

New Hampshire Lakes Association Lake Host™ Program

2015 Manual



Aquatic Invasive Species Education and Prevention Program

Brought to New Hampshire lakes and ponds by local groups and:

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 NEW HAMPSHIRE
LAKES
Members dedicated to protecting lakes and their watersheds

April 23, 2015

Dear Lake Hosts and Point Persons,

The boating season is here—finally! It was a long, cold, and snowy winter here in New Hampshire. As I write this, reports of ‘ice-out’ are coming in from our lake friends throughout the state. While it may be a few more days until ice goes out on the biggest lakes, marinas and boaters throughout the state are getting their boats ready for launch. As a Lake Host, you know that with ice-out comes the threat of aquatic invasive species hitchhiking into our lakes and ponds...

Since 2002, Lake Hosts have conducted more than 664,779 courtesy boat inspections and have officially captured 1,467 pieces of hitchhiking aquatic invasive species before they were able to infest another waterbody! In 2014, our 750 Lake Hosts together set a season record of 83,663 boat inspections, topping the record of 77,254 set in 2012. By encouraging boaters to always take time to “Clean, Drain and Dry” their boats, trailers, and gear before and after boating—even when a Lake Host isn’t at the ramp to help—Lake Host efforts have surely contributed to the prevention of many more aquatic invasive species from sneaking into New Hampshire waterbodies.

While the 2014 Lake Hosting season ended on Columbus Day weekend last October, it has been an exciting past six months for the Lake Host Program. On November 10, the New Hampshire Lakes Association (NH LAKES) was awarded the 2014 Spirit of New Hampshire Outstanding Volunteer Champion Award. And, on February 25, NH LAKES received the 2015 Outstanding Invasive Species Volunteer Award at the National Invasive Species Achievement Awards Ceremony held in Washington D.C. NH LAKES accepted both of these prestigious awards for the management of its Lake Host Program which has leveraged tremendous volunteer participation over the years. Thank you and congratulations to all of our Lake Hosts, especially our volunteers!

The Lake Host Program—the premier education and stewardship program of NH LAKES—officially kicks off its fourteenth season in mid-May. Approximately 750 Lake Hosts stationed at 105 of the most highly used boat ramps throughout the state will continue to teach boaters how to prevent the spread of aquatic invasive species. As invasive species—plants and animals—continue their march east and north towards New Hampshire, it is more important than ever that we encourage all boaters to take the time to “Clean, Drain and Dry” their boats, trailers, and gear in-between waterbodies. Our lakes and future generations are counting on you, Lake Hosts!

Whatever your reason for participating in the Lake Host Program—whether you wanted a summer job, something to add to your resume, a way to help protect your investment along a lake, or a reason to sit by the lake and read a book, paint a picture, knit a sweater, or write a novel—thank you for doing your part to protect New Hampshire lakes and ponds from the spread of aquatic invasive species.

On behalf of the New Hampshire Lakes Association,

Andrea LaMoreaux
Vice President

HAVE YOU SEEN OUR NEW VIDEOS YET?

We are pleased to announce that we have two new videos to help spread the word about the aquatic invasive species problem in New Hampshire and how Lake Hosts can help prevent their spread.

- *Aquatic Invasive Species In New Hampshire’s Waters – The past, present and future?*
- *Protect Our Lakes: How to Lake Host*

These videos will be shown at the official Lake Host training sessions and can be viewed on our website at www.nhlakes.org/lake-host.

We ask that all Lake Hosts watch these videos—they will help you do your job as a Lake Host!

And, we thank Umbrella Productions of Warner, New Hampshire, for their help in producing these videos!

Table of Contents

Lake Host Program Summary_____	1
Aquatic Plants and Their Role in Lake Ecology_____	3
NH's Aquatic Invasive Species Laws_____	5
Waterbodies in NH with Aquatic Invasive Species_____	8
Aquatic Invasive Species Fact Sheets	
Variable Milfoil_____	9
Eurasian Milfoil_____	10
Fanwort_____	10
Water Chestnut_____	10
Zebra Mussel_____	11
Asian Clam_____	13
Didymo_____	14
Spiny Water Flea_____	16
Point Person/Managing Lake Host Position Description_____	17
Lake Host Position Description_____	19
Lake Host Job Expectations and Tips_____	20
Inspection Diagrams_____	23
Specimen Identification Bag Example_____	24
Boater Survey Sheet_____	25
Boater Daily Summary Sheet_____	26
Lake Host Timesheet_____	27
Lake Host Volunteer Match Sheet_____	28

In Memoriam

On September 1, 2014, **Bruce Anderson** and **David (Dave) Ingalls**, both of Kingston, New Hampshire, were killed in a plane crash. Bruce and Dave were members of the Kingston Lake Association and were actively involved in the NH LAKES Lake Host Program and are greatly missed.



New Hampshire Lakes Association (NH LAKES) Lake Host™ Program

Goal: To prevent the introduction and spread of aquatic invasive species—plants and animals—in New Hampshire’s lakes and ponds.

Target Audience: Resident and out-of-state recreational boaters and anglers who launch onto freshwater resources, lawmakers and the general public.

Objectives: To place trained Lake Hosts at boat launch sites to: educate visiting boaters about aquatic invasive species by distributing brochures, answering questions, and completing a brief boater survey; conduct courtesy boat and trailer inspections of vessels both entering and leaving public waters; show boaters where to look for hitchhiking aquatic invasive plants and animals encourage them to conduct self-inspections according to the “Clean, Drain & Dry” method; remove and properly dispose of all plant and animal material and other debris found, and; send samples of suspicious species removed from vessels to the New Hampshire Department of Environmental Services (NHDES) for identification.



Program Need: Aquatic invasive species infestations make recreation in and on lakes, ponds and rivers dangerous and unpleasant, they disrupt the ecological balance of waterbodies, reduce shoreline property values through the reduction of aesthetic and recreational uses of the water body, and are difficult and expensive to control once they infest a waterbody. The main way invasive aquatic plants and animals are spread in New Hampshire is through the transportation of fragments or larvae or on boats and trailers from infested waterbodies to uninfested waterbodies.

Background: In 2002, NH LAKES received a two-year grant from the National Oceanic and Atmospheric Administration (NOAA) as a result of an appropriation secured by U.S. Senator Judd Gregg. The grant supported a comprehensive aquatic invasive plant education and prevention program involving the creation of two videos, the development of plant identification cards, and the staffing of public motorized boat ramps with trained Lake Hosts.

Also in 2002, state legislation was passed to raise boat registration fees by three dollars, effective January 1, 2003. The money collected by this increase, approximately \$300,000 per year, would fund milfoil and other exotic plant prevention and research activities through a grants program administered by NHDES. Up to two-thirds of this amount would be available annually as grants to support exotic aquatic species education and prevention activities (such as the Lake Host™ program). In 2010, this amount was legislatively amended to up to three-quarters. In the winter of 2003, NH LAKES applied for, and was awarded, a \$165,000 grant from NHDES to administer the Lake Host™ program that summer. Subsequent state grants for 2004 through 2014 are indicated below.

Lake Host Program Statistics 2002 – 2014

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Participating Groups (#)	38	46	51	56	57	68	70	71	74	73	77	81	81
Paid Lake Hosts (#)	102	149	190	175	204	221	240	236	230	219	238	247	258
Volunteer Lake Hosts(#)	59	167	216	318	353	429	470	420	517	475	500	500	500
Waterbodies with Lake Hosts (#)	37	45	50	56	56	64	70	71	74	74	78	82	82
Ramps Covered (#)	45	59	61	61	66	83	88	86	90	92	100	103	102
Inspections Conducted (#)	15,878	26,583	31,629	34,878	34,573	44,183	55,924	53,756	62,295	68,158	77,254	76,005	83,663
‘Saves’ (# aquatic invasive species found)	4	7	16	54	54	157	224	297	267	39	137	153	58
Federal Funds	\$260,100	\$10,000	\$85,300	\$35,000	\$117,000	\$117,000	\$89,206	\$89,206	\$0	\$0	\$0	\$0	\$0
State Funds	\$0	\$165,000	\$150,000	\$185,000	\$185,000	\$185,000	\$161,000	\$123,333	\$133,367	\$169,000	\$200,000	\$210,000	\$230,000
Foundations								\$4,000	\$22,000	\$23,000	\$14,500	\$18,259	\$22,500
Local Funds (hard cash and cash-equivalents)	\$37,155	\$112,382	\$151,238	\$200,756	\$183,179	\$292,017	\$334,061	\$341,535	\$393,273	\$404,751	\$486,455	\$494,248	\$512,372
TOTAL PROGRAM	\$297,255	\$287,382	\$386,538	\$420,756	\$485,179	\$594,017	\$584,267	\$558,074	\$548,640	\$596,751	\$700,955	\$722,507	\$764,872

Additional Funding Sources: Supplemental funding has been secured from the following sources: EPA New England Office (2003); NOAA (2004, 2006, 2008, 2009); Watershed Assistance Grant (319 Clean Water Program); EPA’s

Healthy Communities Grants Program (2005); Alden N. Young Trust (2011-2014); Badger Monadnock Fund (2011); Saul O'Sidore Foundation (2010); TransCanada (2009-2014); and an anonymous private foundation (2010).

