



# SECTION #8

## Appendices





## Appendix A: Selected AIS Information Fact Sheet Links

Section 3 of this handbook lists 14 AIS species of particular interest in New York State. For information and mapping on these and other AIS species, visit the [New York Invasive Species Clearinghouse](http://nyis.info) website at <http://nyis.info> and the US Geological Survey Non-Indigenous Aquatic Species website: <http://nas.er.usgs.gov>.

Click on the species' common names below to link to the online fact sheet for that species; see Appendix B for a link to [iMapInvasives.org](http://iMapInvasives.org) New York distribution maps for each species.

### AQUATIC INVASIVE PLANTS

Common Name	Scientific Name
<a href="#">Curly-leaf pondweed</a>	<i>Potamogeton crispus</i>
<a href="#">Eurasian water-milfoil</a>	<i>Myriophyllum spicatum</i>
<a href="#">European frogbit</a>	<i>Hydrocharis morsus-ranae</i>
<a href="#">European water chestnut</a>	<i>Trapa natans</i>
<a href="#">Fanwort</a>	<i>Cabomba caroliniana</i>
<a href="#">Hydrilla/Water thyme</a>	<i>Hydrilla verticillata</i>

### AQUATIC INVASIVE ANIMALS

<a href="#">*Asian carp</a>	<i>Hypophthalmichthys spp.</i>
<a href="#">Asian clam</a>	<i>Corbicula fluminea</i>
<a href="#">Northern snakehead</a>	<i>Channa argus</i>
<a href="#">Quagga mussel</a>	<i>Dreissena rostriformis bugensis</i>
<a href="#">Round goby</a>	<i>Neogobius melanostomus</i>
<a href="#">Rusty crayfish</a>	<i>Orconectes rusticus</i>
<a href="#">Spiny waterflea</a>	<i>Bythotrephes longimanus</i>
<a href="#">Zebra mussel</a>	<i>Dreissena polymorpha</i>

*\*Asian carp is a Watch List species; it is not currently identified in New York State waters as of May 2014.*



Appendix A: Example of AIS Fact Sheet: Asian Carp, p. 1-2 only

**NEW YORK** INVASIVE SPECIES INFORMATION

The New York Invasive Species Clearinghouse

**Asian carp** (*Hypophthalmichthys* spp.)

Ecological Impacts & Risks Economic Impacts Prevention

**Introduction and Spread**

In North America, the term “Asian carp” typically refers to two species of invasive fish introduced from Asia: the bighead, or “bigheaded” carp (*Hypophthalmichthys nobilis*) and the silver carp (*Hypophthalmichthys molitrix*). These “bigheaded carp” are native to China. They were originally imported into the southern United States in the 1970s to provide an inexpensive, fast-growing addition to fresh fish markets. They also served to help keep aquaculture facilities clean. By 1980 the carp were found in natural waters in the Mississippi River Basin. As they have moved north through the Basin they have overwhelmed the Mississippi and Illinois River systems where Asian carp now make up more than 95% of the biomass in some areas. Silver carp can now be found in 12 states. Bighead and silver carp are currently in the Illinois River, which is connected to the Great Lakes via the Chicago Sanitary and Ship Canal.



Key bighead carp identification indicators (David Riecks, University of Illinois/Illinois-Indiana Sea Grant)



Key silver carp identification indicators (David Riecks, University of Illinois/Illinois-Indiana Sea Grant)

Two other species of carp imported to the United States from Asia can also become invasive in the wild, the grass carp (*Ctenopharyngodon idella*) and the black carp (*Mylopharyngodon piceus*). The herbivorous grass carp, indigenous to eastern Asia where it is cultivated for food, was introduced to the United States to control aquatic weeds in lakes and waterways. The molluscivorous black carp (i.e., feeding on snails, clams, mussels, and other mollusks) is a native of China where it is cultivated for medicinal purposes and as a food source. It was introduced to the United States to provide snail control in aquaculture settings. By the 1990s the grass carp had escaped from cultivation into the wild and can now be found in waters within or adjacent to 45 states where they are considered a threat to natural vegetation. Black carp have also escaped and are now in several locations along the Missouri and Lower Mississippi River Basins.

**Appendix A: Example of AIS Fact Sheets: Asian Carp, p. 1-2 only**

*The following text from the Asian carp (*Hypophthalmichthys spp.*) fact sheet at [NYIS.info](http://NYIS.info).*

**Ecological Risks and Impacts of Asian Carp**

Silver and bighead carp are filter-feeders which feed on plankton (drifting animal, plant, or bacteria organisms that inhabit the open waters of waterbodies), with an apparent preference for bluegreen algae). Asian carp can dominate native fisheries in both abundance and in biomass. Bighead carp can reach 110 pounds, although 30 to 40 pounds is considered average (silver carp are generally smaller). Bighead carp can live over 20 years, maturing at about 7 years. Asian carp can consume 5 to 20 percent of their body weight per day. As most native fish feed on plankton during their larval and juvenile life stages (and some native fish remain planktivorous for life), this high level of feeding on plankton by Asian carp can have serious impacts on the stability of the food web, with bighead carp potentially outcompeting native fish while eliminating the main source of food for larval fish and native planktivorous fish. Native fish considered most at risk include ciscos, bloaters, and yellow perch, which serve as prey to important predatory sportfish including lake trout and walleye.

**The Great Lakes provide a wide range of habitat types which would serve as good spawning, recruitment, and maturation areas for Asian carp.** Spawning habitat could be provided in the flowing waters of Great Lakes tributaries, while young Asian carp prefer warm, biologically productive, backwaters and wetlands. When not feeding on plankton, Asian carp have been known to feed on detritus and root in the bottom of protected embayments and wetlands. This disturbance could have significant impacts on Great Lakes wetlands and shoreline vegetation which provide spawning habitat for native fish and breeding areas for native waterfowl.

Black carp, being molluscivores, are not a threat to plankton. Should black carp reach the Great Lakes from the Mississippi Basin, however, they could become a threat to native Great Lakes native clam, snail, and mussel populations (particularly those that are rare or endangered), as well as to lake sturgeon (another molluscivore). Black carp can grow to more than 100 pounds and a length of up to seven feet.

**In their native habitats, populations of Asian carp are held in check by natural predators. Unfortunately, there are no native Great Lakes fish species large enough to prey on adult Asian carp.** White pelicans and eagles have been observed feeding on juvenile Asian carp in the Mississippi Basin. The pelicans, found in the western reaches of the Great Lakes and eagles throughout the Basin may be expected to do the same. Native predatory fish such as largemouth bass may feed on juvenile Asian carp. Given the growth rates of Asian carp, many juveniles can be expected to grow too large too quickly for fish predation to be a significant pressure to hold down carp populations.

Once populations of Asian carp become established with recruitment of young fish exceeding mortality, eradication is considered to be difficult if not impossible. Populations might be minimized in some areas by denying access to spawning tributaries via construction of migration barriers, but this is an expensive proposition which may inadvertently result in negative impacts on native species.

**The best control of Asian carp is to prevent their introduction into the Great Lakes.**



## Appendix B: Selected AIS New York Distribution Maps

Section 3 of this handbook lists 15 AIS species of particular interest in New York State. New York distribution maps for those species follow, with the exception of Asian carp which has not yet been identified as being in New York waters.

The maps included here were taken from the [iMapInvasives.org](http://iMapInvasives.org) website as of May 2014 and represent sightings only up to that point in time. **As noted in the Key in each map**, the numbers indicate the number of sightings, red circles indicate combined source-vetted sighting, orange squares indicated additional approximate locations of sightings yet to be precisely mapped as of the date of each map.

iMap invasives.org is an online, interactive, GIS-based data management system assisting citizen scientists and natural resource managers working to protect resources from the threat of invasive species. It is also an online tool for invasive species reporting. **To view up-to-date versions of the maps** included here or of any invasive species map in NYS along with more detailed maps showing the impacted water bodies, you can visit NY iMapInvasives at [www.nyimainvasives.org/request-login](http://www.nyimainvasives.org/request-login) to request an account.

For information and mapping on other AIS species, visit the [New York Invasive Species Clearinghouse website](http://nyis.info) at <http://nyis.info> and the [US Geological Survey Non-Indigenous Aquatic Species website](http://nas.er.usgs.gov): <http://nas.er.usgs.gov>.

