusty Crayfish
(Faxonius rusticus)
French: Écrevisse à taches rouges

Size: Up to 5 inches long (13 cm)

Characteristics:
- Dark reddish spot on either side of the carapace distinguishes rusty crayfish from other crayfish
- Strong, smooth claws, which are larger than most other species
- Claws can be a brownish olive color or a reddish brown color with black tips
- Claws have an oval gap when closed
- Very hardy creature that can live in both fast and slow-moving waters

Habitat: Depends on well-oxygenated waters in lakes, ponds, and streams. Prefers cobble habitats with rocks, logs, and other debris for shelter

Look Alikes: Difficult to distinguish from, but typically larger than, native crayfish species in the Basin

Distribution: Native to the Ohio River Basin. Present across the Great Lakes and Northeast region. Present in the Lake Champlain Basin and documented in Lake Carmi and the Winooski drainage in Vermont
**Spiny Waterflea**
*(Bythotrephes longimanus)*
French: *Cladocère épineux*

**Size:** Less than 0.5 inches at maturity (12 mm)

**Characteristics:**
- Spiny waterflea is a crustacean, not a flea
- Long barbed tail filament which makes up 70% of total body length
- Tail can have between 1-4 pairs of barbs running down it
- Four pairs of legs, the first being the longest
- Often collect on fishing lines and downrigger cables (see photo)

**Look Alikes:** Fishhook waterflea

**Habitat:** Cold, open (pelagic) waters

**Distribution:** Native to Northern Europe and Asia. Widely distributed throughout the Great Lakes. Present in Lake Champlain (2014), Lake George, NY and a few other Adirondack lakes; also detected in the Champlain Canal in 2012
White River Crayfish  
(*Procambarus acutus acutus*)  
French: *Écrevisse blanche de rivière*

**Size:** Adults are 3-4 inches long (7.5-10 cm)

**Characteristics:**
- Black V-shaped stripe on abdomen  
- Dark red or burgundy color  
- Juveniles are gray with dark spots spread over carapace  
- Rough carapace is split in middle by a gap called the areola  
- Long, slender claws

**Look Alikes:** Difficult to distinguish from native crayfish species without close examination

**Habitat:** Prefers shallow rivers, creeks, and ditches with moderate flows

**Distribution:** Native to the Atlantic slope from Maine to Georgia, and the southern Great Lakes drainages south to the Gulf of Mexico. Patchy distribution throughout Eastern US, but not yet found in Lake Champlain Basin
Red Swamp Crayfish
(Procambarus clarkii)
French: Écrevisse de Louisiane

Size: Adults are 2-5 inches long (5.5-12 cm)

Characteristics:
• Typically dark red in color
• Lines or ridges of the carapace join in the middle of the back (areola gap absent).
• Long, slender claws covered with red, white or black bumps
• Juveniles are brown with black, grey, white or red spots spread over carapace

Look Alikes: Difficult to distinguish from native crayfish species without close examination

Habitat: Variety of permanent freshwater habitats. They burrow deep into the shoreline soils and create large mounds of soil at the opening of the burrow

Distribution: Native to Gulf coastal plain from Florida panhandle to Mexico and stretching north to southern tip of Illinois. Detected in the Atlantic and Pacific slope drainages. Not yet found in the Lake Champlain basin
GUIDE TO AQUATIC INVASIVE PLANTS
Plant Parts

**Flower Parts**

- petal
- sepal
- pistil
- stamen
- perianth
- stigma
- style
- anther
- filament
- petal
- sepal
- perianth

**Stems**

- stipule
- bud
- stem
- midrib
- axil
- internode
- blade
- petiole
- node
- culm
- blade
- node
- sheath
- stolon
- rhizome

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Brazilian Elodea

*Egeria densa*

French: *Elodée du Brésil*

**Characteristics:**
- Submersed rooted perennial
- Leaves are less than 1 inch long (2.5 cm) and can be slender or oblong; occur in whorls of 3-6 and margins have minute serrations
- Flowers are inconspicuous, with 3 white petals and 3 green sepals; reach to or above the water surface
- Stems reach 6 feet (2 m) in length and branch profusely at the water surface, forming thick mats
- Often confused with hydrilla (*Hydrilla verticillata*), but lacks conspicuously toothed leaf margins and tubers
- Spreads from stem fragmentation

