Aquatic Invasive Species Program
2017 Final Report
Hudson River Sloop Clearwater, Inc.

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This project was contracted by the Lower Hudson Partnership for Regional Invasive Species Management (PRISM) using funds from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

Project Objective:

Hudson River Sloop Clearwater, Inc. (Clearwater) was awarded funding in March 2017 to continue the Aquatic Invasive Species Program which was developed in March 2015. This multi-faceted program works to educate a wide variety of people throughout the Hudson Valley including, but not limited to, boaters, anglers, lake association members, and the general public about aquatic invasive species (AIS) identification and spread prevention, and to promote citizen science by getting locals involved in AIS early detection surveying. Clearwater's AIS Program includes the:

- Watercraft Inspection Steward Program
- Education and Outreach Program
- Volunteer Training/Surveying Program

This program was started at a critical time for the Hudson River. Over the years, storms have decimated the native plant populations in the Hudson River leaving the river bottom primed for new plant introductions. While native species such as eelgrass (*Vallisneria Americana*) have been attempting to rebound, aquatic invasive plants have taken advantage of the sparsely populated river bottom.

In 2013 the aquatic invasive plant *Hydrilla verticillata* (hydrilla) was found in the Croton River during a rare plant survey. Hydrilla is one of the world's most invasive aquatic plants, and its introduction to the Hudson River would be detrimental to native plant and animal species. This plant has the ability to grow several inches a day, eventually clogging waterways and choking out native species. These dense mats inhibit boating, fishing, and swimming, which can eventually impact the local economy.

The first step in mitigating the spread of invasive species such as hydrilla is to educate the public about species identification, impacts, management options, and spread prevention methods. The Hudson River is currently home to over 120 aquatic invasive species (AIS), many whose introduction could have been prevented through clean boating practices and proper aquarium disposal. Some of these species, such as water chestnut, have been here for over 100 years. Others, including hydrilla, are new to the Hudson River Valley. It is our responsibility to contain these newly emerging species, and prevent those that have not yet entered the region from becoming established.

Scope of Work and Deliverables

Watercraft Inspection Steward Program

Watercraft inspection stewards are becoming more common across New York and the United States as invasive species become a more widely recognized environmental problem. One of the most common modes of spread for aquatic invasive species is via boats, trailers, and boating equipment. Many species can survive for extended periods outside of water, giving them countless opportunities to "hitchhike" from one waterbody to another. These stewards help to prevent the spread of aquatic invasive species at the source.

Clearwater steward inspecting a boat

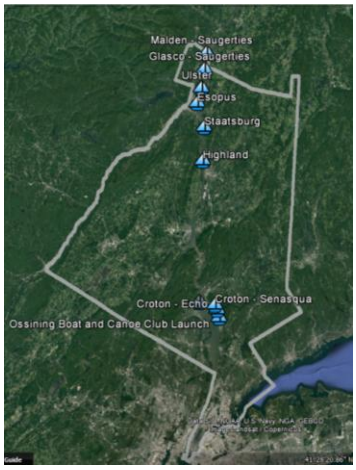
Clearwater started the first Watercraft Inspection Steward Program in the Hudson Valley in 2015. Two stewards were hired for the season, one placed in Croton (site of the hydrilla infestation), and the other in Staatsburg. They each worked 16 weekends (Saturday-Sunday) between Memorial Day and Labor Day. By the end of the season, they had inspected nearly 800 boats and prevented various hitchhikers from entering and leaving the Hudson River, including hydrilla.

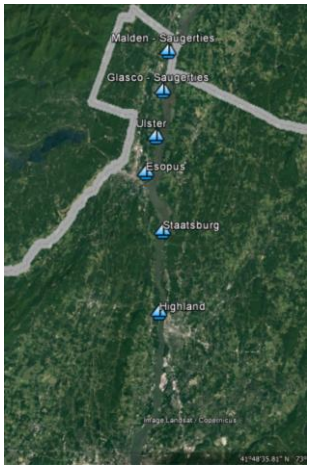
This year we were able to expand the program to include three stewards that each worked four days/week. Stewards were hired to work at Haverstraw, Newburgh, and Staatsburg, and worked Thursday-Sunday. While we had a very successful season, we will still be making changes to the program next season.