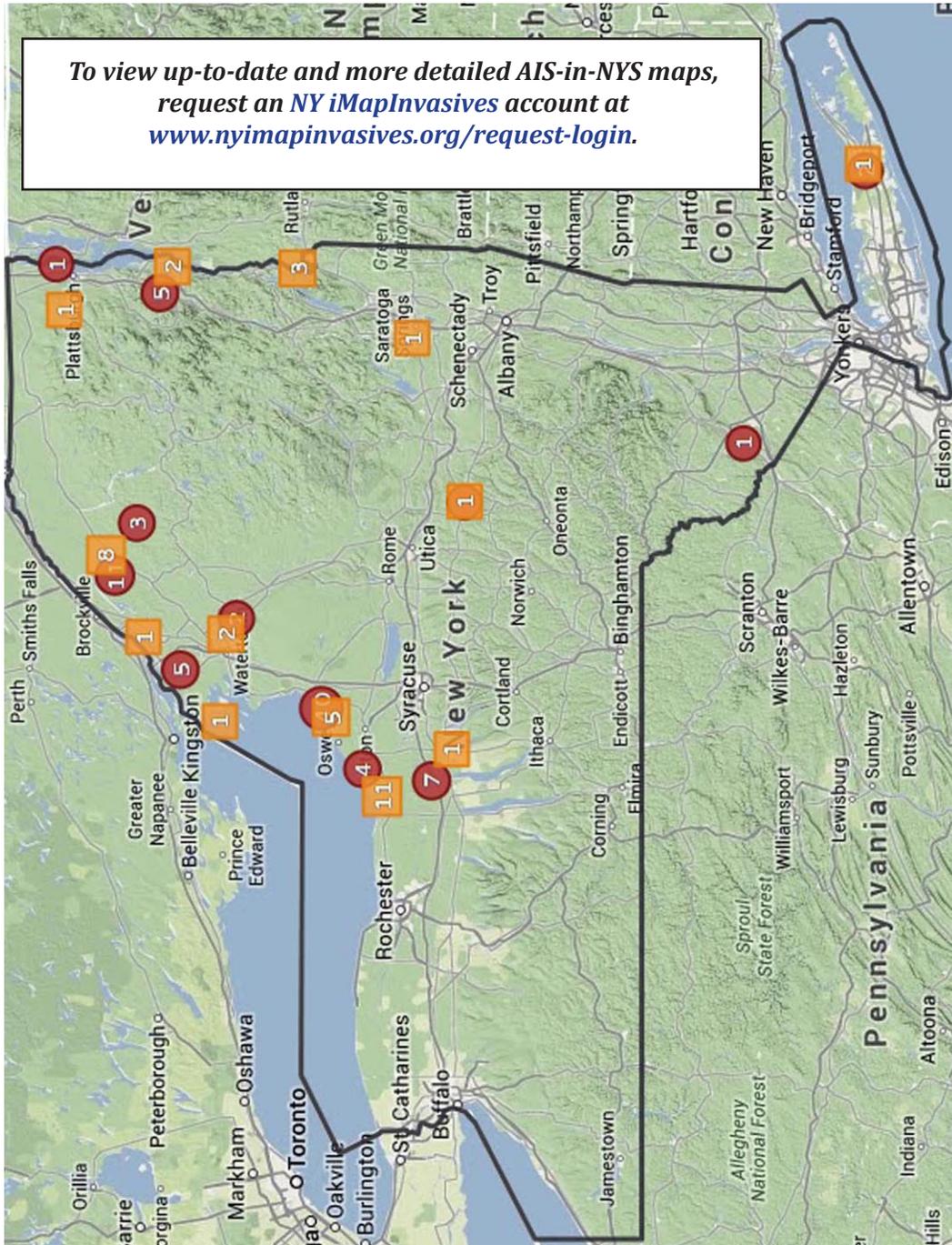


**Appendix B: AIS Invasive Species Map: CURLY-LEAF PONDWEED**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14

**Appendix B: AIS Invasive Species Map: CURLY-LEAF PONDWEED**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14



**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sightings. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.

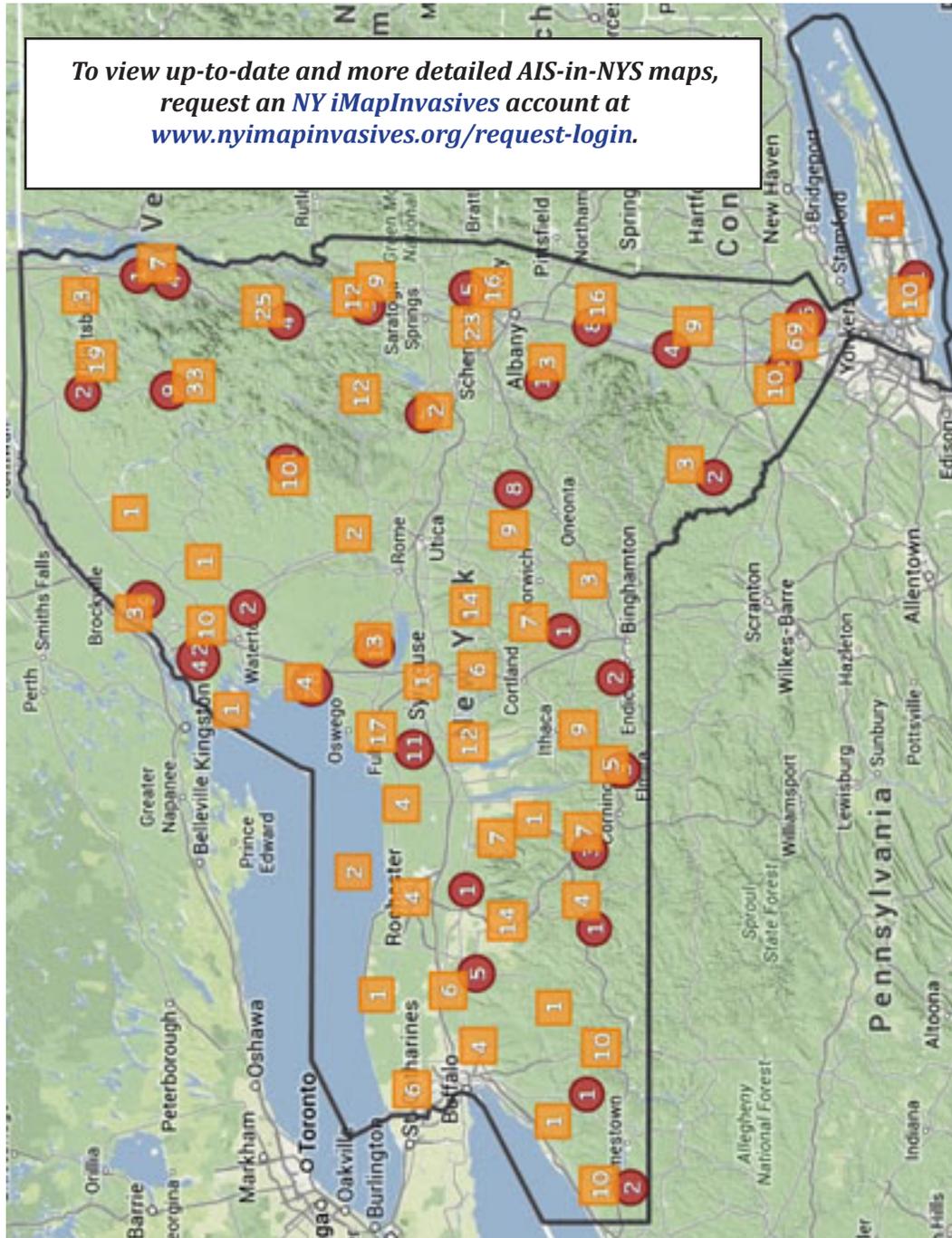