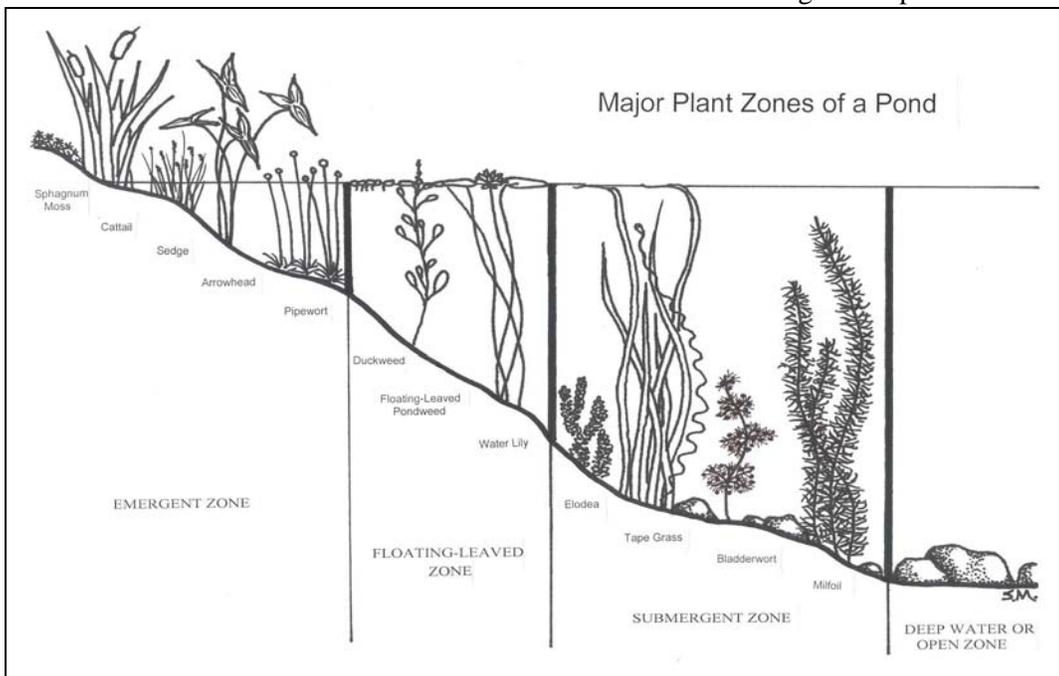
As a result of the program, the following 'saves' have been made of aquatic invasives entering or leaving a waterbody:

- **Beaver Lake** (Derry): Fanwort (2008, 2009), Variable milfoil (2008, 2011), Eurasian milfoil (2012)
- **Bow Lake** (Northwood): Variable milfoil (2003, 2005), Eurasian milfoil (2005, 2009), Milfoil species (2014)
- **Clough Pond** (Loudon): Variable milfoil (2005)
- **Connecticut River** (Hinsdale): Eurasian milfoil (2010), European naiad (2010)
- **Conway Lake** (Conway): Variable milfoil (2011), Eurasian milfoil (2014)
- **Crescent Lake** (Acworth): Eurasian milfoil (2003, 2012), Fanwort (2003)
- **Crystal Lake** (Enfield): Water chestnut (2005), Eurasian milfoil (2010)
- **Deering Reservoir** (Deering): Eurasian Milfoil (2013), Variable milfoil (2014)
- **Eastman Lake** (Grantham): Eurasian milfoil (2010)
- **First Connecticut Lake** (Pittsburg): Variable milfoil (2014)
- **Gilmore Pond** (Jaffrey): Water chestnut (2005)
- **Goose Pond** (Canaan): Eurasian milfoil (2007), Variable milfoil (2009)
- **Granite Lake** (Nelson/Stoddard): Curly leaf pondweed (2009, 2011); Eurasian milfoil (2011, 2013); Variable milfoil (2011)
- **Great East Lake** (Wakefield): Eurasian milfoil (2006, 2008), Fanwort (2010), Variable milfoil (2007, 2008, 2009, 2010, 2013)
- **Highland Lake** (Stoddard): Eurasian milfoil (2005)
- **Island Pond** (Stoddard): Variable milfoil (2013)
- **Jenness Pond** (Northwood): Variable milfoil (2005)
- **Lake Francis** (Pittsburg): Variable milfoil (2014)
- **Lake Massabesic** (Auburn): Fanwort (2013), Variable milfoil (2012, 2014)
- **Lake Monomonac** (Rindge): Eurasian milfoil(2004); Curly leaf pondweed(2004), Variable milfoil (2004, 2005, 2007, 2008, 2014)
- **Lake Ossipee** (Ossipee): Eurasian milfoil (2010), Variable milfoil (2009, 2011, 2012)
- **Lake Potanipo** (Brookline): Fanwort (2010), Variable milfoil (2010, 2011, 2012)
- **Lake Sunapee** (Sunapee): milfoil (2005), Eurasian milfoil (2006, 2007, 2008, 2009), variable milfoil (2007)
- **Lake Waukewan** (Meredith): Eurasian milfoil (2003), Variable milfoil (2007, 2008)
- **Lake Wentworth** (Wolfeboro): Variable milfoil (2008)
- **Lake Wicwas** (Meredith): Variable milfoil (2010)
- **Lake Winnepesaukee** (Meredith, Alton, Gilford, Moultonborough, Tuftonboro, Wolfeboro): Fanwort (2003, 2007); Variable milfoil (2004, 2007, 2008, 2009, 2010, 2011, 2012, 2014), Eurasian milfoil (2012)
- **Lake Winnisquam** (Laconia): Variable milfoil (2008)
- **Little Lake Sunapee** (New London): Variable milfoil (2011)
- **Lovell Lake** (Wakefield): Variable milfoil (2006, 2007, 2013)
- **Merrymeeting Lake** (New Durham): Variable milfoil (2007, 2010, 2012, 2013, 2014), Water Chestnut (2012)
- **Mirror Lake** (Tuftonboro): Chinese mystery snail (2014)
- **Newfound Lake** (Bristol): Eurasian milfoil (2006, 2009, 2010, 2011, 2014), Fanwort (2003, 2006, 2013), Variable milfoil (2002, 2006, 2007, 2008, 2009, 2014), Water Chestnut (2009, 2010), Water naiad (2014)
- **Northwood Lake** (Northwood): Curly leaf pondweed(2007), Eurasian milfoil(2007), Variable milfoil(2008,2010,2011,2013,2014)
- **Nubanusit Lake** (Nelson/Hancock): Curly leaf pondweed (2009), Eurasian milfoil (2002, 2004), Variable milfoil (2007, 2008)
- **Ottarnic Pond** (Hudson): Curly leaf pondweed (2013), Fanwort (2005, 2006, 2007, 2008, 2012, 2013, 2014), Variable milfoil (2006, 2007, 2010, 2011, 2012, 2013, 2014)
- **Pawtuckaway Lake** (Nottingham): Common reed (2007), Curly leaf pondweed (2010, 2013, 2014), Eurasian milfoil (2009, 2010, 2011, 2012, 2014), Fanwort (2009, 2011), Variable milfoil (2007, 2008, 2009, 2010,2012,2013,2014), Water chestnut (2008, 2014)
- **Pleasant Lake** (Deerfield): Eurasian milfoil (2011), Variable milfoil (2004, 2007, 2013)
- **Pleasant Pond** (Francetown): Curly leaf pondweed (2009), Eurasian milfoil (2006); Variable milfoil (2011, 2013, 2014)
- **Pow Wow Pond** (Kingston): Chinese mystery snail (2013), Variable milfoil (2013)
- **Robinson Pond** (Hudson): Chinese mystery snail (2013), Fanwort (2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), Variable milfoil (2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), Eurasian milfoil (2012)
- **Silver Lake** (Madison): Variable milfoil (2002, 2004, 2006)
- **Lake Skatutakee** (Harrisville): Eurasian milfoil (2005)
- **Spofford Lake** (Chesterfield): Eurasian milfoil (2002, 2005, 2008, 2011, 2013)
- **Squam Lake** (Holderness): Curly leaf pondweed (2009), Eurasian milfoil (2007), Fanwort (2013)
- **Suncook Lake** (Barnstead): Variable milfoil (2009, 2013)
- **Swanzey Lake** (Swanzey): Variable milfoil (2011), Eurasian milfoil (2012), Water chestnut (2014)
- **Webster Lake** (Franklin): Eurasian milfoil (2011,2012,2014), Fanwort (2010), Variable milfoil(2009), Curly leaf pondweed(2012)

For More Information: To participate in the Lake Host program, or to become a program sponsor, contact NH LAKES at (603) 226-0299, or info@nhlakes.org. More information can also be found at www.nhlakes.org.

Aquatic Plants and Their Role in Lake Ecology

Aquatic plants are a common sight in New Hampshire's waterbodies, and many lake residents, as well as visitors to New Hampshire's numerous waterbodies, may question the importance and role of aquatic vegetation. One may ask whether these plants are beneficial or detrimental to the health of a lake ecosystem. This fact sheet will seek to address the most commonly asked questions and concerns regarding aquatic vegetation and their role in lake ecology.



What types of aquatic plants live in my lake? There are three common categories of aquatic vegetation; emergent, submergent, and floating. The first category is often the first one encountered as you approach a lake or pond, and is called the “emergent” vegetation. Emergent vegetation is one of the most common types of aquatic vegetation and it grows with its roots down in the sediment and the majority of the shoots stick up out of the water. Submergent plants are those that are wholly underwater and may be rooted or unrooted. Floating leaved plants are those that have leaves that float on the surface of the water and can be rooted or unrooted. Smaller plants called phytoplankton, commonly known as algae, are also present in our waterbodies and though present in the shallows near shore, are the primary plants found in deeper water of lakes where it is too deep for other vegetation to grow or root.

In most cases all of these vegetative forms are present in a waterbody, creating a diverse aquatic habitat for a wide range of organisms. All types of aquatic vegetation are beneficial to a lake ecosystem provided that they are native to New Hampshire waters.

What are the benefits of aquatic plants? Aquatic plants provide many of the same functions as terrestrial plants. Aquatic plants provide a food source, habitat, removal of carbon dioxide, and production of oxygen through photosynthesis. Plants act as the producers in an ecosystem since they produce their own food as well as food for the consumers or animals of that ecosystem. Aquatic vegetation provides food for tiny microscopic animals called zooplankton, fish, waterfowl, moose and other mammals, and in some cases humans.

Aquatic vegetation also acts as a habitat. Submerged vegetation provides a habitat for small fish which may seek refuge from predators. They may also use this vegetation as spawning beds to lay their eggs. Emergent vegetation provides a habitat for certain songbirds, or wading birds that may nest at these sites or use them as feeding areas.