**Look Alikes:** Native elodea

**Habitat:** Grows in lakes, rivers, and streams

**Distribution:** Native to South America. Not yet found in Lake Champlain Basin; present in New Hampshire, Massachusetts, and New York
Brittle Naiad
(Najas minor)
French: Petite Naiade

Characteristics:
• Submersed annual aquatic plant
• leaves are in pairs along the stem
• Leaves are 1 to 2 inches long, stiff and brittle
• Leaf margins have minor serrations visible to the naked eye
• Leaves are subopposite but appear to be whorled
• Leaves are 0.3-0.5 mm wide
• Flowers grow along the leaf axils
• Spread by easily fragmenting stems and seed dispersal

Look Alikes: Native naiads

Habitat: Grows in alkaline waters of streams, ponds, and lakes

Distribution: Native to Europe, western Asia, and northern Africa. Currently found in a limited number of waterbodies in the basin including Lake Champlain (1960), Waterbury Reservoir and Lake George (2000)
Common Reed
(*Phragmites australis*)
French: *Roseau commun*

**Characteristics:**
- Large perennial grass that grows up to 15 feet tall (4.5 m)
- Large stalk can be 1 inch thick (2.5 cm)
- Large feathery plumes of flowers that change from a purple-brown color in July to tan or grey later in the season
- Long, sharp, bluish-green leaves grow up to 2 feet long (61 cm) and 2 inches wide (5 cm)
- Feathery, plume-like flower heads with individual clusters of small purple-brown flowers that change to tan or grey at the end of the season; flowers less than 1 inch long (2.5 cm)
- Difficult to distinguish from native genotype
  Any new populations should be reported
- Spreads mainly by fragmentation and elongation of rhizomes (underground stems); occasional establishment of new populations may occur from seed

**Look Alikes:** Native phragmites.

**Habitat:** Grows in lakeshores, marshes, bogs, fens, wet meadows, and roadside ditches

**Distribution:** Native to Europe. Introduced to the east coast of the United States between late 1700s and early 1800s; it has been gradually expanding westward. Found throughout the Lake Champlain Basin
Curly-leaf Pondweed
(Potamogeton crispus)
French: Potamot crispé

**Characteristics:**
- Submersed, perennial, aquatic plant
- Leaves reddish-green, waxy with finely-toothed margins and wavy edges, translucent with 3 main veins
- Leaves alternate along stem, 1.5-4 inches long (4-10 cm) and 0.2-0.4 inches wide (5-10 mm)
- Flattened branching stems grow up to 6 feet long (1.8 m)
- Tiny, inconspicuous flowers arranged in spikes
- Spreads by turions (burr-like, vegetative winter buds); one plant may produce hundreds of new plants

**Look Alikes:** Native pondweeds

**Habitat:** Grows in lakes, ponds, rivers, and streams

**Distribution:** Native to Eurasia, Africa, and Australia. Lake Champlain and many other water bodies in the basin; in Lake Champlain since early 1900s
Eurasian Watermilfoil
(Myriophyllum spicatum)
French: Myriophylle à épi

**Characteristics:**
- A submersed, aquatic perennial plant
- Feather-like leaves grouped in 3 to 6 whorls around the stem
- Each leaf is divided into paired leaflets, generally 10-20 pairs per leaf; native watermilfoils typically have fewer leaflet pairs
- Blunt ends of leaf look as though they were snipped by scissors
- Individual stems branch several times as they near the surface
- Shoots are reddish brown near surface
- Small reddish flowers blossom in July and August
- Plant will go limp when removed from water
- Spreads primarily by rooting of plant fragments

**Look Alikes:** Native milfoil species and non-native variable-leaved milfoil

**Habitat:** Grows in lakes, rivers, and ponds at depths of 3 feet (0.9 m) or more

**Distribution:** Native to Europe, Asia, and northern Africa. Throughout Lake Champlain and many water bodies in the basin. In Lake Champlain 1960s
European Frogbit
*(Hydrocharis morsus-ranae)*
French: *Hydrocharide grenouillette*