**Appendix B: AIS Invasive Species Map: EURASIAN WATER-MILFOIL**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14

**Appendix B: AIS Invasive Species Map: EURASIAN WATER-MILFOIL**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14



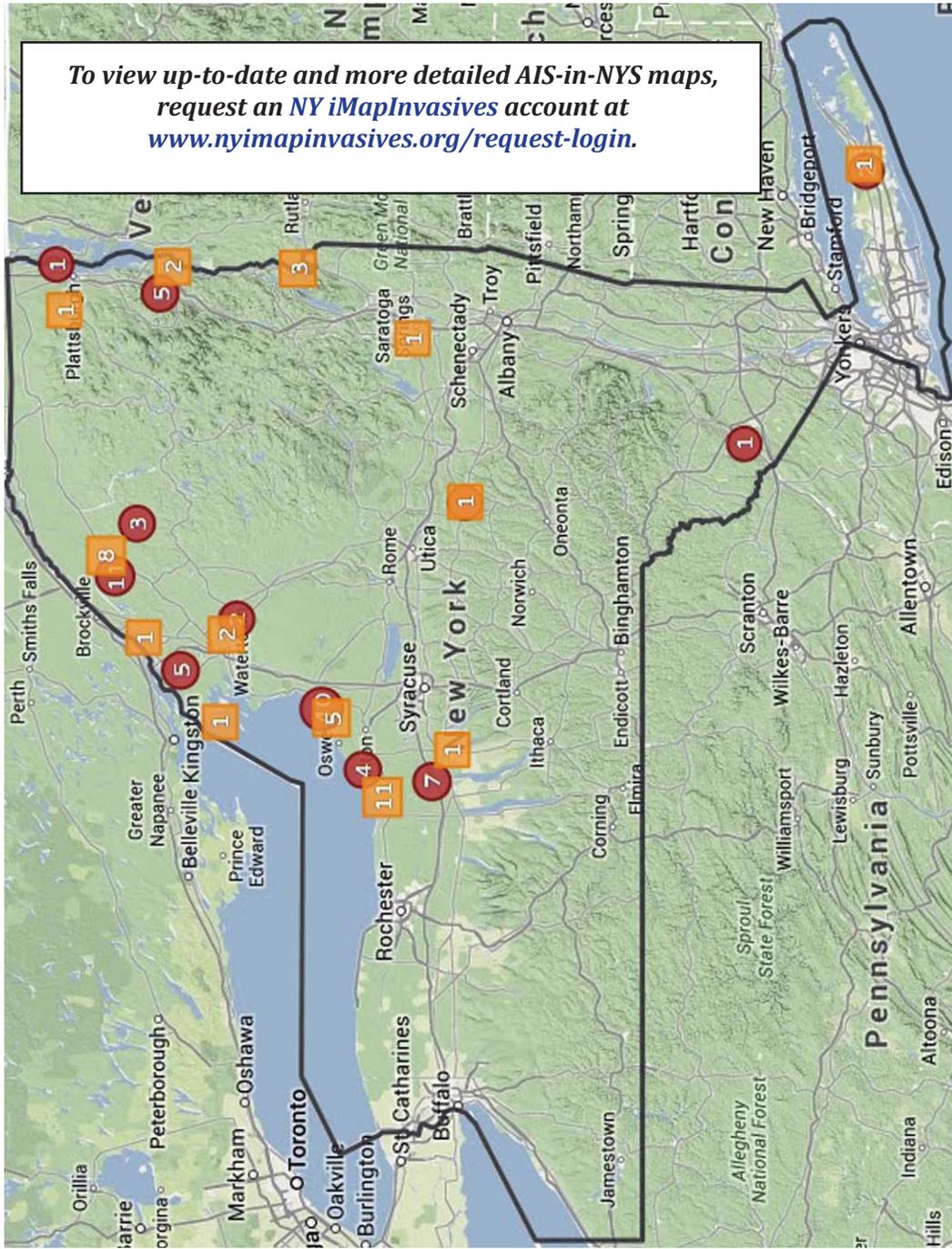
**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



**Appendix B: AIS Invasive Species Map: FROGBIT**

Source: New York iMapInvasives, www.nyimainvasives.org, accessed 05/14/14

**Appendix B: AIS Invasive Species Map: FROGBIT**  
 Source: New York iMapInvasives, www.nyimainvasives.org, accessed 05/14/14