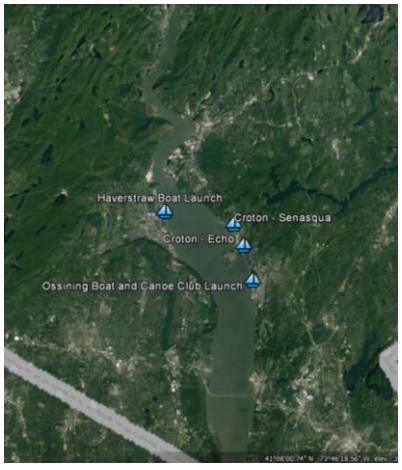
Clearwater steward speaking with boaters about AIS spread prevention

Next year we will be increasing the amount of stewards from three to five, including one traveling steward. The four stationary stewards will work three days/week and the traveling steward will be working four days/week. These changes are being made for two reasons: safety and efficiency. We do not want to leave stewards alone at the Newburgh boat launch because our 2016 steward had various safety concerns. All stewards also noted that Thursdays at their boat launch were extremely quiet, and we felt that the funding could be used more efficiently spread over four stewards working three days/week rather than three stewards working four days/week.

Target Area:







The target area for the Watercraft Inspection Steward Program included 9 boat launches: Croton Echo, Croton Senasqua, Highland, Kingston, Ossining, Saugerties Glasco, Saugerties Malden, and Staatsburg. This was a difficult year for the Watercraft Inspection Steward Program. We had two people quit days before the start of the season, one person was let go, and two more left by the end of July. The Program Manager was constantly looking for replacement stewards. Only one of the launches, Highland, was manned throughout the entire season. We also began the season using NYSDEC tablets with a new data collection app, Survey123. Unfortunately, due to tablet malfunctions, we lost hundreds of data points.

Stewards inspected boats that were last launched into waterbodies in Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Texas.

2017 Watercraft Inspection Stewards Summary:

- Inspected 583 boats
- Spoke with 1,417 boaters (not including general public that stopped to ask questions)
- 88.5% of boaters were willing to participate
- 8.72% of boats had hitchhikers on them
    - Eurasian watermilfoil, water chestnut, zebra mussel, eel grass, and various native grasses and pondweeds
- 70.6% of boaters had previous interactions with a boat steward
- 74.6% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Comparison to 2016 Watercraft Inspection Stewards Summary:

- Inspected 1,317 boats
- Spoke with 3,378 boaters (not including general public that stopped to ask questions)
- 78.7% of boaters were willing to participate
- 8% of boats had hitchhikers on them
    - Brittle naiad, coontail, Eurasian watermilfoil, native pondweeds, water chestnut, zebra mussels

- 72.5% of boaters had previous knowledge about aquatic invasive species
- 69.3% of boaters take precautions to clean their boat

Croton Echo (8 days):

- Inspected 21 boats
- Spoke with over 56 boaters (not including general public that stopped to ask questions)
- 60% of boaters were willing to participate
- 24% of boats had hitchhikers on them
    - Eel grass
- 65.7% of boaters had previous interactions with a boat steward
- 65.7% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Highland (28 days):

- Inspected 177 boats
- Spoke with over 477 boaters (not including general public that stopped to ask questions)
- 97.8% of boaters were willing to participate
- 6.21% of boats had hitchhikers on them
    - Water chestnut, Eurasian watermilfoil
- 79.6% of boaters had previous interactions with a boat steward
- 85% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Kingston (11 days):

- Inspected 143 boats
- Spoke with over 444 boaters (not including general public that stopped to ask questions)
- 76.8% of boaters were willing to participate
- 12.6% of boats had hitchhikers on them
    - Water chestnut, Eurasian watermilfoil
- 66.1% of boaters had previous interactions with a boat steward
- 68.8% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Ossining (8 days):

- Inspected 42 boats
- Spoke with over 80 boaters (not including general public that stopped to ask questions)
- 100% of boaters were willing to participate
- 9.5% of boats had hitchhikers on them
    - Water chestnut, Eurasian watermilfoil
- 47.6% of boaters had previous interactions with a boat steward
- 69.05% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Saugerties (1 day):