**Characteristics:**
- Free-floating aquatic plant of open water marshes and standing pools of swamps
- Small white flowers with three white petals open just above the water surface
- Well developed root system that tangles around other plants or themselves to form dense patches
- Round heart-shaped leaves float on surface and are 0.5-2.5 inches long (1.3-6.3 cm)
- Resembles native American frogbit (*Limnobium spongia*), but the native species has a convex layer of spongy, gelatinous, red tinged tissue beneath the leaf
- Reproduction is most often vegetative via spreading stems and winter vegetative buds (turions)

**Look Alikes:** Native pond lilies

**Habitat:** Grows in lakes, rivers, and marshes

**Distribution:** Native to Europe and northern Asia. Widespread in Lake Champlain and the basin with documentation in the southern Lake, the islands region, Missisquoi Bay, the Winooski River delta, and Shelburne Pond, VT; documented in Lake Eaton, Rogers Pond, and Westport in Essex County, NY. In Lake Champlain in 1993
Fanwort  
(*Cabomba caroliniana*)  
French: *Cabombe de Caroline*

**Characteristics:**
- Rooted perennial with submersed opposite (but appearing whorled) leaves
- Submersed leaves are finely divided and fan-like
- Also has inconspicuous oblong floating leaves
- Stems are tubular, long and multi-branched, 6 to 30 feet long (2-9 m)
- White or pink flowers 0.5 inches long (1.3 cm) reach above water surface
- Spreads primarily by stem fragments or rhizomes

**Look Alikes:** Native water marigold and crowsfoot

**Habitat:** Grows in ponds, lakes, and quiet streams

**Distribution:** Native to southern Brazil, Paraguay, Uruguay, northeast Argentina, southeastern United States. Not yet found in Lake Champlain Basin; present in various lakes in New Hampshire, the Adirondack Park, Massachusetts, and Connecticut
Flowering Rush  
(*Butomus umbellatus*)  
French: *Butome à omelle*

**Characteristics:**
- Emergent or submersed plant
- Can grow three feet high on land (0.9 m) and up to 10 feet in water (2.7 m)
- Flowers grow in umbrella-shaped clusters, each flower has three pinkish-white petals
- Green stems are triangular in cross section
- Leaf tips are spirally twisted
- Leaves are grass-like on land, and ribbon-like underwater
- Dark brown, beaked fruits are 0.4 inches long (1 cm)
- Reproduction occurs by seeds or vegetative spread of rootstocks

**Look Alikes:** Native rush species when no flowers present

**Habitat:** Grows in lakes and rivers as submerged plant; on lakeshores and riverbanks as emergent

**Distribution:** Native to Africa, Asia, and Eurasia. Throughout Lake Champlain Basin; in Lake Champlain since the 1920s
**Hydrilla**  
*(Hydrilla verticillata)*  
French: *Hydrilla*

**Characteristics:**
- Submersed, rooted perennial
- Whorls of 3-8 slender leaves
- Undersides of leaves may have spines; leaf edges have serrations or small spines
- Midrib of leaf is reddish
- Small, inconspicuous white flowers
- Can be distinguished from Brazilian elodea (*Egeria densa*) and American water weed (*Elodea canadensis*) by its tubers, which are off-white to yellowish, potato-like structures buried in the sediment, 0.2-0.4 inches long (0.5-1 cm)
- Stems grow up to 25 feet long (7.6 m), branch heavily, and form thick mats on the water surface
- Reproduces mainly by re-growth of stem fragments; also reproduces by growth of vegetative buds (turions) and subterranean tubers

**Look Alikes:** Native elodea and non-native Brazilian elodea

**Habitat:** Grows in lakes, rivers, ponds, canals, and drainage ditches

**Distribution:** Native to India and Korea. Not yet found in Lake Champlain Basin; present in a limited number of ponds in Maine, Connecticut and Connecticut River, Massachusetts, New York and the Erie Canal
**Japanese Knotweed**  
*(Fallopia japonica)*  
French: *Renouée japonaise*