**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sightings. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.

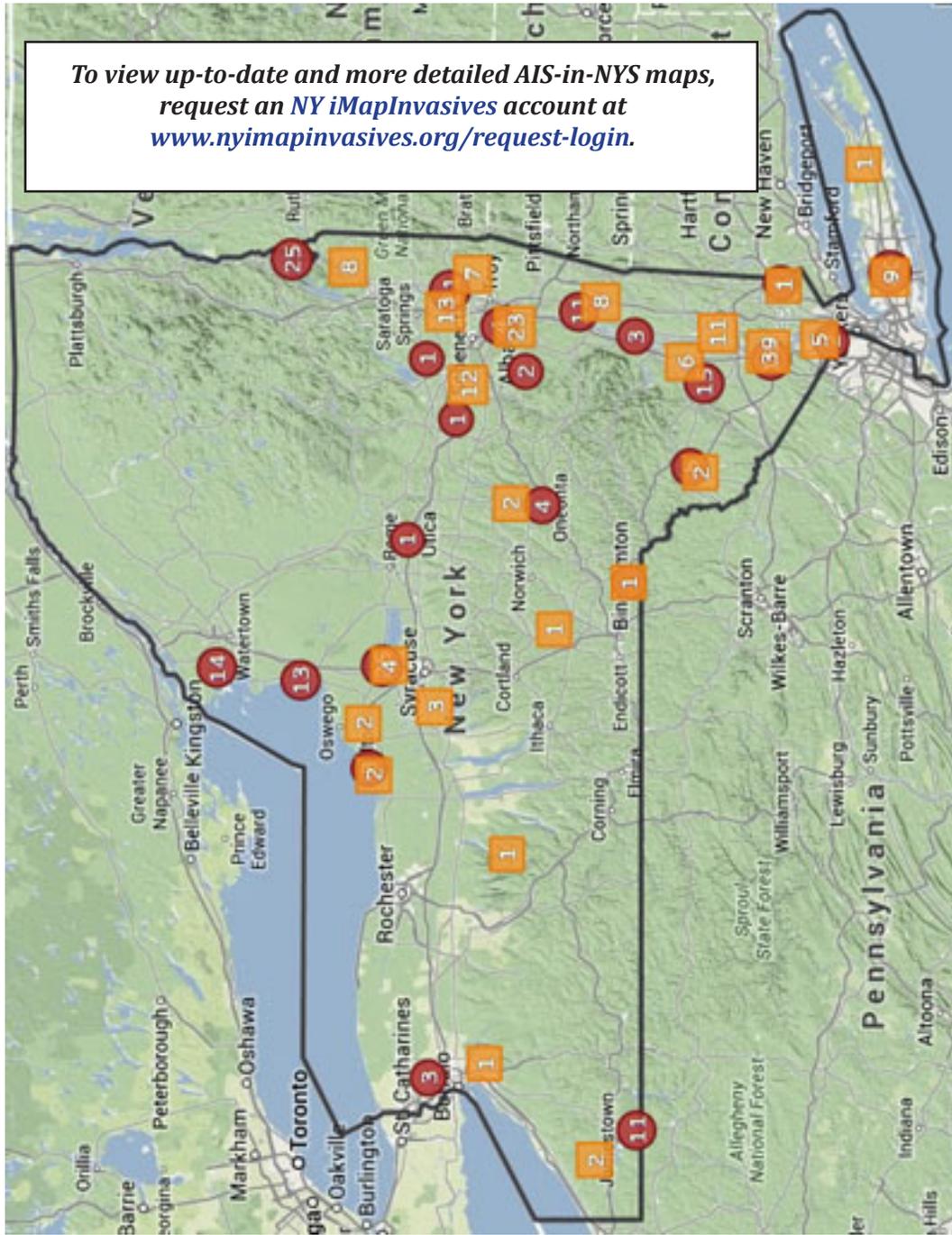


**Appendix B: AIS Invasive Species Map: EUROPEAN WATER CHESTNUT**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14

**Appendix B: AIS Invasive Species Map: EUROPEAN WATER CHESTNUT**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14

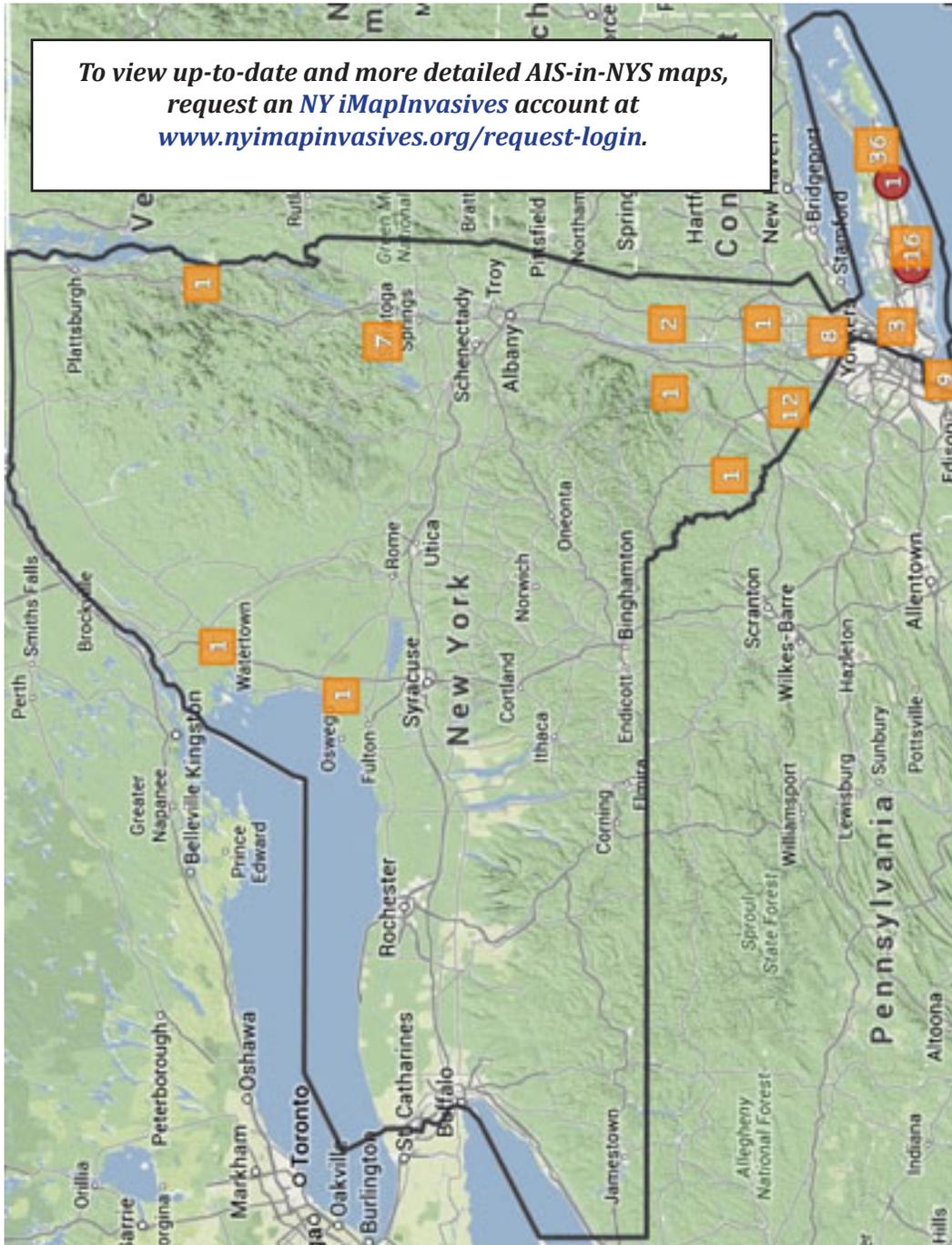


**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sightings. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



**Appendix B: AIS Invasive Species Map: FANWORT**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



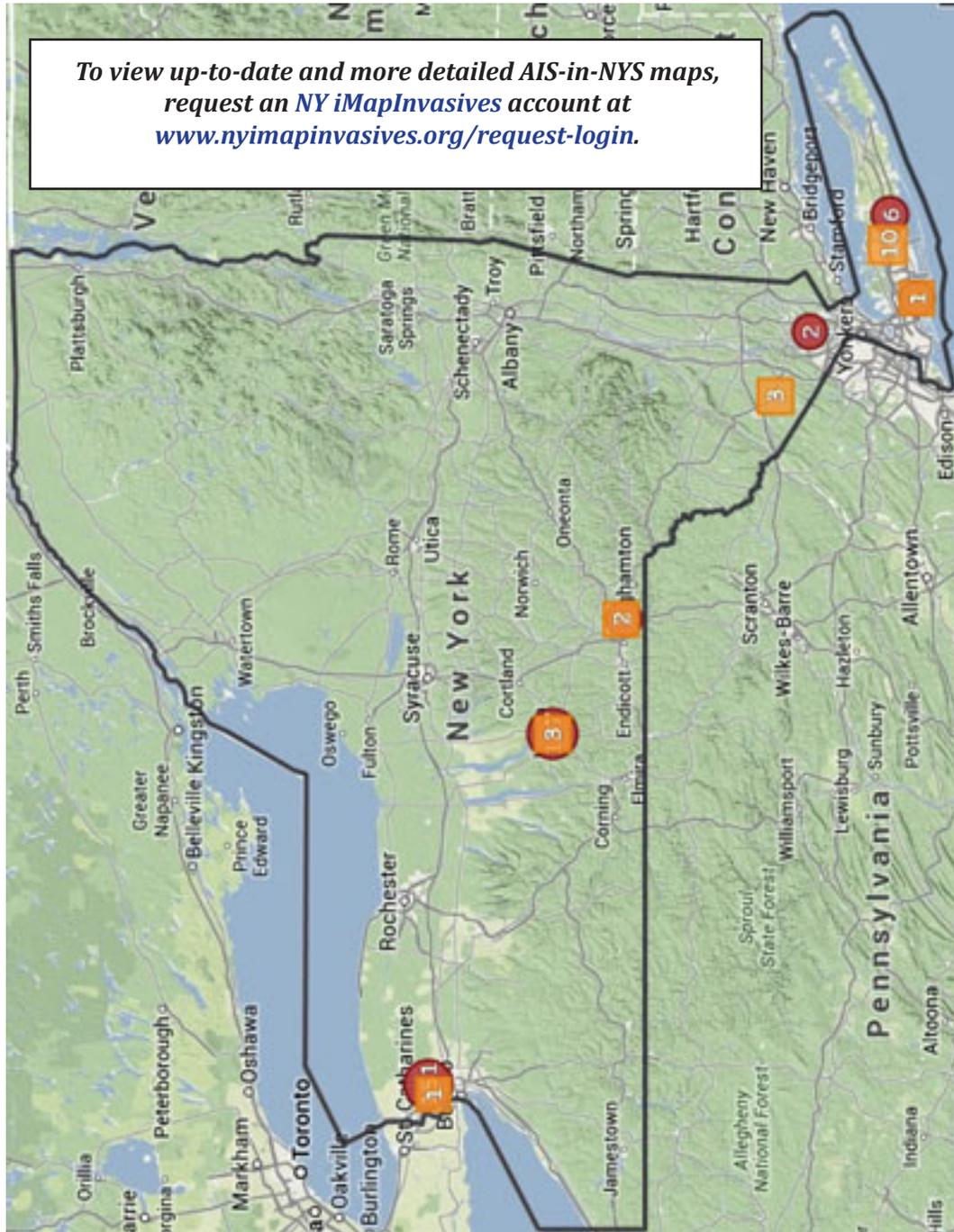
**Appendix B: AIS Invasive Species Map: FANWORT**  
 Source: New York iMapInvasives, [www.imainvasives.org](http://www.imainvasives.org), accessed 05/21/14