Not all aquatic plants are nuisances which require removal. Native plants provide many benefits to the lake including spawning and habitat areas for organisms in the lake, as well as fishing and wildlife viewing areas for the residents around the lake.

The wildlife that resides on a lake, as a result of healthy habitats, adds to its serenity. Melodies sung by songbirds, the cry of the common loon, the chirping of frogs, dazzling dragonflies, the painted turtle sunning itself on a rock, and even the majestic herons would be threatened if it weren't for the food and habitat which aquatic vegetation provide.

Aquatic plants also provide several items which humans use. Some of these include rice, cranberries, blueberries, fiber for rope, reeds for caning, herbs, medicinal compounds, and aesthetic items such as flowers and colorful fruits and berries for decoration.

What can be done to limit nuisance amounts of plant growth? As a lake resident or concerned citizen, be aware of the activities that take place within the watershed. Nonpoint source pollution is the most

common means of nutrient transport into a waterbody. Runoff from roads, septic systems, lawns, and agriculture may bring with it much nitrogen and phosphorus and even silt and sediment. In freshwater, phosphorus is a nutrient that limits plant growth. The lower the phosphorus levels, the fewer the plants. The best way to protect a waterbody is by protecting its shoreland by maintaining a healthy, well-distributed stand of trees, saplings, shrubs, and groundcover, which act as a filter for nutrients and sediments.

Aquatic plants are a natural and beneficial part of your lake. Aquatic plants are found in most lakes and ponds in New Hampshire. They are a natural component and vital link to a healthy and diverse aquatic ecosystem. When aquatic plants interfere with human activities, the plants may be quickly viewed as “weeds,” or nuisances that must be removed. However, complete removal of native plants is not recommended. Not only is it costly and impractical, and may need a permit, it is detrimental to a healthy lake ecosystem. In addition, if the lake is cleared of its native aquatic vegetation, invasive exotic aquatic vegetation may start to colonize the lake, or the lake may shift to an algal dominated system in which clarity is low and the water is murky. This occurrence has been proven in a number of New Hampshire waterbodies where disturbances to native plant communities have taken place. Maintaining a healthy and diverse population of native plant life in a waterbody is the ultimate goal.

If you suspect you find a plant that may be an aquatic invasive species, please contact the DES Exotic Species Program immediately at (603) 271-2248.

Aquatic Invasive Plant Main Points

What are aquatic invasive plants? Aquatic invasive plants are exotic aquatic plants that are not native to New Hampshire, and that have certain invasive characteristics that allow them to grow more rapidly than native vegetation, thereby taking over a water body. Native aquatic plants, on the other hand, are vital to a healthy lake or pond; they are kept in check through natural controls (predators and other environmental factors).

Why are invasive aquatic plants a problem? Invasive aquatic plants are problematic as they can clog waterbodies, impede recreational activities like swimming, fishing and boating, and they can be economically and ecologically harmful as well. In some states, milfoil and other invasive aquatic plants have been implicated in people drowning.

What is the extent of the problem? Invasive aquatic plants are now found in 78 waterbodies in New

Hampshire. Sixty-seven waterbodies have variable milfoil, five have Eurasian milfoil, nine have fanwort, three have curly-leaf Pondweed, one has Brazilian elodea, a couple have European Naiad, and one has water chestnut. Some waterbodies have multiple infestations of plants (as many as six). Invasive species are spreading to new lakes and ponds at the rate of one to two new infestations annually.

What is the law that pertains to exotic aquatic plants in New Hampshire? RSA 487:16-a prohibits the sale, introduction, propagation, purchase, importation and transportation of 27 listed prohibited species in New Hampshire. Chapter Env-Wq 1300 is where Administrative Rules on the program are found.

How are aquatic invasive species spread? New exotic species are brought into the country and state via the pet and nursery industry. Occasionally these species escape into the wild and become invasive. Once in our lakes and ponds, the transient boater is the prime mechanism of spread from waterbody to waterbody. While birds are often thought to be a vector, it is unlikely that they are the cause of very many infestations.

What control measures are being used in NH?

Various management practices are being used (in an approach termed Integrated Plant Management), including hand-pulling, benthic barriers, and herbicide applications. Once entrenched, invasive plants are very difficult to manage, and likely cannot be eradicated. Management practices cost hundreds of thousands of dollars annually.

What education activities are being used? Numerous education strategies are used to spread the word about invasive species. The use of volunteer Weed Watchers, Lake Hosts, and other interested parties helps to spread the word. The Department of Environmental Services’ (DES) staff, along with NH LAKES and other organizations, include the topic of aquatic invasive species in various public presentations throughout the state. Additionally, fact sheets, pamphlets, and other educational materials are distributed on a wide basis throughout the state. Signs are also posted at access sites to inform the lake user whether or not a particular waterbody is infested with an aquatic invasive plant, and what they should do to protect the lake.

What about research to solve the problem controlling and/or eventually eradicating aquatic invasive species? DES continues to coordinate and fund projects associated with aquatic invasive plant research. Recent projects include an evaluation of seed viability of variable milfoil to determine if regrowth is common from milfoil seeds in bottom sediments. DES is also conducting research to try to limit the dosing and number of treatments when herbicide treatments are required to reduce an infestation.

ENVIRONMENTAL Fact Sheet



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What are New Hampshire's Exotic Aquatic Plant Laws?

As of January 1, 1998, the **sale, distribution, importation, purchase, propagation, transportation, or introduction** of exotic aquatic weeds in the state **is prohibited** (RSA 487:16-a). This law was designed to act as a tool for lake managers to help prevent the spread of nuisance aquatic weeds. It is hoped that by preventing their transport over land, their spread between lakes will be stopped.

What are exotic aquatic weeds? Exotic aquatic weeds include only those species of vascular aquatic plants which were not part of New Hampshire's native aquatic flora before 1950. This list contains 28 exotic plants:

Latin Name	Common Name(s)
All <i>Myriophyllum</i> species	Milfoils or feather-foils
All <i>Cabomba</i> species	Fanworts
<i>Hydrilla verticillata</i>	Hydrilla or Anacharis
All <i>Trapa</i> species	Water chestnut
<i>Potamogeton crispus</i>	Curly-leaf pondweed
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Phragmites australis</i> or <i>P. communis</i>	Common reed
<i>Egeria densa</i>	Brazilian elodea
<i>Hydrocharis morsus-ranae</i>	European frogbit
<i>Butomus umbellatus</i>	Flowering rush
<i>Najas minor</i>	European naiad
<i>Nymphoides peltata</i>	Yellow floating heart
<i>Crassula helmsii</i>	Swamp stonecrop
<i>Epilobium hirsutum</i>	Great willow herb or hairy willow herb
<i>Glyceria maxima</i>	Reed sweet grass or manna grass
<i>Hygrophila polysperma</i>	East Indian Hygrophila
<i>Ipomoea aquatica</i>	Water spinach
<i>Iris pseudocarus</i>	Yellow iris or yellow flag iris
<i>Lagarosiphon major</i>	African oxygen weed
<i>Limnophila sessiliflora</i>	Ambulia
<i>Marsilea quadrifolia</i>	Water fern
<i>Myosotis scorpiodes</i>	Water forget-me-not
<i>Sagittaria japonica</i>	Double flowering arrowhead, Japanese arrowhead, or old world arrowhead
<i>Sagittaria sagittifolia</i>	Giant sagittaria
<i>Typha gracilis</i>	Slender cattail
<i>Typha laxmanii</i>	Dwarf cattail or Laxman's cattail
<i>Typha minima</i>	Miniature cattail or micro-mini cattail
<i>Salvinia molesta</i>	Giant salvinia

What are the penalties for spreading exotic aquatic plants? It shall be unlawful to knowingly, recklessly, or purposely offer for sale, distribute, sell, import, purchase, propagate, or introduce exotic aquatic weeds into New Hampshire waterbodies (487:16-b). Any person engaging in such an activity shall be guilty of a violation and may be subject to an **administrative fine of up to \$2000**.



NH Fish and Game Department

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Aquatic Invasive Animal Species in New Hampshire

The Fish and Game Department regulates fishing and importation and release of animals (vertebrates and invertebrates) in the state, including possession, transport, and use of aquatic invasive species by anglers, bait dealers, and aquaculture producers.

Stop Aquatic Hitchhikers!

Aquatic Invasive Species are hitching rides to new waters. These invaders spread quickly, wreak havoc on native plants and animals, degrade the quality of aquatic resources and make waters unusable for boating, fishing, and swimming.

Aquatic invasive species includes both plants and animals such as zebra mussels, exotic milfoil and fish, which can easily be transported to new waters by boats, motors, trailers, fishing equipment, livewells, bait buckets, diving gear, and other aquatic recreational equipment.

The quality of New Hampshire's waters are extremely valuable both as a natural and economic resource. In addition to providing essential aquatic habitat, New Hampshire's waters annually provide ~14.7 million visitor days for boating, fishing, and swimming, which are popular family-oriented recreational activities that generate more than \$1 billion to the state's economy.

Preventing the spread of aquatic invasive species is the most environmentally sound and cost-effective method for battling aquatic hitchhikers since once they become established, aquatic invasive species can be impossible to contain and control.

New Hampshire has laws and regulations that prohibit the import and possession of these alien invaders. Additionally, the release of any amphibian, reptile, or fish is illegal without first obtaining special permits issued by the New Hampshire Fish and Game Department.

Compliance with the importation, possession, and release laws is critically important because it represents the most effective strategy for preventing the destruction caused by aquatic invasive species. Please remember, unwanted plants and animals should never be disposed of in New Hampshire's waters because the potential harm caused by this action can devastate aquatic habitat essential to native plants and animals.