**Characteristics:**
- Large, hardy perennial
- Forms dense thickets
- Stems are hollow, stout, reddish brown, and between 4-9 feet tall (1.2-2.7 m)
- Leaves are 2-6 inches long (5-15 cm) and about 2/3 as wide as long
- Egg-shaped leaves come to a point at tip
- Small flowers vary from creamy-white to greenish-white
- Flowers appear in elongate clusters in late summer
- Shiny black fruit is 3-sided
- Reproduction is primarily vegetative with new shoots developing from extensive rhizomes (underground stems) and by seeds

**Look Alikes:** None

**Habitat:** Often found in yards, roadside ditches, and river banks

**Distribution:** Native to Eastern Asia. Throughout Lake Champlain Basin especially along river corridors. In Lake Champlain Basin since late 1800s
Parrot Feather
(Myriophyllum aquaticum)
French: Myriophylle aquatique

Characteristics:
• Submersed, rooted perennial
• Emergent grey-green, stiff leaves, arranged in whorls of 4-6
• Submersed leaves are limp and feather-like, divided into 24-36 thread-like leaflets, often appear to be decaying
• Flowers white to pinkish
• Stems are brownish and rarely branch; can grow to 7 feet (2.1 m) and protrude up to 8 inches (20 cm) above the water surface
• Forms thick mats at the surface of the water
• Spreads from stem fragmentation

Look Alikes: Native and non-native milfoil species

Habitat: Grows in lakes, ponds, and rivers

Distribution: Native to the Amazon River basin in South America. Not yet found in Lake Champlain Basin; present in a limited number of waterbodies in Massachusetts, New York, and Connecticut
Purple Loosestrife
(Lythrum salicaria)
French: Salicaire pourpre

**Characteristics:**
- Erect perennial plant, 1.5-5 feet tall (0.45-1.5 m)
- Magenta flowers blossom in spikes 4-16 inches long (0.1-0.4 m) from July to September
- Lance shaped leaves up to 4 inches long (10 cm)
- Leaves are simple, entire, opposite and in whorls of three
- Stem is square
- Each flower has 5 to 7 petals arising from a cylindrical green tube
- Spreads primarily by seeds, can re-sprout from broken roots following incomplete removal of stem

**Look Alikes:** Native Fireweed and Blue Vervain

**Habitat:** Grows in moist or marshy areas, along river banks, wetlands, or lake edges

**Distribution:** Native to Eurasia. Throughout Lake Champlain Basin. In Lake Champlain since late 1800s
Starry Stonewort  
*(Nitellopsis obtusa)*  
French: *Unknown*  

**Characteristics:**  
- The smooth main stem has whorls of 4 to 8 branches.  
- Branches often grow branchlets (bracts) which are shorter than the branches. This is unique among the stonewort species.  
- Small white star shaped bulblets may be present at the base of the plant attached to translucent rootlets.

**Look Alikes:** Native stoneworts, muskgrasses, fine-leaved pondweeds, and water stargrass

**Habitat:** Grows in water from a few inches to 30ft deep in pillow-like mats. Can tolerate low light conditions and may grow under the ice. Prefers water with high mineral content and often found in shallow still waters and near boating accesses.

**Distribution:** Found throughout the temperate region of the Eurasian continent from Western Europe to Eastern Asia. Present in the Great Lake states. Found in Lake Memphremagog/Saint Frances River drainage and in Derby Lake, Vermont.
Variable-leaved Watermilfoil
(Myriophyllum heterophyllum)
French: Myriophylle à feuilles variées

Characteristics:
• Rooted, submersed and emergent perennial aquatic plant
• Leaves finely divided, resembling a feather; arranged in whorls of 4 to 6 around the stem
• Emergent leaves are long and slender with serrated margins
• Flowers grow from the base of the emergent leaves and form an erect spike
• Spreads through fragmentation, roots, winter buds, and seeds (but to a lesser extent)
• Looks like a bottle brush