**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



**Appendix B: AIS Invasive Species Map: HYDRILLA/WATER THYME**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14



**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.

**Appendix B: AIS Invasive Species Map: HYDRILLA/WATER THYME**

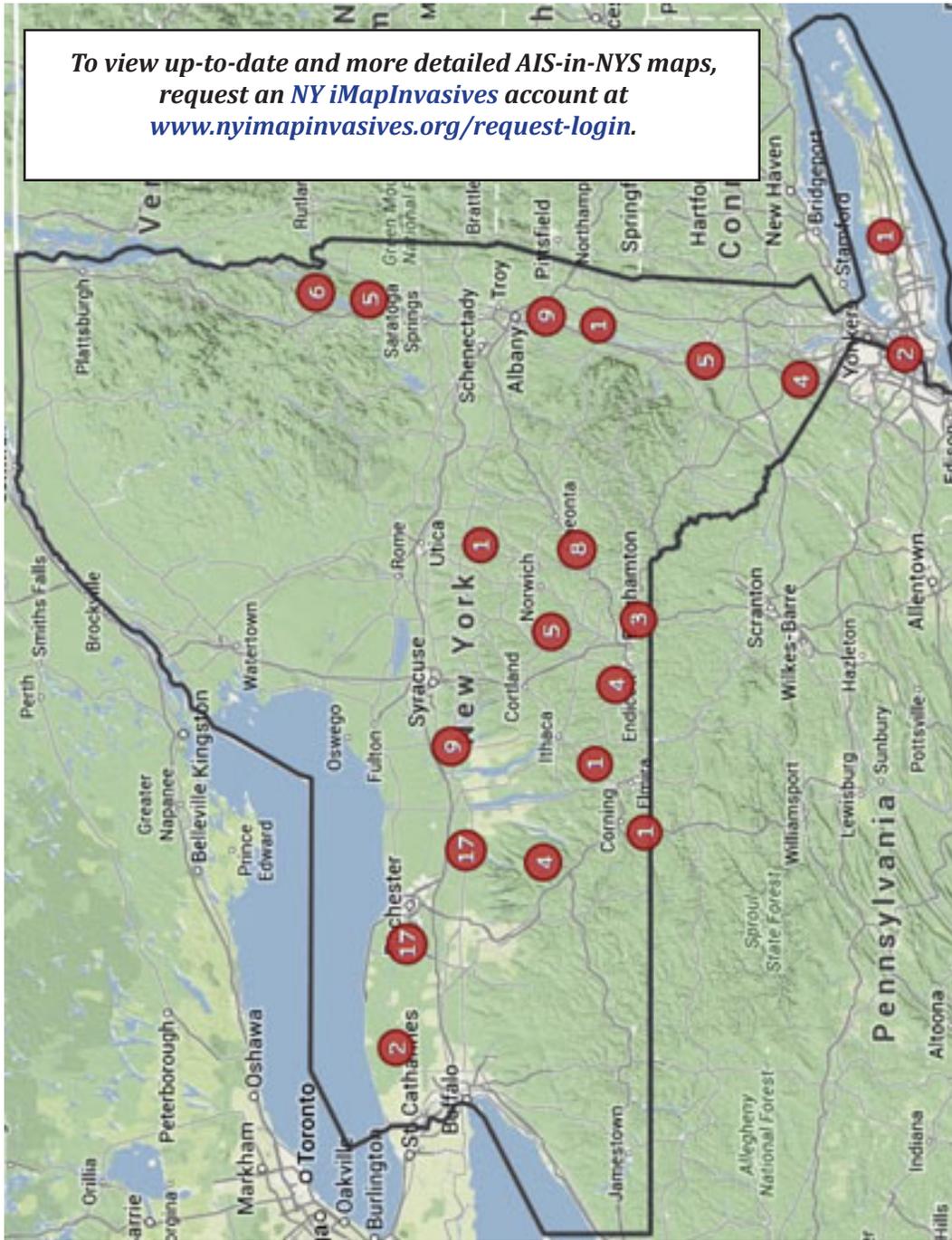
Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/14/14



**Appendix B: AIS Invasive Species Map: ASIAN CLAM**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

**Appendix B: AIS Invasive Species Map: ASIAN CLAM**  
 Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

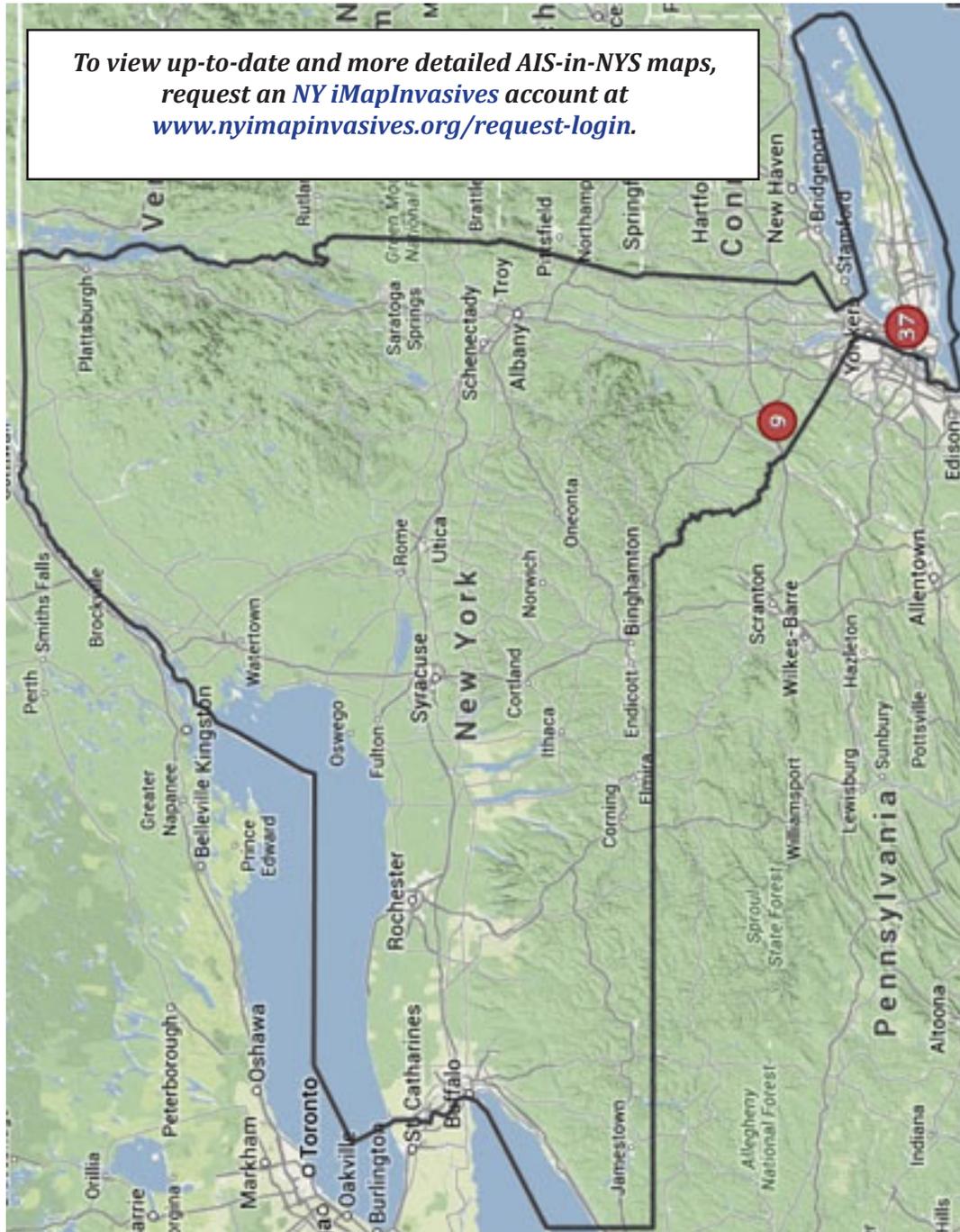


**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



### Appendix B: AIS Invasive Species Map: NORTHERN SNAKEHEAD

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



### Appendix B: AIS Invasive Species Map: NORTHERN SNAKEHEAD

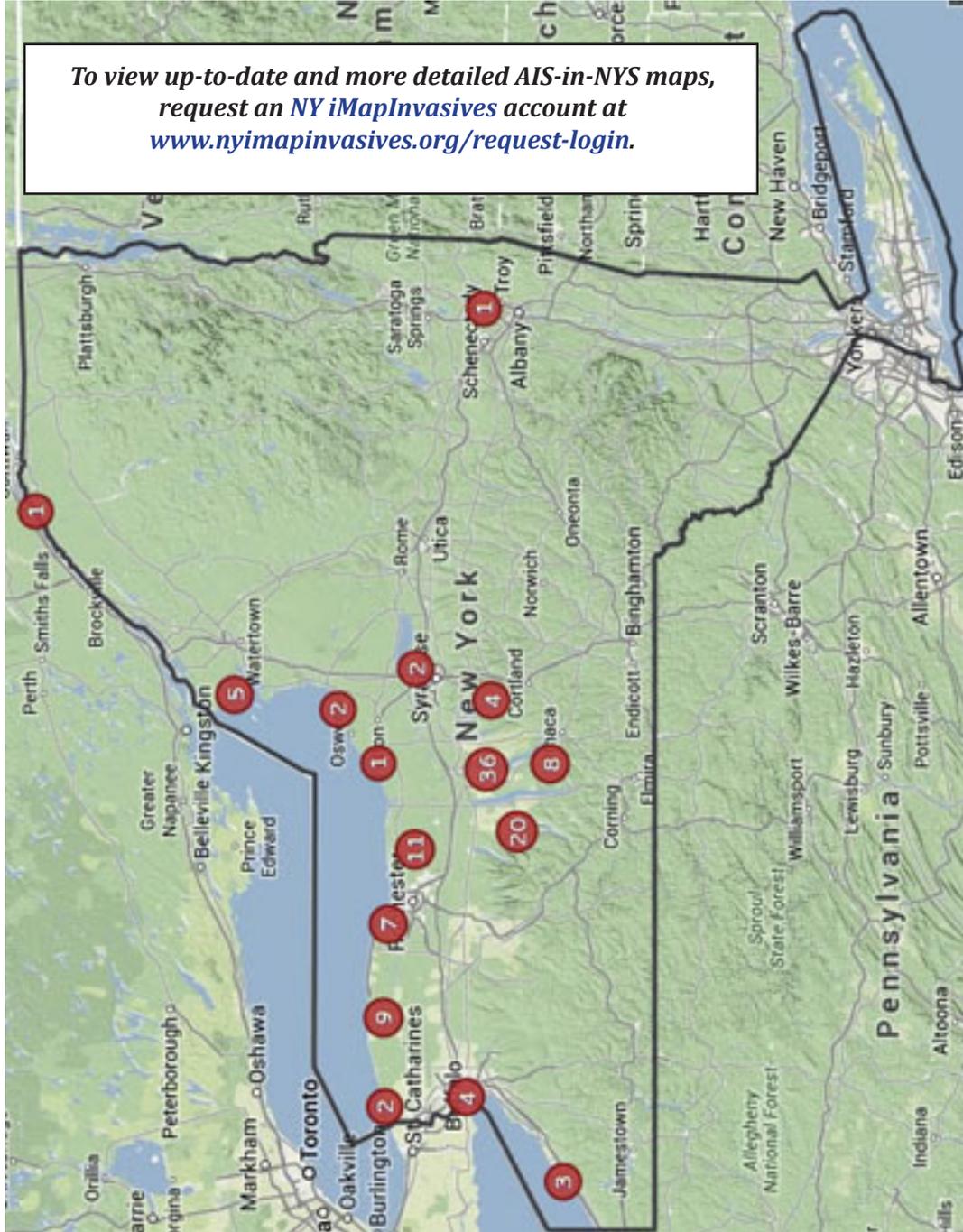
Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sightings. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