- Inspected 7 boats
- Spoke with over 16 boaters (not including general public that stopped to ask questions)
- 100% of boaters were willing to participate
- 14.3% of boats had hitchhikers on them
    - Eurasian watermilfoil
- 42.9% of boaters had previous interactions with a boat steward
- 57.1% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Staatsburg (19 days):

- Inspected 126 boats
- Spoke with over 344 boaters (not including general public that stopped to ask questions)
- 96% of boaters were willing to participate
- 4.76% of boats had hitchhikers on them
    - Water chestnut, Eurasian watermilfoil, eel grass
- 75.6% of boaters had previous interactions with a boat steward
- 74.1% of boaters had previous knowledge of the Clean, Drain, and Dry protocol

Deliverables met:

- Increased recreational boater knowledge
- Education and outreach materials (described in Education and Outreach Deliverables)
- Updated field guide and training materials
- Standardized data sheet for stewards
- Open Data Kit survey created to move away from hand-written data collection (increase speed and accuracy of surveys, and decrease human error)
- AWI steward training and local training at Newburgh boat launch
- Data collected and analyzed
- Decisions made about future locations of stewards based on data from 2016

AIS Education and Outreach Program

Educating the public about invasive species is the first step to preventing their spread. The Program Coordinator held and attended a wide variety of events to reach the widest range of people possible, including invasive species removal events, AIS identification and survey trainings, tabling events, and hands-on workshops. By holding a wide variety of events we were able to reach teachers, students, Lake Association members, boaters, anglers, town and village officials, and more.

The Program Coordinator created numerous informational materials including pamphlets, brochures, and field guides.

Breakdown of Education and Outreach Events

- # **Trainings**: 6
  - # People Trained: 73
- # **Clearwater Events**: 11
  - # People Reached: 1,005
- # **Presentations**: 14
  - # People Reached: 344
- # **Tabling Events**: 8
  - # People Reached: 1,250

Total:

- **# Events**: 39
- **# People Reached:** 2,672

Training: event where individuals are taught AIS identification, management, and surveying protocol
Clearwater Event: educational programs, workshops, or seminars held by Clearwater
Tabling: Outreach event where informational material was distributed
Removals: Invasive Species removal held by Clearwater

Target Area:

The goal of the Education and Outreach Program is to reach people all across the Lower Hudson PRISM region. Riverside towns are targeted, but outreach occurs at clubs, schools, businesses, and community events across the region.

Deliverables met:

- 6 Trainings
- 11 Clearwater events
- 14 Presentations
- 8 Tabling events
- New and updated education/outreach materials

AIS Volunteer Program

Invasive species become much more difficult to manage as they become more widespread. Clearwater is working to prevent hydrilla, among other species, from becoming widespread by conducting early detection surveying across the Lower Hudson PRISM region. Eradication can still be possible if a species is found early enough. Clearwater's AIS Volunteer Program promotes citizen science by

Hudson River Sloop Clearw

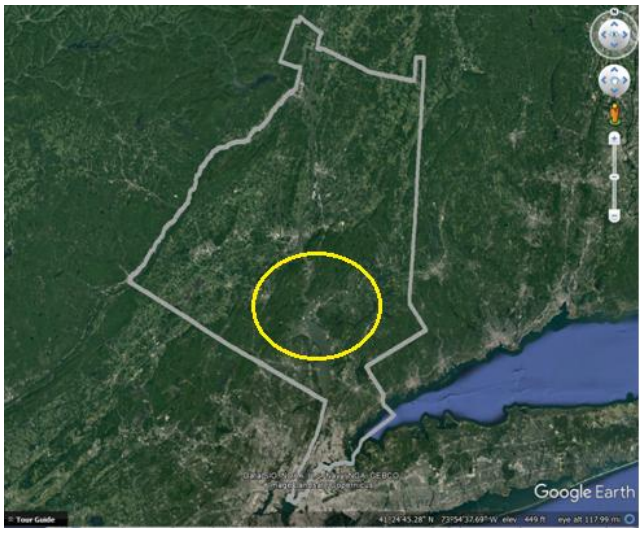
training people to identify and survey for some of the most invasive aquatic plants in the region.