N.H. laws and Fish and Game rules related to aquatic invasive species

Prohibited Species - Importation and Possession

No person shall be issued a permit to import (*Fis 803.03 & Fis 803.04(b)*) or possess (*Fis 804.03*) the following designated prohibited wildlife:

Invertebrates:

Zebra mussels (*Dreissena polymorpha*, *D. bugensis*)
Spiny waterflea (*Bythotrephes cederstroemi*)
Fishhook waterflea (*Cercopagis pengoi*)
All non-indigenous crayfish
Asiatic clam (*Corbicula fluminea*)

Fish:

Walking catfish (*Clarias batrachus*)
White amur/grass carp (*Ctenopharyngodon idella*)
Black carp (*Mylopharyngodon piceus*)
European rudd (*Scardinius erythrophthalmus*)
Round goby (*Neogobius melanostomus*)
Tubenose goby (*Proterhinus marmoratus*)
Ruffe (*Gymnocephalus cernuus*)
Snakeheads (Family: Channidae)

[NOTE: *Fis 803.03*, *803.04(b)*, and *804.03* effective as of June 5, 2007]

Prohibited Species - Release (*Fis 805.01*)

No person shall be issued a permit to release the following designated prohibited wildlife:

Amphibians	All indigenous imported into the state
	All exotics
Reptiles	All indigenous imported into the state
	All exotics
Fish	All species listed as prohibited for importation and release
	All non-indigenous species
	Any species not naturalized in New Hampshire
Invertebrates	All indigenous imported into the state
	All exotics

Definitions

"Aquatic species" includes, but are not limited to, all fish, crustaceans, mollusks, invertebrates and aquatic plants that usually inhabit fresh water. (RSA 211:62-e)

"Exotic species" means wildlife that are non-indigenous species (not naturally occurring or naturalized in New Hampshire). (Fis 801.08)

"Import" means bringing or causing wildlife to be transported into the state by any means. (Fis 801.11)

"Prohibited" means that the wildlife species or activity such as collection, importation, transportation, possession, sale, transfer or release of that wildlife is not allowed. (Fis 801.19)

"Wildlife" refers to all species of mammals, birds, fish, mollusks, crustaceans, amphibians, invertebrates, reptiles or their progeny or eggs which, whether raised in captivity or not, are normally found in a wild state. (RSA 207:1, XXXV)

For More information:

Visit the NH Fish and Game website at http://www.wildlife.state.nh.us/Fishing/aquatic_nuisance.htm#laws.

Waterbodies in New Hampshire containing aquatic invasive species growth (as of 4/17/15)

Lake Hosts: Please photocopy and attach to the back of your inspection clipboard for quick reference!

Waterbody (TOWN)	Species
Arlington Mill Reservoir (SALEM)	Fanwort
Ashuelot River (WINCHESTER)	Variable milfoil
Baboosic Lake ((AMHERST)	Variable milfoil
Balch Lake (WAKEFIELD)	Variable milfoil
Barnstead Parade Pond/Suncook (BARNSTEAD/ PITTSFIELD)	Variable milfoil
Beaver Lake (DERRY)	Variable milfoil
Belleau Lake (WAKEFIELD)	Variable milfoil
Big Island Pond (DERRY)	Variable milfoil, Fanwort
Big Turkey Pond (CONCORD)	Variable milfoil
Bixby Pond (EPSOM)	Variable milfoil
Brindle Pond (BARNSTEAD)	Variable milfoil
Captain Pond (SALEM)	Variable milfoil
Cheshire Pond (JAFFREY)	Variable milfoil
	Variable milfoil
	Asian clam
Cobbetts Pond (WINDHAM)	Asian clam
Cocheco River (ROCHESTER)	Variable milfoil
Connecticut River (CHARLESTOWN)	Eurasian milfoil European Naiad Didymo (rock snot) Curly-leaf Pondweed
Contoocook Lake (JAFFREY)	Variable milfoil
Contoocook River (VARIOUS LOCATIONS)	Variable milfoil
Crescent Lake (WOLFEBORO)	Variable milfoil
Danforth Pond (FREEDOM)	Variable milfoil
Dublin Lake (DUBLIN)	Variable milfoil
Flints Pond (HOLLIS)	Variable milfoil
Forest Lake (WINCHESTER)	Variable milfoil
Glen Lake (GOFFSTOWN)	Variable milfoil
Gorham Pond (DUNBARTON)	Variable milfoil
Halfmoon Pond (BARNSTEAD)	Variable milfoil
Hopkinton Lake/Dam (HOPKINTON)	Variable milfoil
Horseshoe Pond (MERRIMACK)	Variable milfoil
Jones Pond (Stumpfield Pond) (NEW DURHAM)	Variable milfoil
Kimball Pond (HOPKINTON)	Variable milfoil
Lake Pemigewasset (MEREDITH)	Variable milfoil
Lees Pond (MOULTONBOROUGH)	Variable milfoil
Little Suncook River (EPSOM/NORTHWOOD)	Variable milfoil
Little Turkey Pond (CONCORD)	Variable milfoil
Locke Lake (BARNSTEAD)	Variable milfoil
Long Pond (DANVILLE)	Variable milfoil
Long Pond (PELHAM)	Asian clam
Mascoma Lake (ENFIELD)	Eurasian milfoil
	Variable milfoil, Fanwort
Massabesic Lake (AUBURN)	Variable milfoil, Fanwort
Massasecum Lake (BRADFORD)	Variable milfoil
Melendy Pond (BROOKLINE)	Variable milfoil
Merrimack River (BOSCAWEN/ CANTEBURY/CONCORD)	Variable milfoil
Merrimack River (LOWER)	Asian clam
	Variable milfoil, Fanwort
Mine Falls Pond (NASHUA)	Variable milfoil, Fanwort

Waterbody (TOWN)	Species
Monomonac Lake (RINDGE)	Variable Milfoil
Mountain Pond (BROOKFIELD)	Eurasian milfoil
Nashua River (NASHUA)	Variable milfoil Eurasian milfoil
	Curly-leaf Pondweed Fanwort Water Chestnut
	European Naiad
Naticook Lake (MERRIMACK)	Variable milfoil
Northwood Lake (NORTHWOOD)	Variable milfoil
Nutts Pond (MANCHESTER)	Brazilian elodea
Opechee Lake (LACONIA)	Variable milfoil
Ossipee Lake (Broad Bay) (FREEDOM)	Variable milfoil
Ottarnic Pond (HUDSON)	Variable milfoil, Fanwort
Otter Lake (GREENFIELD)	Variable milfoil
Paugus Bay (LACONIA)	Variable milfoil
Pearly Pond (RINDGE)	Variable milfoil
Pemigewasset Lake (NEW HAMPTON)	Variable milfoil
Pemigewasset River (SANBORNTON)	Variable milfoil
Phillips Pond (SANDOWN)	Fanwort
Piscataquog River (GOFFSTOWN)	Variable milfoil
Post Pond (LYME)	Eurasian milfoil
Potanipo Lake (BROOKLINE)	Variable milfoil
Powder Mill Pond (HANCOCK)	Variable milfoil
Powwow Pond (KINGSTON)	Variable milfoil
Robinson Pond (HUDSON)	Variable milfoil, Fanwort
Rocky Pond (GILMANTON)	Variable milfoil
Rockybound Pond (CROYDON)	Curly-leaf Pondweed
Scobie Pond/Haunted Lake (FRANCESTOWN)	Variable milfoil
Silver Lake (TILTON)	Variable milfoil
Spaulding Pond (MILTON)	Variable milfoil
Squam Lakes (HOLDERNESS/ASHLAND)	Variable milfoil
Squam River (ASHLAND)	Variable milfoil
St Paul's School Pond (CONCORD)	Variable milfoil
Sunapee Lake (SUNAPEE)	Variable milfoil
Suncook Lakes (BARNSTEAD)	Variable milfoil
Sunrise Lake (MIDDLETON)	Variable milfoil
Turtle Pond (CONCORD)	Variable milfoil
Upper Goodwin Pond (CONCORD)	Variable milfoil
Wash Pond (Sunset Lake/Hampstead)	Asian Clam
Wentworth Lake (WOLFEBORO)	Variable milfoil
Willand Pond (DOVER)	Variable milfoil
Wilson Lake (SALEM)	Fanwort
Winnepesaukee Lake (VARIOUS LOCATIONS)	Variable milfoil
Winnepesaukee River (TILTON)	Variable milfoil
Winnisquam Lake (MEREDITH/BELMONT)	Variable milfoil

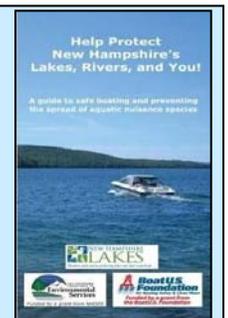
Offering Boaters Outreach Materials

REQUIRED materials to offer to boaters the first time you see them:

- “Help Protect New Hampshire’s Lakes, Rivers & You!” brochure
- “Clean, Drain & Dry” decal (if one is not visible on boat)

OPTIONAL materials to offer to boaters the first time you see them:

- The Boater’s Guide of NH
- Local group brochure
- Information about lead and loons



Variable milfoil

Myriophyllum heterophyllum (Michx)

Species Description: Milfoil is a submerged aquatic plant with fine densely packed, featherlike leaves whorled around a main stem. It can grow up to 15 feet and may exhibit a three-to-six inch green spike like flower above the waterline in late June or in July. A cross-section of the stem will reveal “pie-shaped” air chambers.

This invasive exotic species of milfoil has been in the state since the late 1960s, and can currently be found in 73 waterbodies in New Hampshire. There are six native milfoil species present in the state that do not cause problems, as they are low growing and do not form monocultures, unlike variable milfoil. Eurasian milfoil is another nonnative milfoil found in New Hampshire, but it is less of a threat than variable milfoil due to our water chemistry (Eurasian milfoil tends to be found in waters with higher pH ranges than those found in New Hampshire).

Why is milfoil considered an invasive species? This species is not native to our state and is very difficult to control once it becomes fully established. Milfoil reproduces through fragmentation whereby plant fragments break off from the parent plant through wind or boat action, grow roots, and settle in a new location. Seeds are also a means of spread within an infested waterbody. Milfoil spreads rapidly and displaces beneficial native plant life, often forming monoculture of growth around the shallows of a waterbody. It makes swimming difficult and can devalue waterfront property. Where this species grows in its native environment, insects and fish may feed on this plant at such a rate as to control its growth. In New Hampshire, variable milfoil has no abundance of natural predators to keep its population in check. Under optimum temperature, light and nutrient conditions, milfoil may grow up to an inch per day.