### Appendix B: AIS Invasive Species Map: QUAGGA MUSSEL

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



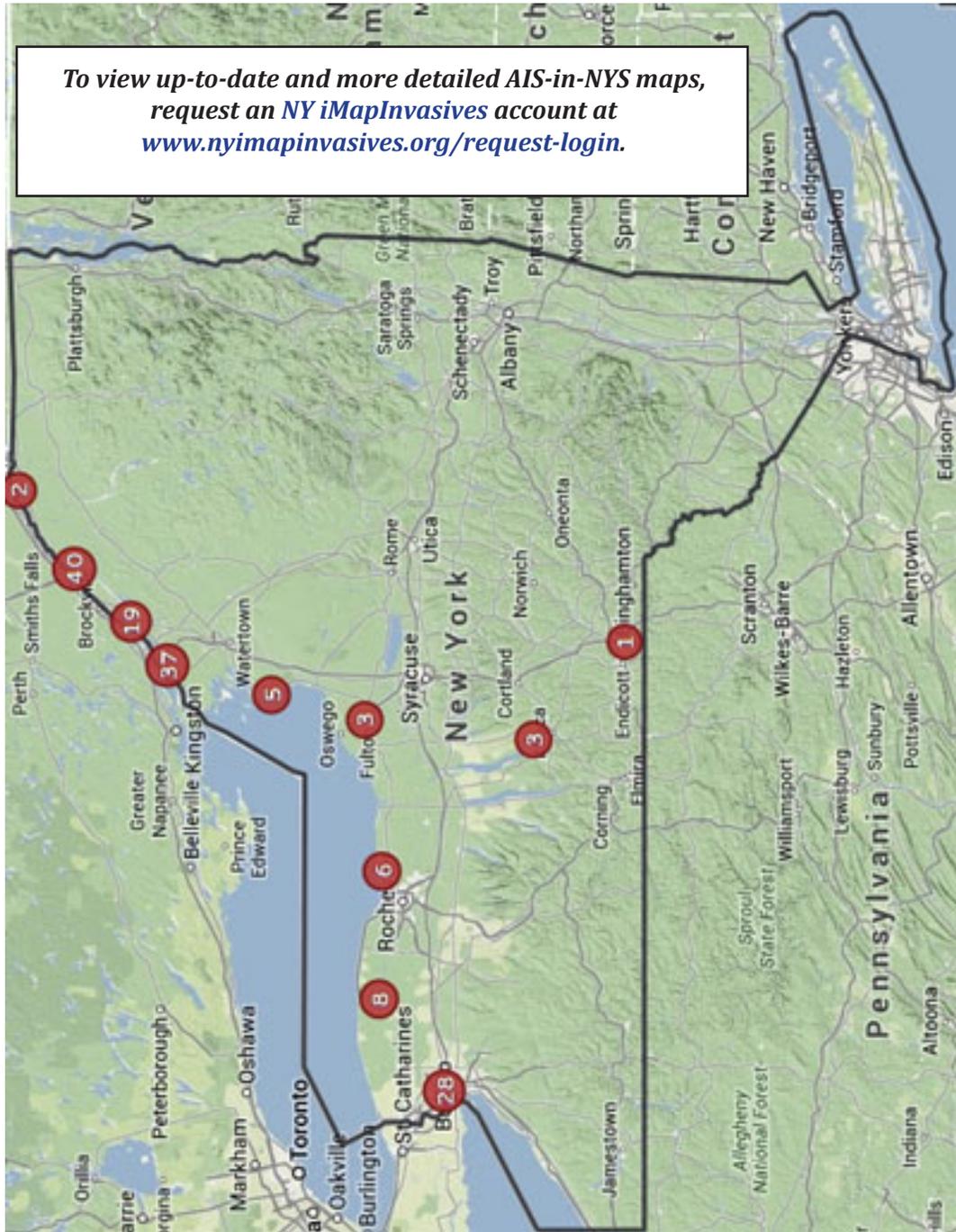
**Appendix B: AIS Invasive Species Map: QUAGGA MUSSEL**  
Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sightings. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



**Appendix B: AIS Invasive Species Map: ROUND GOBY**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



**Appendix B: AIS Invasive Species Map: ROUND GOBY**  
 Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

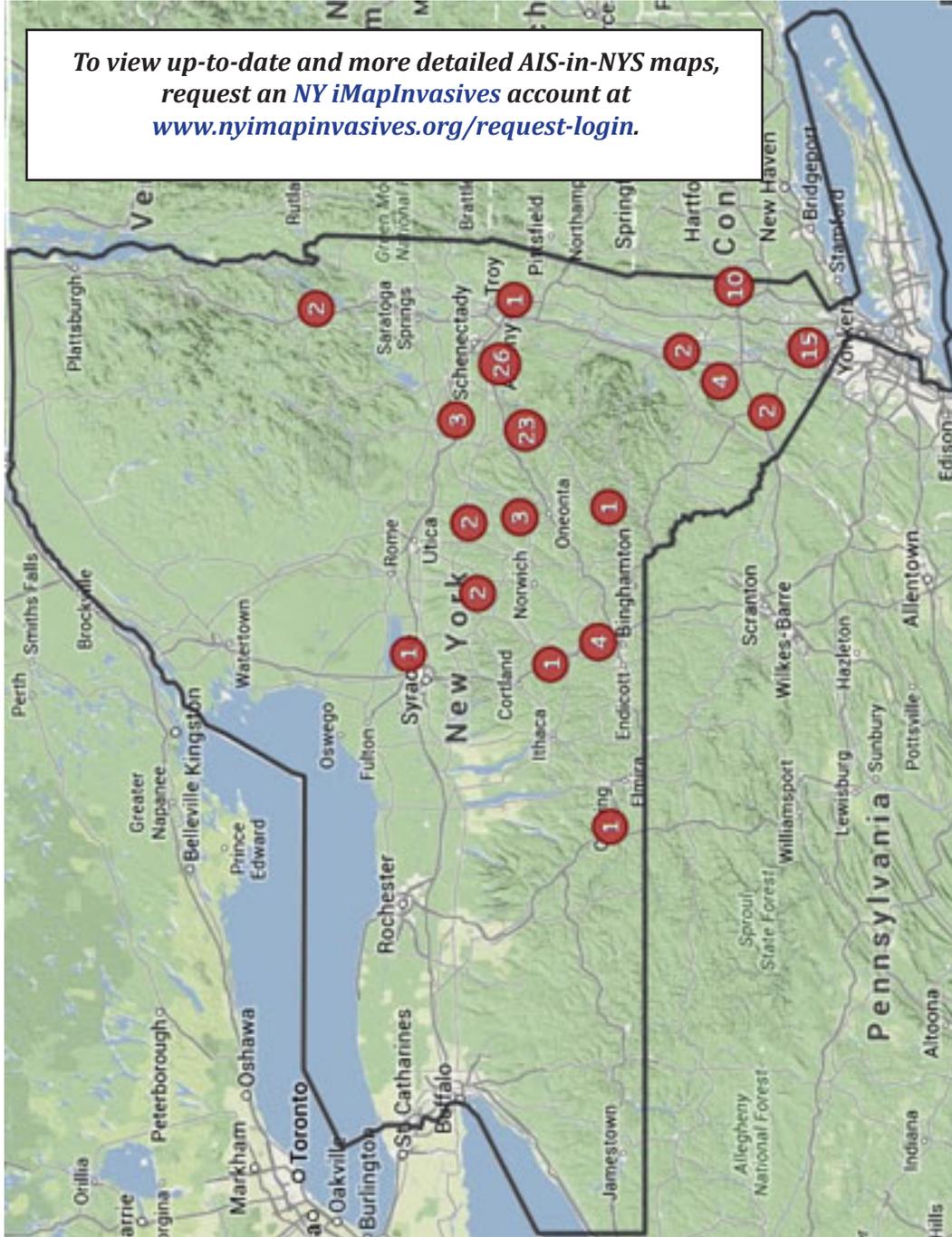
**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