These trainings are hands-on, allowing volunteers to see first-hand what the plants look like and how to differentiate them from their native (and sometimes invasive) lookalikes. After seeing the plants, volunteers are brought to the water where they are given all of the necessary equipment, including data sheets, a field guide, a GPS, and a weed rake. There they have an opportunity to practice using the weed rake and identify the species they pull up. When they feel confident with their identification skills they are sent into the field to either survey high priority areas surrounding the Croton hydrilla infestation, or to survey any of the other waterbodies found throughout the region.

This year, while we still held public trainings, Clearwater focused its trainings on larger groups including Lake Associations. Next year we will continue to work with more Lake Associations to train larger groups of people that can do routine surveys of their lakes, which should give us an idea of how the lake vegetation is changing over time.

Clearwater intern surveying for AIS in Peekskill, NY

Target Area:



Aquatic species surveying was focused around the Croton hydrilla infestation, but volunteers were free to survey any waterbody that they came across.

Deliverables met:

- AIS Field Guide – 2016 Focal Species
- Standardized data collection sheets
- 264 data points taken at 41 locations
- 1 Lake Association trained
- 8 trainings total

Project Summary:

Clearwater's 2016 Aquatic Invasive Species Program was very successful. Below are the statistics that summarize all of the measurable deliverables previously set in the 2016 PRISM contract:

- 4,089 People reached
  - 1,417 boaters/anglers
  - 2,672 people including students, teachers, lake associations, canoe associations, city officials, etc.
- 10 Waterbodies surveyed
  - 107 points mapped and sent to iMapInvasives
  - New occurrence of invasive water hyacinth reported in Lake Tiorati, Harriman State Park
- 39 Events held/attended
  - 6 Trainings
  - 11 Clearwater events
  - 14 Presentations
  - 10 Tabling events

Looking Ahead:

We have prepared for various changes that will begin in the 2017 season. Some of these are minor, but still important changes like revising the Surveying Data Collection Sheet for volunteers. Others are much larger and include new equipment. Below is a list of things we plan to change for the 2017 season.