How did exotic milfoil become established in this state? It was most likely a “stowaway” fragment attached to a boat or trailer that came to this region. Milfoil can live out of water for many hours if it remains moist, like when it’s wound around a wet carpeted bunk



on a boat trailer or in a live well. Milfoil is usually first found near boat launch sites when it infests a new waterbody, a sure sign that transient boaters are the leading means of spread. Another theory is that milfoil was introduced to a New Hampshire waterbody through the dumping of a home aquarium. This plant is sometimes used as an ornamental plant in fish aquariums.

Once established, how does milfoil infest other areas of a waterbody? Boat propellers chop milfoil plants into small fragments. These fragments float on the surface and are at the mercy of the wind and lake currents. In a short time, roots form on these fragments. If washed ashore, these plants eventually take hold creating a new colony of milfoil. The cycle goes on until every suitable area is filled in with these weeds. An alternative form of the plants develops during low water. This vegetation type is more succulent than the submersed form and can persist for moderate periods of low water.

DES has recently collaborated in a study to evaluate the viability of milfoil seeds and the research showed that milfoil seeds are very viable and have a high regeneration rate, though survival of the seedlings is thought to be relatively low. Regardless, seed production in a dense milfoil bed is high, and seeds are thought to be a probable source of new plants, even following extensive control measures (seeds are resistant to herbicides). Data suggest that long term monitoring and appropriate follow up activities are needed to truly reduce or potentially eradicate infestations. Regular surveys by DES biologists or volunteer Weed Watchers are needed to find new growth early, so that small scale control measures can address the problem before it spreads. It is unlikely that seeds are responsible for lake to lake spread, though, and fragments are still the big cause of that problem.

What methods are currently being used to control milfoil? DES implements an integrated plant management (IPM) approach for control. Each infestation is assessed and a long term management plan is prepared to guide control activities for a number of years. Waterbody specific goals range from reduction of the infestation, to control, to possible eradication depending on the status of the infestation and characteristics of the waterbody. All available control options are considered, and actions are chosen that best suit the size, density, and character of the infestation. Hand pulling, diver-assisted suction harvesting, benthic barrier placement, herbicide treatment, and other strategies are evaluated for each infestation, including a review of a ‘no control’ option, and often a combination of approaches are recommended.

Have chemicals been used to effectively control invasive exotic milfoil? Yes. DES has collaborated on a number of research projects focusing on chemical

control of milfoil. Through that research we evaluated 11 aquatic herbicides on the market and have learned that 2,4D is the best herbicide available for control of this plant. Used at lower concentrations to target milfoil, native aquatic plants and other aquatic life are not impacted by the herbicide.

Herbicide treatment is a science, and therefore should be conducted by trained professionals. It is illegal to apply chemical herbicides to any New Hampshire waters unless you contract with a licensed applicator. The use of chemicals by an untrained person could jeopardize the health and welfare of the lake and its ecology. Inappropriate or inaccurate use of chemicals is life threatening to people, mainly due to overdosing as a result of the unwise “more is better” approach. It should be noted that the state has been conducting herbicide applications under permit and through licensed applicators for several years, and no negative impacts to non-target plants, animals, or humans have been observed.

EURASIAN MILFOIL (*Myriophyllum spicatum*)

Species Description: Eurasian milfoil is a submerged aquatic plant with whorled feather like leaves that appear to have been clipped on the end. Eurasian milfoil can grow 12 to 15 feet tall, and exhibits a reddish shoot near the surface. It forms dense mats of tangled plants in lakes and ponds. Leaves have 12 or more pairs of leaflets which is an identifying factor to aid in species level identification.



General Information: Eurasian milfoil, which originally came to this country from Europe and Asia, is a serious nuisance to many lake residents. Once introduced to a lake (usually by transient boats) it grows and spreads very quickly, ultimately impairing the ecology of the system, and value of shorefront property.

There are five waterbodies with Eurasian milfoil in New Hampshire today: Mountain Pond in Brookfield; the Connecticut River south of Hanover; Mascoma Lake in Enfield; Post Pond in Lyme; and the Nashua River. This species can also be found in nearby Vermont and Massachusetts, and is considered a national problem in lakes and other freshwater systems.

FANWORT

(*Cabomba caroliniana*)

Species Description:

Fanwort is a submerged bright green aquatic plant with narrow leaves arranged in a fan shape manner oppositely located on a long a narrow stem. Floating, lily-like leaves are found on the water's surface during flower production in August or September. Flowers are small, white, and emergent. This plant stands



approximately two to 12 feet tall. Leaf segments are approximately 1 mm wide.

General Information: Fanwort is a native plant of the southern United States, and Latin and South America. It is currently found in Arlington Mill Reservoir in North Salem, Big Island Pond in Derry, Phillips Pond in Sandown, Robinson Pond and Otternic Pond in Hudson, Lake Massabesic in Auburn, Mine Falls Pond in Nashua, the Nashua River in Nashua, and Wilson Lake in Salem. This exotic plant was discovered in New Hampshire in the late 1960s and entered the state via the back of a transient boat trailer or was dumped from a tropical fish aquarium. This plant has been prohibited in New Hampshire since 1999.

Characteristic of many invasive exotic plants introduced to a new environment, fanwort quickly invades shoreline areas of waterbodies, ultimately impairing recreational activities and other designated uses of the waterbodies

WATER CHESTNUT

(*Trapa natans*)

In July 1998, the NH Department of Environmental Services confirmed reports that the invasive exotic aquatic plant water chestnut has infested the Nashua River in Nashua. Luckily the plant has not spread from this waterbody to date,



however the seeds are being found more and more on transient recreational gear where they get stuck in the carpeting on trailer bunks, so it is expected that more water chestnut infestations will be found in the near future.

Water chestnut can completely cover the surface of a waterbody and cause ecological hardship to native plants and animals. Fishing and boating can become extremely difficult as well.

This plant is not the same species as the edible water chestnut used in Asian cooking. Water chestnut is a member of the Trapaceae family and derives its name from the single



seeded horned fruits, the chestnut. Each of the four horns on the nut is sharp and has a spine with several barbs. Each plant has two types of leaves: submerged leaves that are featherlike and oppositely paired along the stem, and waxy floating leaves that are triangular and form a rosette on the water's surface. The petiole (leaf stalk) of the floating leaves has a bladder-like swelling filled with air and spongy tissue which provides buoyancy. Cordlike plant stems can attain lengths of up to 16 feet.

The water chestnut is an annual plant which exhibits great reproductive capacity. The seeds germinate in early spring. An individual seed can give rise to 10 to 15 rosettes, each of which can produce 15 to 20 seeds. Thus, one seed can produce 300 new seeds in a single year.

Water chestnuts begin to flower in mid to late July, with their nuts ripening approximately one month later. Flowering and seed production continue into the fall when frost kills the floating rosettes. The mature nuts sink to the bottom when dropped and may be able to produce new plants for up to 12 years. The plant spreads either by the rosettes detaching from their stems and floating to another area, or more often by the nuts being swept by currents or waves to other parts of the lake or river. The plant overwinters entirely by seed.

Water chestnut is an aquatic invasive plant that limits boating and fishing in infested areas. It has the potential to infest wetlands and critical environmental habitats in other areas of the state.

Zebra Mussels (*Dreissena polymorpha*)

What are Zebra Mussels and where do they come from?

Zebra mussels are small shellfish marked by alternating light and dark bands. They are typically two inches or less (roughly the size of a pistachio nut) in size and have a life span of four to eight years. Zebra mussels have an extremely high reproductive rate of 30,000-1,000,000 new mussels per year and are able to reproduce at one year of age.



Zebra mussels are native to the drainage basins of the Black, Caspian and Aral Seas of Eastern Europe. It is believed that ships originating from European ports carried the mussel in freshwater ballast that was discharged into Great Lake ports.

The first North American zebra mussel discovery was in Lake St. Clair, Mich., in June 1988. By September 1991, the mussel was found in all five of the Great Lakes, the St. Lawrence River, the Finger Lakes region of New York, and throughout the Mississippi River basin. The mussel is expected to infest most areas of North America within the next few years. During the summer of 1993 the zebra mussel was discovered in Lake Champlain, Vermont. In 1998, the mussel was found in East Twin Lake, Connecticut. During the summer of 2009 the zebra mussel was identified in a pond in the Berkshire region of Massachusetts. With infestations to the south and west, it is anticipated that their arrival in New Hampshire is just a matter of time.

Adult and juvenile mussels (referred to as veligers) are transported by waterfowl and by attachment to boat hulls, crayfish and turtles. Larval stage mussels (veligers) can be transported in anglers bait bucket water and boat engine cooling water. Similar to other introduced non-native species such as milfoil, these exotic mussels can reproduce rapidly because natural predators are not present to keep the population in check.

Why are Zebra Mussels a concern in North America?

Zebra mussels are not native to the U.S. They disrupt aquatic ecology via the food web and cause problems to humans wherever they have appeared. Zebra mussels are the only freshwater mussel that can secrete durable elastic strands, called byssal fibers, by which they can

use to securely attach to nearly any surface, forming barnacle-like crusts several feet thick. Through this mechanism zebra mussels can attach to stone, wood, concrete, iron, steel, aluminum, plastic, fiberglass, PVC, crayfish and other mussels. They have also recently been found growing on softer substrates like plants and mud.