**Appendix B: AIS Invasive Species Map: RUSTY CRAYFISH**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

**Appendix B: AIS Invasive Species Map: RUSTY CRAYFISH**  
 Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



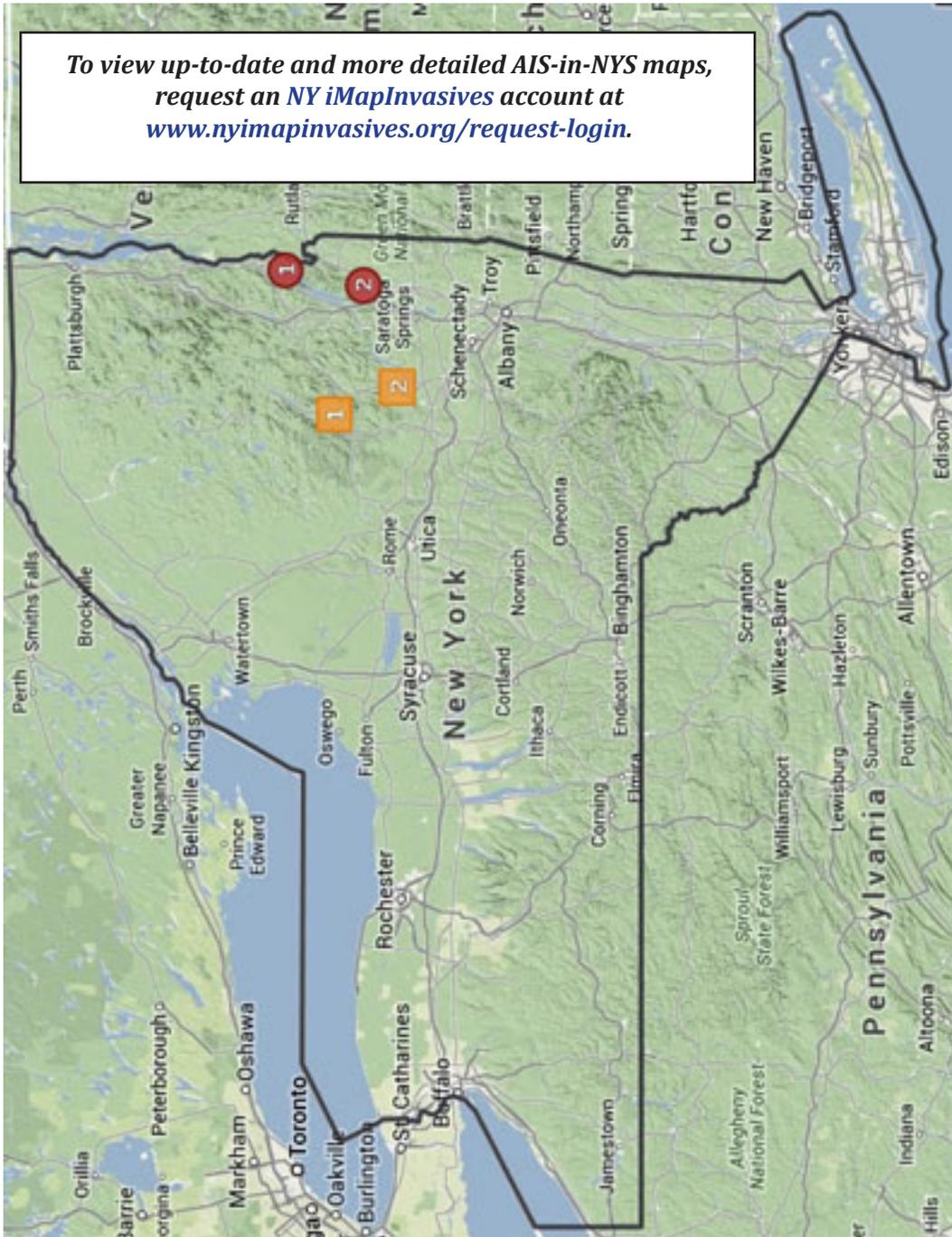
**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sightings. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



### Appendix B: AIS Invasive Species Map: SPINY WATERFLEA

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

**Appendix B: AIS Invasive Species Map: SPINY WATERFLEA**  
Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



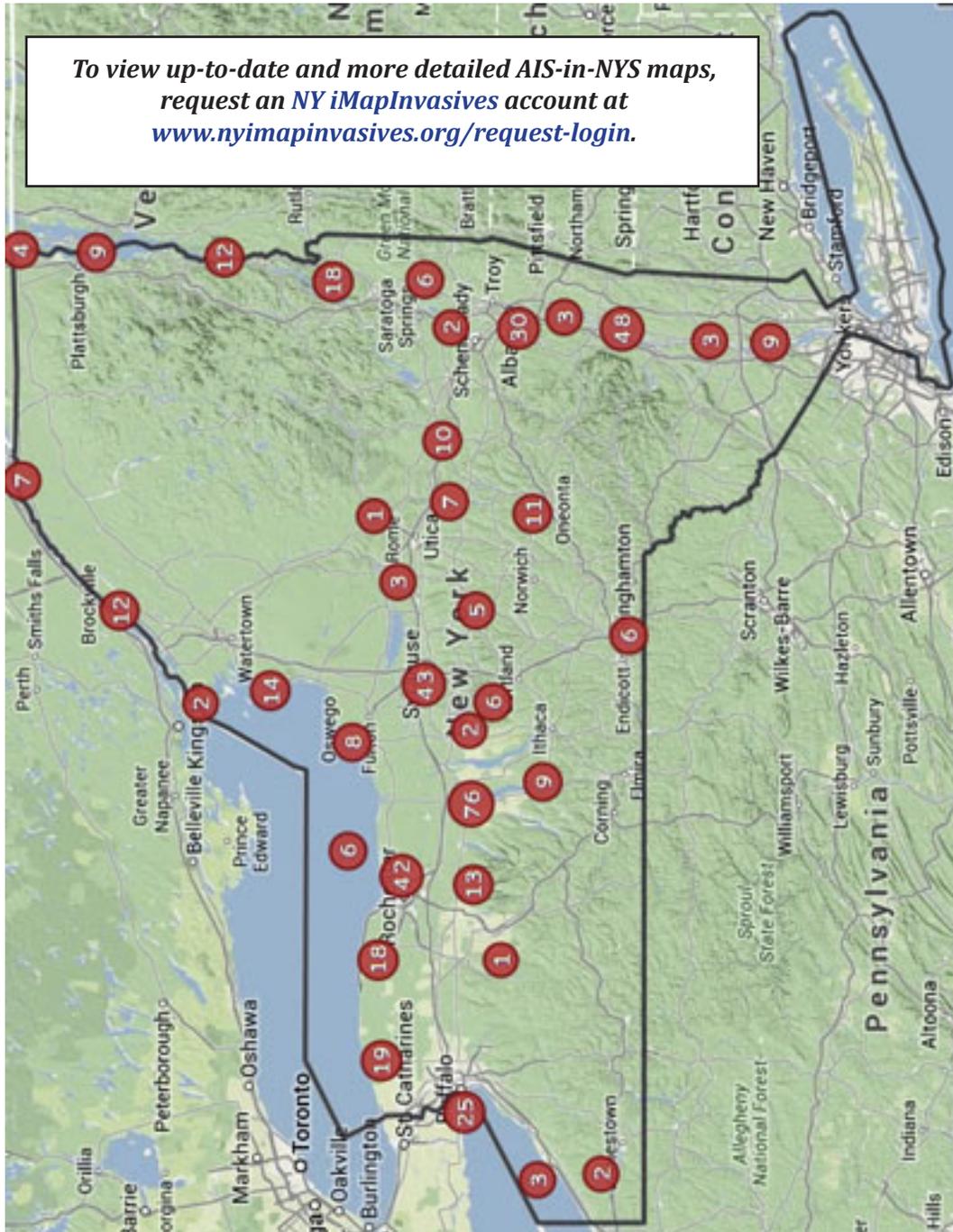
**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



**Appendix B: AIS Invasive Species Map: ZEBRA MUSSEL**

Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14

**Appendix B: AIS Invasive Species Map: ZEBRAMUSSEL**  
 Source: New York iMapInvasives, [www.nyimainvasives.org](http://www.nyimainvasives.org), accessed 05/21/14



**Key:** Numbers indicate number of sightings. Red circles indicate combined source vetted sighting. Orange squares indicate additional approximate locations of sightings yet to be precisely mapped as of the date of this map.