Look Alikes: Native milfoil and non-native Eurasian water milfoil

Habitat: Grows in ponds, lakes, and streams

Distribution: Northern Lake Champlain and several lakes in the Adirondack Park, southern Maine, and New Hampshire. Native to Southeast and Midwest United States. In Lake Champlain since 2009
Water Chestnut  
(*Trapa natans*)
French: *Châtaigne d’eau*

**Characteristics:**
- Rooted annual aquatic plant with both submerged and surfacing leaves
- Surfacing leaves are waxy and triangular with toothed edges
- Submersed leaves are feathery and whorled around the leaf stalk
- White flowers blossom from July until first frost
- Nut-like fruit that bears 4 sharp, inbarbed points
- Stems branch and can grow up to 16 feet long (4.8 m)
- Reproduces by over-wintering seeds

**Habitat:** Grows in slow-moving, nutrient-rich waters

**Distribution:** Southern Lake Champlain and its tributaries with satellite populations in MNWR and Black Creek Marsh, Lake Bomoseen (VT) and Lake Alice and Hadlock Pond (NY), and several other lakes and ponds in the basin. Native Range: Europe, Asia, and Africa. In Lake Champlain since the 1940s
Water Hyacinth
(Eichhornia crassipes)
French: Jacinthe d’eau

**Characteristics:**
- Perennial free-floating plant with dark feathery roots
- Spongy, glossy green leaves form rosettes and are inflated at the base with a rounded edge
- Showy lavender-blue with a yellow blotch flowers on a spike above the rosette
- Fruit is a capsule with many seeds
- Reproduces through fragmentation of stolons, root system, and by seeds

**Look Alikes:** Native pickerel weed

**Habitat:** Grows in a variety of freshwater systems. Is not tolerant to long periods of temperatures below freezing

**Distribution:** Native Range: Upper Amazon basin in South America. Not yet established in the Lake Champlain basin; has been reported in many states throughout the country including New York, Massachusetts, and Connecticut
Yellow Floating Heart
(Nymphoides peltata)
French: Fauz-nymphéa à feilles peltées

**Characteristics:**
- Rooted perennial aquatic plant
- Bright, yellow flowers, approximately 1 inch wide (2.5 cm)
- 2-5 flowers from each stalk
- 5 petals per flower that are fringed on the edges
- Petal arrangement resembles the spokes of a wheel
- Heart-shaped floating leaves with fringed edges and purple undersides
- The fruit is a 1-inch long (2.5 cm) beaked capsule filled with flat seeds
- Creates dense patches in slow-moving waters
- Reproduces by seed and vegetatively by broken stems (w/ leaves) and by stolons

**Look Alikes:** Native lily species

**Habitat:** Grows in shallow, quiet bays of lakes, ponds, and rivers

**Distribution:** Limited areas of southern Lake Champlain. Native Range: native to Eastern Asia and the Mediterranean. In Lake Champlain since 1963
Yellow Flag Iris
(Iris pseudacorus)
French: Iris faux-acore

Characteristics:
• Rooted perennial plant that expands quickly via rhizomes which can persist for over ten years in soil and survive more than three months if dried
• 10-35” long and 1.2” wide sword-like leaf blades are flat, erect and linear with a raised midrib and dark to blue-green in color
• Flowers (late-May to early-July) are pale to bright yellow or cream colored and 2.5-4” wide. 4-12 flowers per stem. flowers occasionally have brown/purple veins
• A large seed pod, containing dozens of seeds densely arranged in three rows, is three-sided and angular and turns from glossy green to brown as it ripens from August through October
• Can form dense monotypic stands that reduce habitat, displace native species, compact soil, and clog streams. All parts of the plant are toxic to livestock and other animals
• It’s known to be able to remove metals from wastewaters
• When not in bloom, it might be confused with native irises or the larger typha (cattail) species which look similar in structure and height

Look Alikes: Native blue flag iris

Habitat: Grows along the edges of streams and ponds, in open and forested flood plains, along shorelines, and in freshwater and brackish marshes

Distribution: Widely distributed across the Basin. Native Range: native to temperate regions of Europe, Asia, and northern Africa. Imported to North America as an ornamental plant in late 1700s. Found in Lake Champlain as early as 1909
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