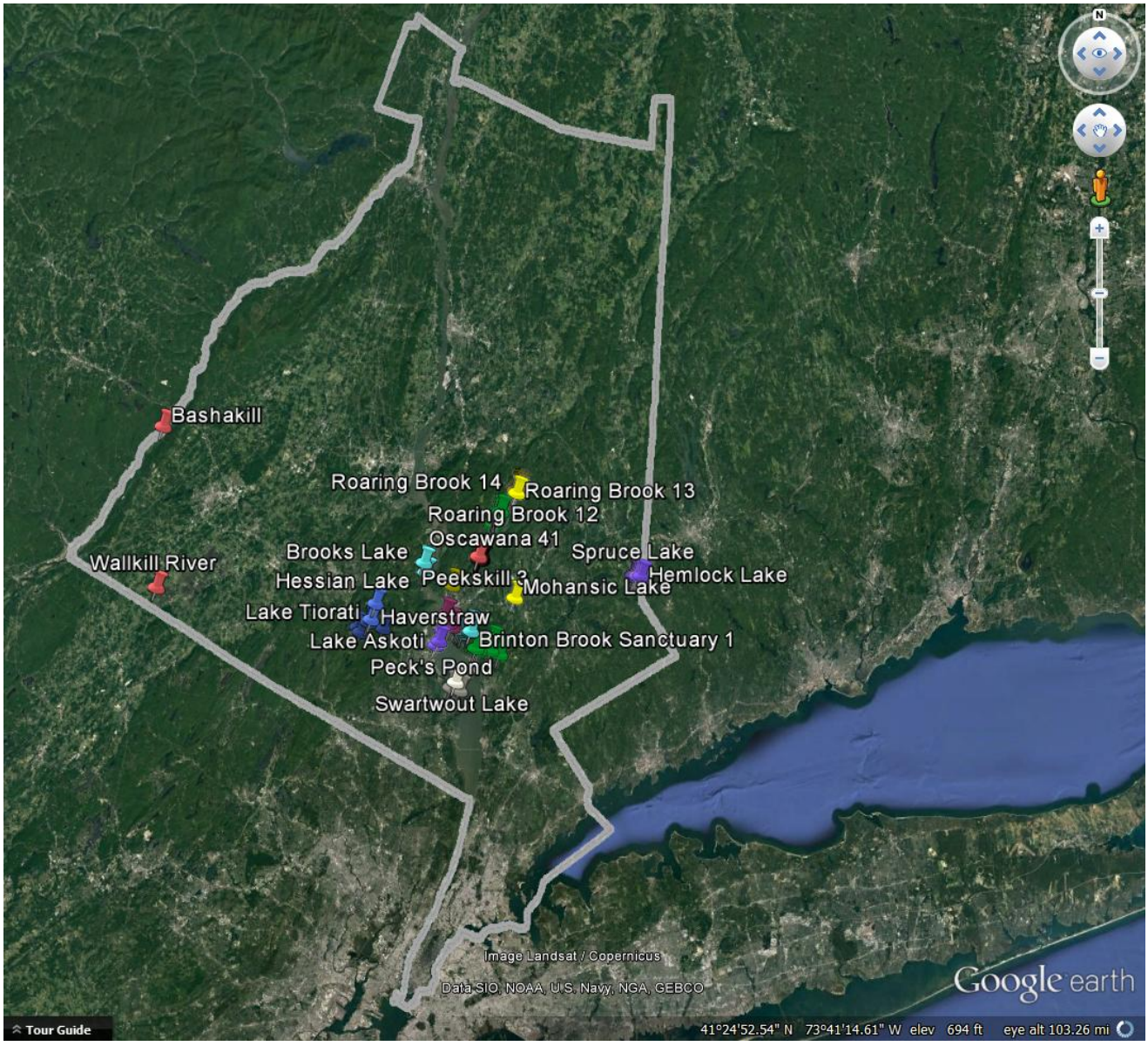
- Update Surveying Data Collection Sheet
  - Have all information on one side of page so volunteers don't have to flip back and forth
  - We will clear all GPS units and allow volunteers to fill out the point #, rather than the GPS coordinates for each site
- Participate in Water Chestnut Chasers
  - Involve the stewards in water chestnut removals – now possible after the purchase of 2 canoes and 3 kayaks
- Train stewards at the same level as Conservation Corps members, including water safety training
- Focus trainings on environmental groups and lake associations
- Always be prepared to present a presentation, even at hands-on trainings – now possible after the purchase of a laptop and projector

Appendix A:

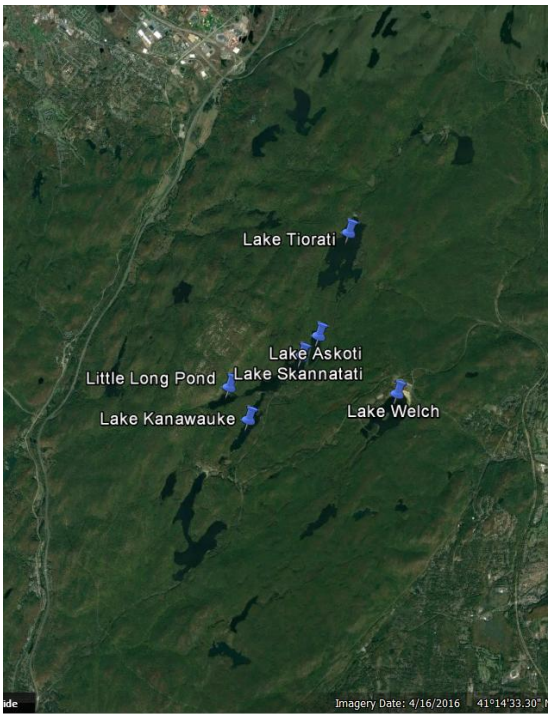
Date	Location	Event Name	Type	# People Reached	Type of People
4/24/2017	Scarsdale, NY	Pollution Program	Clearwater	80	3rd graders
4/26/2017	Scarsdale, NY	Pollution Program	Clearwater	160	4-6 graders
5/9/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
5/11/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
5/12/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
5/15/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
5/16/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
5/17/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
5/18/2017	Kingston, NY	Hudson River Stewards	Workshop	100	4th grade
6/8/2017	Riverdale, NY	Riverdale Elem School	Workshop	60	3rd graders
8/13/2017	Kingston, NY	ISF Crew	Workshop	5	ISF Crew
2/2/2016	Ulster, NY	Town Hall Public Hearing	Presentation	30	Municipal Leaders, general public
3/16/2016	Riverdale, NY	Riverdale Elem School	Presentation	60	3rd graders
1/17/2017	Ossining, NY	Town Hall Public Hearing	Presentation	12	Municipal Leaders, general public
1/19/2017	Newburgh, NY	Excelsior Academy HS	Presentation	25	9th grade students
1/19/2017	Newburgh, NY	Excelsior Academy HS	Presentation	25	9th grade students
2/14/2017	Albany, NY	EPF Day	Presentation	5	Senators
3/8/2017	Highland, NY	Town Hall Public Hearing	Presentation	8	Municipal Leaders
3/22/2017	Putnam Valley, NY	Lake Association Meeting	Presentation	30	Municipal Leaders, general public
4/13/2017	Millbrook, NY	Federated Sportsman Clubs of Dutchess Co	Presentation	35	Boaters and Fisherman
4/29/2017	Kingston, NY	Citizen Science Sail	Presentation	40	General Public
5/17/2017	Brewster, NY	Trout Unlimited DEP Talk	Presentation	9	DEP staff, Trout Unlimited Leaders
6/6/2017	NYC	NY Harbor School	Presentation	20	10th grade students
6/6/2017	NYC	NY Harbor School	Presentation	25	10th grade students
7/12/2017	Kingston, NY	Invasive Species Panel	Presentation	20	General Public
2/11/2017	Croton, NY	Eaglefest	Tabling	200	General Public
4/22/2017	Ossining, NY	Earth Day	Tabling	150	General Public
5/13/2017	Coxsackie, NY	Earth Day	Tabling	30	General Public
6/4/2017	Croton, NY	Croton Summerfest	Tabling	30	General Public
6/11/2017	Beacon, NY	Strawberry Festival	Tabling	200	General Public
6/17/2017	Croton, NY	Revival	Tabling	300	General Public
6/18/2017	Croton, NY	Revival	Tabling	300	General Public

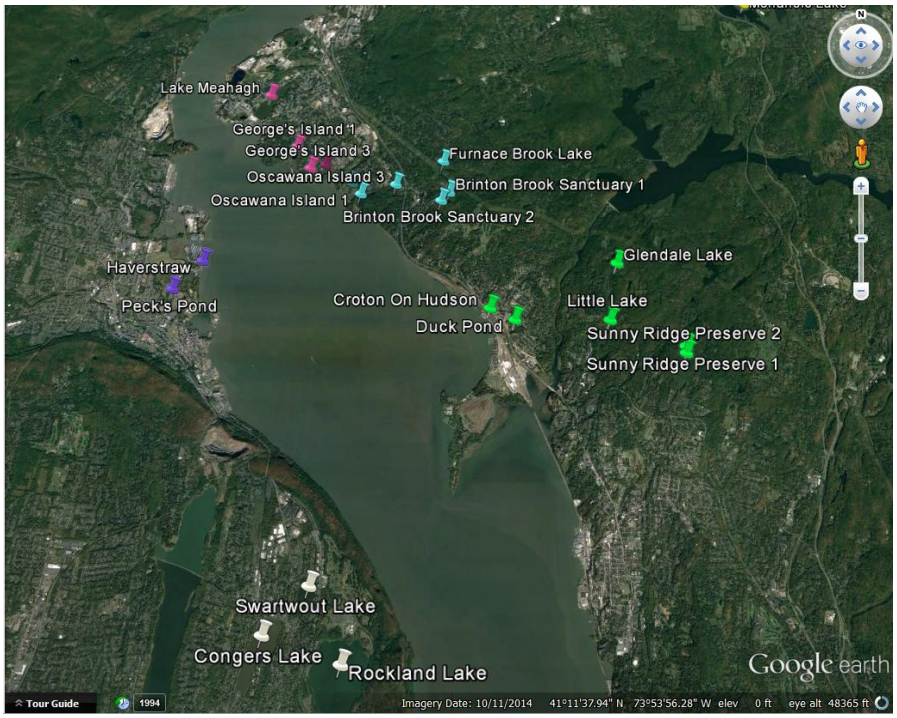
6/24/2017	Kingston, NY	River Day	Tabling	40	General Public
7/9/2017	Putnam Valley, NY	Indian Lake Training	Training	4	Lake Association
7/15/2017	Mohegan Lake, NY	Lake Day	Training	10	Lake Association
8/5/2017	Harriman, NY	American Canoe Association	Training	12	General Public
8/10/2017	Ossining, NY	Young Women at the Helm	Training	25	Ages 12-17
9/2/2017	Orange County, NY	Lake Guymard Lake Assoc	Training	12	Lake Association
9/5/2017	Kingston, NY	Crew AIS Training	Training	10	Clearwater Crew