## **Appendix C: New York State Partnerships for Regional Invasive Species Management (PRISM)**

Among the 12 recommendations of the 2005 NYS Invasive Species Task Force report to the Governor and Legislature was the formation of eight Partnerships for Regional Invasive Species Management (PRISMs) to help prevent or minimize the harm caused by invasive species on New York’s environment, economy and the health and well-being of the State’s citizens.

PRISMs are intended to coordinate invasive species management functions including coordinating partner efforts, recruiting and training citizen volunteers, identifying and delivering education and outreach, establishing early detection monitoring networks and implementing direct eradication and control effort.

For a list of the current PRISMs in New York State, visit [www.nyis.info/?action=prism\\_main](http://www.nyis.info/?action=prism_main). As of June 2014, those programs are:

**Adirondack Park Invasive Plant Program (APIPP)**

**Capital/Mohawk Region PRISM**

**Catskill Regional Invasive Species Partnership (CRISP)**

**Finger Lakes PRISM**

**Long Island Invasive Species Management Area (LIISMA)**

**Lower Hudson PRISM**

**St. Lawrence-Eastern Lake Ontario (SLELO) PRISM, and**

**Western New York PRISM.**



## Appendix D: Sample Launch Site Property Owner Permission Letter

DATE

Name of Property Owner

Address of Property Owner

Address of Property Owner

Dear **TITLE (Mayor/Supervisor) LAST NAME** of the **City/Village/Town of \_\_\_\_\_**:

I am writing this letter to request permission to conduct educational activities, including voluntary watercraft inspections for boaters at the \_\_\_\_\_ (**Name**) **boat launch at \_\_\_\_\_ (Location)** and to provide you with the details of the (**YOUR ORGANIZATION'S NAME**) watercraft inspection steward program.

In an effort to slow and/or prevent the spread of aquatic invasive species (AIS), boat launch stewards would work with you as site manager to select an inspection location for conducting educational and voluntary watercraft inspections from \_\_\_\_\_ (**PROGRAM ACTIVITY DATE**) to \_\_\_\_\_ (**DATE**). Days and times of duty at each site will change throughout the season but be limited to daylight hours. This effort is part of a statewide boat/launch steward program and one of the NYS Department of Environmental Conservation's Aquatic Nuisance Species priorities.

The inspection process would not impede launch access/exit. Boater participation in this initiative is 100% voluntary; these are not regulatory inspections. The goal of the program is for the stewards to teach boaters how to look for and remove aquatic invasive species from their boats and to empower boaters with information so they can inspect their watercraft in the absence of stewards. With boaters, the launch stewards will:

- walk through inspection checkpoints using a standardized protocol;
- engage boaters in dialogue about AIS, their impacts on the environment, and the importance of taking measures to prevent their spread;
- provide AIS educational materials; and
- collect boater usage and aquatic invasive species data.

Launch stewards will have field supplies with them at the launch. These supplies may include: sandwich board, folding table, chair, umbrella, preserved specimens for educational purposes, and distribution materials. Stewards will bring supplies to the launch each day and will remove them from the launch at the end of each shift.

Please contact me **by DATE** with your decision about allowing these inspections at your location, or if you would like additional information. I look forward to working with the **City/Village/Town of NAME** to minimize the spread of aquatic invasive species in New York's waters.

Respectfully Submitted,

**Your Name and Title**

**Contact information: address, telephone, email**



## APPENDIX E: Dealing with Boater Questions and Myths

### Boater Question Sample Scenarios

#### **Boater Question #1: Is it reasonable to think that prevention and control efforts will eradicate well-established AIS, e.g., water chestnut in the Oswego River?**

The honest answer is probably not. Once invasive species become established, they are difficult and often impossible to eradicate. While complete eradication is often not likely, there are other options such as suppression and containment. It is reasonable to suggest that controlling populations will reduce the risk that they will spread to new bodies of water.

#### **Boater Question #2: Why are you out here wasting public resources when the unwanted species is going to come anyway?**

Even the most educated individuals will ask this question. Suggested responses:

- Even if we cannot keep the unwanted species out completely, we can prevent widespread damage by them.
- Management efforts provide some level of control of the range of an AIS and time to adopt new control methods for that AIS as they are developed.
- Prevention efforts to protect currently pristine waters help keep those waters pristine longer and help delay the costs of management and property devaluation after an unwanted species arrives.

#### **Boater Question #3: Aren't all plants a problem anyway?**

It is important to clear up this misconception! This is what you can say: Native plants are essential lifelines for an aquatic ecosystem, providing the basis for all life within. The problem lies with invasive (non-native) plants that have no natural inhibitors and therefore outcompete native plants, lowering the water body's aquatic diversity.

#### **Boater Question #4: I don't have time for this... I know all about it already!**

This remark is fairly common. If the boaters do not wish to help you with the survey, you must respect their rights and let them be. In such a situation, the suggested action would be to offer them a rack card/brochure and thank them for protecting New York's waters.

#### **Boater Question #5: Why has it taken so long to do something about aquatic invasive species?**

Suggested response: Traditionally, environmental problems become established in an area before action responses are developed or implemented. New York is now taking action well before the plants spread into too many of our sensitive environments, and you can help.

*Adapted from The Volunteer Monitoring Guidelines for Aquatic Invasive Species 2005 Edition, Wisconsin Department of Natural Resources Water Division, Madison Wisconsin PUB-WT-780 2*



## APPENDIX E: Dealing with Boater Questions and Myths Dispelling Myths about Aquatic Invasive Species

### **Myth #1: Invasive species movement is natural.**

**Response:** Plants and animals have moved around the globe for millennia, but that movement occurred over thousands of years, not overnight. And, historically, it largely occurred unassisted by any human intervention. Invasive species became an increasing problem in the mid 1900s. Why? Because the increased movement of people and goods accelerated the number and rate of accidental or intentional introductions of non-native species. Lands and waters can't keep up with the infusion of all of these new species, which tips the scale in favor of the invader. The resilience of forests, for example, often enabled them to weather past forest pests, but never before have the forests been bombarded by so many in so short a time: beech bark disease, sirex woodwasp, hemlock wooly adelgid, emerald ash borer, Asian longhorned beetle, and the list goes on.

### **Myth #2: Invasive species increase diversity.**

**Response:** Next to outright habitat loss, invasive species are the second leading cause of the loss of diversity outranking impacts of pollution, overpopulation, and overharvesting. For instance, when loosestrife first arrives in a wetland, one species is added to the existing plant community. But, over time, that one species continues to spread and pushes out native plants by overcrowding and outcompeting them for space, nutrients, and light. Overtime, the introduction of invasive species can result in decreased species diversity. Similarly, invasive animals prey upon native organisms that can result in local species extinction.

### **Myth #3: The cost of prevention and management of AIS isn't worth it.**

**Response:** Prevention and management of AIS does require funding, but the cost of doing nothing far exceeds an investment in action. Once invasive species are left to spread, their impacts are often irreversible. It is not just natural areas that are at risk. Invaders attacking fruit and vegetables can inflict losses on the billion dollar economy of New York agriculture by reducing crop production, increasing food prices faced by consumers, and undermining export potential. Need to relate this to aquatic environment

### **Myth #4: There is nothing we can do about invasive species.**

**Response:** Certain invasive species are well established in some areas, but that doesn't mean that we should leave the door wide open for others to freely enter. Opportunities exist every day to reduce the spread of AIS. Simple steps include regularly practicing **Clean~Drain~Dry** with all vessels, water containers, and recreational gear and equipment after every use; using firewood local to the area you are visiting; landscaping with non-invasive plants in the garden, and alerting nurseries to invasives they are selling. Education is a major part of the solution.

*Adapted from Smith, H. (2010) Dispelling myths about invasives. Adirondack Daily Enterprise, June 1, 2010.*