What problems do Zebra Mussels cause? The zebra mussel's ability to rapidly propagate and physically attach to objects creates several problems:

- Zebra mussels filter small particles such as phytoplankton (microscopic plants), small zooplankton (microscopic animals), and detritus (pieces of organic debris) from water. Mussels are capable of filtering up to 1 liter of water within a 24 hour period. Large populations of zebra mussels can severely alter the lake or riverine food web by competing with existing species such as salmon and walleye.
- Raw water intakes such as those at drinking water, electric generation, and industrial facilities can become infested with zebra mussels. A water supply system serving 50,000 people in a Michigan city had to shut down due to pump failure by zebra mussels in its intake system.
- Beaches in infested areas may be impacted by the washing up of sharp shells in shallow areas, which can cut bathers and litter beaches. Decomposition of mussels can also create obnoxious odors.
- Impacts on boating and navigation include:
- Organisms attached to hulls increase drag, reduce speed, thus increasing fuel consumption.
- Growth of larval mussels drawn into a boat engine cooling water intakes may occlude the cooling system, leading to overheating and possible damage to the engine.
- If shells are drawn into the engine, abrasion of cooling system parts, especially impellers, could result.
- Marker buoys can sink under the weight of mussel encrustation.
- Docks can be destabilized or sunk by mussel colonization.

What kind of habitat do Zebra Mussels prefer?

Zebra mussels can tolerate fairly wide ranges of environmental conditions. They prefer water temperatures between 68°F and 77°F and water currents 0.15 to 0.5 meters per second for proper growth. The mussels prefer spawning in water temperatures in the mid 50°F range. While normally a freshwater species, the zebra mussel can adapt to and inhabit brackish waters ranging from 0.2 to 2.5 parts per-thousand total salinity in estuarine locations. Zebra mussels are found in lakes that are not overly enriched but which have a higher calcium content. Only a few of New Hampshire's

waterbodies are at a risk for infestation, especially waterbodies with calcium levels greater than 12 ppm, like the Connecticut and Merrimack rivers, and lakes and ponds along the western border of NH.

How can Zebra Mussels be controlled? An effective way to permanently eliminate infestations has not been found, therefore, emphasis must be placed on controlling impacts on ecosystems and water users. For drinking water, electrical generation and industrial facilities, screen mesh can exclude adult and juvenile mussels from water intake systems. This method is only effective in excluding those mussels which originate upstream of the screens or filters. Veligers can pass through the screens and infest downstream areas. Other controls for water intakes include increasing intake and distribution flows to rates exceeding those at which zebra mussels can attach, and physically scraping the mussels where access for personnel and equipment is available. Oxygen deprivation, thermal controls (exposing mussels to water temperatures greater than 140°F), and chemical controls can be used to kill the mussels. However, these methods will likely affect other aquatic organisms.

What can individuals do to help? Tell your lake, river or watershed association, your local marina, your municipal officials, or anyone with an interest in aquatic resource protection about the zebra mussel. If you are in the power generation industry, plan now for the mussel's invasion to your facility. Call the UNH Cooperative Extension Services or NH Sea Grant, both in Durham, to learn about their zebra mussel public education program, or the NH Fish and Game Department to learn about their initiatives with the zebra mussel. You can also contact the DES, as the state agency with the primary responsibility of protecting and managing the state's lakes and rivers. DES intends to take an active role in zebra mussel prevention and control.

When boating in infested waters, be sure to clean and de-mussel your boat before you leave the area. De-musseling includes performing the following activities

AWAY FROM ANY SURFACE WATER:

- Draining the bilge, live wells and engine cooling system.
- Dumping any bait buckets.
- Inspecting the boat by checking the hull, trim plates, anchors, and the trailer.
- Washing down the boat with hot water (140°F), if mussels are found, and allowing the boat and trailer to sit for 2-5 days dry and/or spraying down gear with a 10% bleach solution and letting the solution stand for a few minutes before rinsing clean.

The best defense is to prevent the zebra mussel from entering the waters of New Hampshire. However, when

they arrive, we all need to implement the proper controls to prevent these undesirable invaders from spreading.

ENVIRONMENTAL Fact Sheet

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov



ASIAN CLAM (*Corbicula fluminea*)

What are Asian clams and where do they come from? Asian clams, also called “golden clams,” are round, yellow-green to dark brown colored shellfish with thick, concentric rings on their shells. The clams are typically small, averaging less than 1.5 inches in size, and have a life span of one to seven years. A single clam can release 2,000-8,000 offspring in a year, depending on conditions, and some can self-fertilize.



Photos courtesy of Lake George Association, N.Y.

Asian clams are native to the freshwater of southern and eastern Asia. It is believed that immigrants to North America brought the clams as a food source and subsequently released them into the wild. The first documented discovery of Asian clams in the United States was sometime between 1924 (Indiana report) and 1938 (Washington State report). Today, the Asian clam is found in over 40 states and is expected to continue spreading. An infestation was recorded in the Northeast in Marlborough, Mass. at Fort Meadow Reservoir in 2005, and in Lake George, N.Y. in 2010. Populations of the Asian clam have been documented in four New Hampshire waterbodies: Merrimack River, from Bow, south; Cobscook Pond in Windham; Long Pond in Pelham; and Wash Pond (Sunset Lake) in Hampstead. There are likely more populations that have yet to be documented.

Why are Asian clams a concern in North America?

Asian clams are not native to the United States. Larval and juvenile clams are easily transported by water currents, or when humans move water from one waterbody to another. They can form dense clusters of over 5,000 clams per square meter, dominating the benthic community and altering the benthic substrate.

Native birds, mammals, fish and other animals feed on Asian clams. However, these invasive clams reproduce rapidly, making it difficult for native predators to keep Asian clam populations in check.

What problems do Asian clams cause? The Asian clam’s ability to rapidly propagate and physically attach to objects as juveniles creates several problems, including:

- Large populations of Asian clams may severely alter lake or riverine food webs by directly competing with existing native fish and shellfish species for food and space.
- Raw water intakes such as those at drinking water, electric generation, and industrial facilities become impaired or clogged by clam shells or by juveniles that are sucked into the intake and that grow in the system.

The clams release phosphorus into the water through burrowing, feeding from the sediment and their excreta. Phosphorus feeds plant and algal growth, and makes potentially hazardous cyanobacteria blooms more likely to occur. Impacts on boating and navigation include:

- Larval clams drawn into boat engine cooling water intakes may occlude the cooling system, leading to overheating and damaging the engine.
- If shells are drawn into the engine, abrasion of cooling system parts, especially impellers, could result.

What kind of habitat do Asian clams prefer? Asian clams can tolerate a fairly wide range of environmental conditions. Asian clams live in lakes, ponds, rivers and streams with sand or gravel bottoms, in sun-lit, warm, shallow water. They live just below the surface of the sediment or with a third of their shell just above the sediment’s surface. Generally, it was thought that these clams only tolerated water temperatures of 2°C to 36°C; however, in Lake George these clams successfully overwinter, surviving temperatures below 1°C for months. These clams are found in clear water with good water quality and are intolerant of high nutrient levels.

How can Asian clams be controlled? An effective way to permanently eliminate infestations has not been found, therefore, emphasis must be placed on controlling impacts on ecosystems and water users. Methods that have been tested for removing adult Asian clams include: removal of infested sediment, water level drawdown, and asphyxiating with plastic mats. Controls for water intakes include: increasing flows, removing clams by hand and using chemicals or high temperatures to kill the clams. However, many of these methods will likely affect other aquatic organisms and may require state and/or federal permits/approvals.

Asian clams are regulated in New Hampshire, and it is illegal to import, possess or release Asian clams in this state. (Administrative Rules NHFG FIS 803.04, NHFG FIS 804.03 and NHFG FIS 805.01 respectively.)

What can citizens do to help? Tell your local watershed association, marina, municipal officials, or anyone interested in protecting New Hampshire's waters about the Asian clam. If you are in the power generation industry, plan now for the clam's invasion of your facility. Do not purchase Asian clams for use in aquariums, in ponds or as bait. When boating in infested waters, perform the following activities AWAY FROM ANY SURFACE WATER:

- Inspect for and remove mud, plants and organisms from your boat hull, trim plates, anchors and trailer.
- Remove all water from your boat and equipment: drain your boat's bilge, live wells and engine cooling system; dump bait buckets.
- Dry anything that comes into contact with the water for five to seven days in the sun before traveling to another waterbody
- If you find clams, wash down the boat with hot water (140° F) and allow the boat and trailer to sit for two to seven days to dry and/or spray down gear with a 10 percent bleach solution and let the solution stand for a few minutes before rinsing clean
- The best defense against Asian clams is to prevent them from entering New Hampshire's waters. However, when they arrive, we all need to take part in ensuring that this invasive species does not continue to spread. DES and the Fish and Game Department are collaborating to identify occurrences of this species in New Hampshire.

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Didymo (*Didymosphenia geminata*)

During the summer of 2007, the first population of Didymo (also called, "rock snot") was found in the Connecticut River in Pittsburg, N.H.

This non-native and invasive alga forms thick mats of felt-like growth on rocks, and can impair the recreational and ecological values of waterways in the state. Below are some frequently asked questions about rock snot, and the answers to each question.



What is Didymo? Didymo is the common name for *Didymosphenia geminata*, an invasive freshwater diatom (microscopic alga). Didymo can form extensive "blooms" on the bottoms of rocky river beds, essentially smothering aquatic life forms such as macro invertebrates (aquatic insects), native algae, and other organisms. Didymo uses stalks to attach to rocks and plants in a river system. The diatom actually creates these stalks, which can form masses 3 inches to 5 inches thick on the river bottom, and trail for lengths of 2 feet to 3 feet in the current. It is actually the stalks that are more problematic than the alga. The alga will eventually die off and decompose, while these stalks tend to persist for several months on the river bottom.

Where did it come from? Didymo is generally a northern circumpolar species, found in colder, low nutrient, high clarity streams. We are noticing, however, a shift in the habitats where Didymo can survive now, which includes streams in warmer climates, streams with more nutrients, and streams with moderate clarities and even some tannic (tea colored) waters. Didymo is currently found in Europe (Scotland, Poland) and it is spreading throughout the Northwest U.S. It is also in Quebec and British Columbia. New Zealand has been particularly hard hit by the Didymo problem. We believe Didymo was introduced to this region by contaminated fishing/wading gear.