Appendix B:

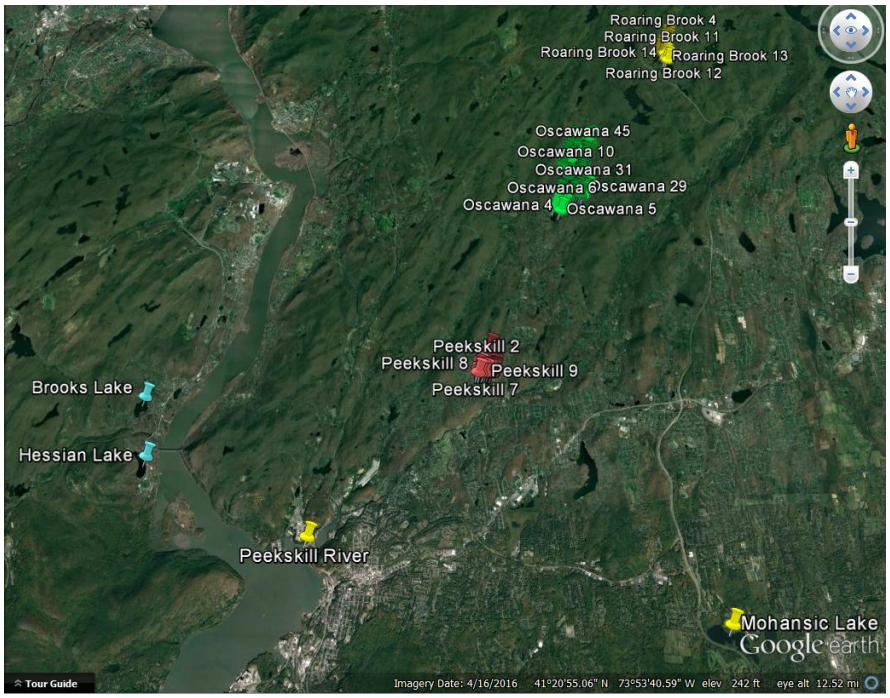


Overview of waterbodies surveyed in 2016


Lake Tiorati
Lake Askoti
Little Long Pond
Lake Skannatati
Lake Kanawauke
Lake Welch
Imagery Date: 4/16/2016


Lake Meahagh
George's Island 1
George's Island 3
Oscawana Island 3
Oscawana Island 1
Furnace Brook Lake
Brinton Brook Sanctuary 1
Brinton Brook Sanctuary 2
Haverstraw
Peck's Pond
Glendale Lake
Croton On Hudson
Little Lake
Duck Pond
Sunny Ridge Preserve 2
Sunny Ridge Preserve 1
Swartwout Lake
Congers Lake
Rockland Lake
Google earth
Tour Guide
Imagery Date: 10/11/2014


Little Pine Lake
Spruce Lake
Hemlock Lake
Big Pine Lake
Laurel Lake
41°20'04.30" N 73°35'28.80" W elev 421 ft


Roaring Brook 4
Roaring Brook 11
Roaring Brook 14
Roaring Brook 13
Roaring Brook 12
Oscawana 45
Oscawana 10
Oscawana 31
Oscawana 6
Oscawana 29
Oscawana 4
Oscawana 5
Peekskill 2
Peekskill 8
Peekskill 9
Peekskill 7
Brooks Lake
Hessian Lake
Peekskill River
Mohansic Lake
Google earth
Tour Guide
Imagery Date: 4/16/2016 41°20'55.06" N 73°53'40.59" W elev 242 ft eye alt 12.52 mi