Why is Didymo a problem? Didymo will change the bottom appearance, structure, and food web of a stream. Ecologically, common macro invertebrates found on the bottoms of well-oxygenated streams will change to more worm-like and snail populated communities. Aesthetically, the brownish-white flowing masses of stalk structures are unpleasant to see and recreate in.

What is the current distribution in the Northeast? As of fall 2007, Didymo extends from just north of Lake Francis in Pittsburg, down through Northumberland, N.H. In other states, portions of the White River in Vermont downstream of the Stony Brook confluence are infested, and the Batten Kill River between Vermont and New York has some populations of Didymo. Most recently, the East and West Branches of the Delaware River in New York and Pennsylvania support populations of this alga.

What does it look like? Didymo is often described as looking similar to a sewage spill with wet toilet paper streaming in the waterbody. This is the result of the stalk material becoming long and shredding at the ends, and bleaching white. These mats have a slimy appearance, but are not slimy at all to the touch.

Over time, the bloom may take on a brownish/floppy appearance as sediment particles become embedded within the stalks.

What does it feel like? Didymo feels like wet felt, wool, or cotton balls. It is hard to pull apart, and hard to remove from the substrate it has attached to.



In contrast, most other algae species feel slimy and will slip through your fingers.

Does it smell or have an odor? Generally, no. There is no distinctive odor or smell associated with the alga or the stalk material.

In what types of habitats/conditions is Didymo generally found? Didymo is found in river systems with stable substrates such as cobble or rock bottoms. Water conditions are usually clear, cool (optimal temperature is about 60°F), have high light penetration, and lower nutrient concentrations. Flow conditions are generally moderate to moderately fast.

How does Didymo spread? This alga is so small it can go unobserved when it is a single algal cell on the bottom or in the water column. Additionally, the alga can remain viable for several weeks if kept moist. Because of this, spread of the alga is unfortunately easy. Felt soled waders are often particularly to blame, since fishermen use them to gain a grip on slippery, rocky bottomed areas. The alga easily becomes attached to the felt, and if not properly cleaned or thoroughly dried before use, the diatom can spread to another waterbody. Any other recreational equipment, including bait buckets, neoprene diving gear, water shoes/sandals, canoes, kayaks, and life jackets, to name a few.

Will we ever get rid of it? There is no means of “eradication” for this alga. Copper sulfate complexes can be used, but they are not 100 percent effective. Some algae will survive and float downstream and form new colonies. Many researchers across the globe are currently working on control and eradication methods.

Can Didymo grow in lakes? Yes, since Didymo is an alga, it can certainly grow in lakes, ponds, or other freshwater systems. Didymo generally will not reach bloom conditions in these types of systems, however. Didymo will mostly be a problem in river systems. In fall 2007, biologists from the N.H. Fish and Game Department noted the presence of Didymo attached to

some of the nets deployed for a period of time for fisheries sampling in Lake Francis.

What do I do if I think I saw Didymo? First, consult the link on the Didymo page www.des.nh.gov/wmb/exoticspecies called “How to Tell if You May Be Seeing Didymo” to determine if the specimen is worth collecting. If yes, then collect a representative sample of what you are seeing, and send it to the N.H. Department of Environmental Services or the Vermont Department of Environmental Conservation. Addresses are listed on the identification page. Please send samples to the agency in the state where the sample was collected. Include a location description, estimate of the area that is impacted, and date/time the sample was collected. GPS coordinate are also very helpful, if you have a GPS unit handy. Samples can be folded into a business card, or placed into a jar or plastic baggie.

What is the response strategy that is being taken to combat this problem species? The biologists from both the Vermont and the New Hampshire environmental agencies have met and will be coordinating on strategies to track and monitor Didymo spread. Signage is available from either state agency, or by download from www.des.nh.gov/wmb/exoticspecies on the Didymo page. Laboratory personnel in each state are prepared to examine specimens that are sent in for identification. We are all now just learning how to respond and contain (if possible) this new threat to our waterbodies. More information will be posted on the New Hampshire/Vermont Didymo websites as it becomes available.

What should I do? We prescribe a “CHECK and CLEAN” protocol.

CHECK – Remove all visible clumps of algae and plant material from fishing gear, waders, clothing, water shoes and sandals, canoes and kayaks, *and anything else* that has been in the water.

CLEAN – Soak and scrub all items for at least 10 minutes in *very hot water* with lots of soap. Felt-soled waders need 30 minutes!

For more information on aquatic invasive species visit:

<http://des.nh.gov/organization/divisions/water/wmb/exoticspecies/index.htm>

Spiny Water Flea (*Bythotrephes longimanus*)



(Photo source: Minnesota Sea Grant)

What is Spiny Water Flea? Spiny water flea (*Bythotrephes longimanus*) is a tiny crustacean related to native forms of zooplankton, such as Daphnia, but ranges up to about one half-inch in size, over ten times larger than native water fleas! The elongated, barbed tail of this non-native organism protects against predation by small juvenile fish that have difficulty ingesting the tail spine.

Where did it come from? Spiny water flea is native to Eurasia and was introduced into the Great Lakes via freighter ballast in the mid-1980s. It was discovered in Great Sacandaga Lake, N.Y. in September 2008, in Lake George, N.Y. in 2012, and in Lake Champlain N.Y./V.T. in 2014.

Why is Spiny Water Flea a threat? This non-native organism threatens fishing in two ways:

1. Spiny water fleas compete with juvenile sport fish for food. Both the spiny water flea and young fish prey almost entirely on native water fleas and other zooplankton. Research has shown that spiny water flea predation is capable of reducing the diversity and density of native zooplankton, thus impoverishing the food chain that sustains adult fish.

2. The barbed tail of this organism catches on fishing gear, especially fishing lines and downrigger cables. Masses of the organism can accumulate as gelatinous, cotton-like clumps, fouling gear, and interfering with fishing.

How does Spiny Water Flea spread from one water body to another? Research has shown that human recreation involving boats is the principle mechanism of transfer of non-native species between water bodies. Boating is an activity that is extremely vulnerable to

“hitch-hiking” by non-native organisms because so many surfaces, nooks, and crannies of nautical gear are immersed in water. This is especially true of the spiny water flea because it produces thick-walled “resting” eggs that can remain dormant for long periods of time and are resistant to environmental extremes. These eggs even survive passage through the digestive tracts of fish. Adult spiny water fleas snagged during boating or fishing may contain resting eggs. These eggs can survive for extended periods after being tangled with downriggers, anchor line, trailer parts, and fishing gear. Consequently, resting eggs are insidious “stowaways” and contribute greatly to the rapid dispersal of this non-native organism from infested lakes to clean ones. There is no way to eradicate spiny water flea once it is introduced into a waterbody.

What can you do to keep Spiny Water Flea out of our waters? The only hope for excluding spiny water flea from our waters is personal vigilance on the part of each and every visiting boater and angler.

If you move your boat among various water bodies, you are the highest probability carrier of non-native organisms from waterbody to waterbody.

Clean, Drain and Dry! If you visit more than one waterbody per season, please scour your boat, trailer, bait buckets, fishing gear, and anything else exposed to outside waters and remove all plant fragments, mud, and debris. Drain water from bilge, engine, and live wells, and allow all of the above to dry completely for at least five days before visiting another waterbody.



(Photo source: Minnesota Department of Natural Resources)

This information on the spiny water flea was adapted from the Massachusetts Department of Environmental Conservation Spiny Water Flea Alert. (www.mass.gov)

New Hampshire Lakes Association

2015 POINT PERSON/MANAGING LAKE HOST POSITION DESCRIPTION

OVERVIEW:

Each organization that is accepted to participate in the Lake Host™ Program must provide a volunteer **Point Person** or a paid **Managing Lake Host** who serves as the local administrator of the program. A Point Person serves as a volunteer to help the participating group meet its Lake Host Program local match requirement. A paid Managing Lake Host is hired as employee of New Hampshire Lakes Association (NH LAKES). Managing Lake Hosts can be paid through the payroll grant; however, they cannot be paid more than **5 hours per week for administrative work**.

The Point Person/Managing Lake Host functions as the liaison between the local Lake Host employees and volunteer Lake Hosts and NH LAKES. As **THE** local point of contact for the program over the summer months, the Point Person/Managing Lake Host is someone who is available all summer, and can devote up to 5 hours per week facilitating the Lake Host Program locally, as described by the administrative duties listed below. **The Point Person/Managing Lake Host must attend one formal NH LAKES training session in 2015, even if he/she has done so in past years** (*preferably as early in the season as possible*).



SPECIFIC DUTIES OF THE POINT PERSON/MANAGING LAKE HOST:

1. Advertise for, and then interview (using interviewing guidelines provided by NH LAKES), potential Lake Host employees and recommend to NH LAKES Lake Hosts to be hired.
2. Provide NH LAKES with completed and verified employment forms for each Lake Host employee and completed contact information forms for Lake Host employees and volunteers. Point People/Managing Lake Hosts will be provided with access to employment and contact information forms.
3. Ensure that **ALL** Lake Hosts employees, whether new or returning, sign and return their Letter of Employment with NH LAKES **before** they start working at the ramp.
4. Ensure that all **NEW** Lake Host employees attend a NH LAKES/DES training workshop as early in the season as possible. **New Lake Host employees can not work until they have attended a formal NH LAKES/DES training.**
5. Conduct a local training workshop for all returning Lake Host employees (since returning Lake Host employees are not required to attend a formal NH LAKES/DES training) and all new or returning volunteer Lake Hosts (since volunteers are not required to attend a formal NH LAKES/DES training). It is recommended that the local training be conducted as early possible, and that part of the local training occur at the actual local boat ramp. **Returning Lake Host employees can not work until they have attended a local training. Returning new or returning volunteer Lake Host can not volunteer at the ramp until they have attended a local training.**
6. Determine the weekly staffing schedule and share it with Lake Hosts and volunteers **in advance**, as well as the procedures to be followed in case of inclement weather.
7. Forward the weekly staffing schedule to NH LAKES and notify NH LAKES if there are changes. **(NH LAKES will make unannounced site visits to ramps during summer 2015.)**

8. Ensure that all volunteer Lake Hosts (and you as the Point Person/Managing Lake Host) keep track of their hours on the volunteer match sheet/spreadsheet provided. **This documentation is required if it is being applied to the local match.**
9. Prior to the start of the Lake Host employees staffing the ramp, make sure the group has submitted 100% of pledged locally-contributed hard cash match (or has arranged a payment installment schedule with NH LAKES) for additional Lake Host employee hours or higher Lake Host employee hourly rates than provided through the payroll grant (as indicated on payroll grant application). **NH LAKES will not upfront ramp additional funds for Lake Host employees.**
10. **Every other week**, on the **Sunday** immediately at the end of the pay period (pay period is Monday through Sunday, two weeks later), collect, verify, and then sign all Lake Host employee timesheets and then scan **email scans or photos of timesheets or FAX (603.224.9442) timesheets to NH LAKES on Monday, no later than 4:00 p.m.** Timesheets received **AFTER 4:00 p.m.** on “Payroll Monday” will **NOT** be processed until the next pay cycle. **Please mail via US Postal Service volunteer match sheets at the end of every pay period.**
11. Also **every other week**, collect completed Boater Survey sheets and Daily Summary sheets from all Lake Host employees and volunteers. Check these over to ensure that they are completely and accurately filled out, and then forward them to NH LAKES. (Postage cost can be applied to the local match.)
12. Supervise the work of all Lake Host employees and volunteers on a regular basis to ensure quality performance. If necessary, contact NH LAKES to discuss Lake Host discipline problems and/or to recommend termination of Lake Host employment or volunteer commitment. NH LAKES is officially responsible for terminating Lake Host employees as they are NH LAKES employees.
13. Contact NH LAKES when supplies of brochures, specimen bags, and decals are running low.
14. Make more copies of timesheets and surveys, as needed.
15. Send suspicious specimens to the New Hampshire Department of Environmental Services in the prescribed manner. (Instructions are provided at the training and in the manual.)
16. Publicize the program the group’s newsletter and local papers and forward copies of articles to NH LAKES.
17. By October 1, 2015, send NH LAKES a Final Report in the format specified.



NEW HAMPSHIRE LAKES ASSOCIATION

2015 LAKE HOST POSITION DESCRIPTION

OVERVIEW:

The Lake Host is the first “official” friendly face that visitors see as they enter and/or leave the boat launch area. The Lake Host is an ambassador of the New Hampshire Lakes Association (NH LAKES) and of the local organization that is participating in the program, and, as such, his/her job is to always greet and treat people in a friendly, non-threatening, and courteous manner. The visitor recognizes the Lake Host as someone “official” because of the uniform—the Lake Host shirt, hat, and a big smile.

Lake Hosts are responsible for: greeting every boater in the process of launching or removing a vessel from the water; educating boaters about what they can do to prevent the spread of aquatic invasive species; surveying boaters about their aquatic invasive species prevention practices; and, conducting a courtesy boat and trailer inspection (if permitted to do so by the boat owner) in order to remove all hitchhiking pieces of aquatic invasive species.



DUTIES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO:

1. Greeting visitors both entering and leaving the boat launch area in the prescribed manner.
2. Asking survey questions and recording responses.
3. Distributing brochures and other program-related materials.
4. Conducting a courtesy boat and trailer inspection in the prescribed manner after asking for permission and inviting the boater to assist.
5. Removing all debris found.
6. Thanking the boater when finished and asking him/her to conduct his/her own inspection every time upon entering or leaving a waterbody.
7. Attempting to identify species removed from boats and trailers in between visits from boaters.
8. Calling the local supervisor’s attention to ‘suspicious’ species, so that he/she can send the sample to the New Hampshire Department of Environmental Services for identification. (The local supervisor is the Point Person/Managing Lake Host for the group administering the local program.)
9. Completing the boater survey and, if applicable, daily summary sheet for each day worked, and providing these and timesheets or volunteer match sheets to the local supervisor in the manner specified.
10. Other related duties as assigned by the local supervisor.

EDUCATION/SKILLS/ATTITUDES REQUIRED:

The ideal Lake Host is a person who possesses the following qualities: is comfortable interacting with strangers; is friendly; has a sense of humor; is able to deal productively with “down time” at the ramp site; is cooperative; is task-oriented; and is self-motivated. Minimum age: 18. (Exceptionally mature and independent 16- and 17-year-olds will be considered; however, it is recommended that 16- and 17-year-olds work in pairs or with older Lake Hosts.)

WORKING RELATIONSHIPS/ACCOUNTABILITY:

The paid Lake Host is an employee of the New Hampshire Lakes Association (NH LAKES). Locally, the Lake Host employees and volunteers are directed by and report to the **Point Person/Managing Lake Host** for the local organization participating in this program. The Point Person/Managing Lake Host sets the weekly schedule and communicates this information to Lake Host, including what happens in case of inclement weather. The Lake Host will turn in Boater Surveys, Daily Summary Sheets, timesheets or volunteer match sheets, and plant specimens to the Point Person/Managing Lake Host in the manner specified. In case of questions or problems, the first person the Lake Host is to contact is the Point Person/Managing Lake Host. It is expected that the Point Person/Managing Lake Host will check in on the Lake Host on a regular basis and provide feedback on performance. While the Lake Host is directly supervised by the Point Person/Managing Lake Host, he/she is ultimately accountable to the NH LAKES.



NH LAKES 2015 Lake Host Program - Lake Host Job Expectations and Tips

The Lake Host is the first official, friendly face that the visitor sees. The visitor recognizes you as someone “official” because you are wearing your Lake Host shirt/sweatshirt, and possibly a hat and name badge. Your smile is your welcoming greeting! Always approach a boater confidently and with a positive attitude.

10 Simple Steps for Conducting Successful Lake Host Inspections

- 1. The first thing to do as a vehicle with a boat arrives at the ramp from the road or the lake** is to write down the state the boat is from and identify the type of boat on your survey sheet before approaching the boater.
 - **For boats arriving from the road:** approach the boater before he/she is backing down the ramp, if possible, to prevent delays and a backup of boaters wanting to launch.
 - **For boats arriving from the water:** allow the boater time to pull it out of the water and secure it on the trailer.
 - Remember to inspect **all** boats **entering** and **leaving** the waterbody whether or not the lake you are working at contains a known aquatic invasive species.
 - **Note: If your ramp becomes busy** and you are working at a waterbody containing an aquatic invasive species, give priority to departing boats. At an aquatic invasive species free waterbody, give priority to incoming boats.
- 2. Introduce yourself and explain why you are at the ramp.**

Sample Script:
“Good Morning/Afternoon. I am __[name]__ from __[local lake association/host agency]__ and we are working with the New Hampshire Lakes Association to prevent the spread of aquatic invasive species. Are you aware that **aquatic invasive species** are a problem in New Hampshire’s lakes? Have you heard of variable milfoil or the Asian clam? Have you met a Lake Host before?”

“We survey boaters about **aquatic invasive species** and conduct courtesy boat and trailer inspections to remove hitchhiking vegetation and other debris to prevent aquatic invasive species from spreading. Invasive plants such as milfoil, and invasive animals such as the Asian clam, once introduced to a lake, grow uncontrollably and can make boating, fishing and swimming difficult, if not impossible, and even dangerous. This is a serious problem!”
- 3. Ask the boater if you can do a courtesy boat and trailer inspection.** *Sample Script...*

“Aquatic invasive species—both plants and animals—spread from lake to lake when they become attached to boats, trailers, fishing and other recreational gear. Sometimes these hitchhikers can be seen, as is the case with invasive plants, but often they can not be seen. Aquatic invasive animals like the Asian clam are typically spread by boaters when they are in their microscopic larval stage in drops of water. You can help prevent the spread of aquatic invasive species by always **cleaning, draining, and drying** your boat, trailer, and recreational gear every time after you take it out of a waterbody and before putting into a new waterbody. May I show you how to inspect your boat and trailer, explain how to drain and dry, and ask you a few questions? It will only take a few minutes.”

 - **If the boater does not allow you to inspect**, that is his/her right. You may want to explain to the boater that it is illegal to transport aquatic invasive species, you can mention but do not over-emphasize that fines are involved, as this can make people hostile or defensive. **Remember, you are not an enforcer—you are an educator providing a courtesy service.** That is the extent of your power; if the boater insists on launching, get out of the way. Do NOT throw yourself in front of their car or trailer! Check the boat ramp and nearshore area after the boater leaves for fragments or other debris.
 - **If the boater is reluctant to take the time to conduct the inspection with you**, conduct it yourself. Explain the inspection steps out loud while you are inspecting.
- 4. While inspecting the boat:**
 - Ask the boater the last body of water the boat was in. (Record response on your survey sheet).
 - Explain that **all vegetation and other debris should be removed**, whether or not it is an invasive species (since it is hard to tell), and properly disposed of (composted or put in the trash).
 - Ask the boater if he/she rinsed their boat, trailer, and gear with clean water after their last waterbody visit. (Record response on survey sheet.)
 - Ask the boater if he/she has drained the motor, bilge, live wells, bait buckets and other areas that collected water since their last waterbody visit. (Record response on survey sheet.)
 - Ask the boater how many days the boat was out of water “drying.” (Record response on survey sheet.)

- Check the license plate area, trailer lights and wheels, around the boat motor and propeller.
 - Inspect the trailer and pay special attention to dark, carpeted bunks for potentially attached water chestnut seeds.
 - Ask to inspect the anchor and anchor line and all fishing gear and live wells (if appropriate). **Note:** Do not reach into the boat without the owner's permission.
 - **Regarding jet powered craft:** When the vessels are out of the water, ask the owner to run the motor for a second just to expel water (and any plant fragments or other debris).
 - **Regarding canoes, kayaks, and rafts:** Inspect the hulls and paddles and ask the boater to inspect the cockpit and storage areas or ask permission to inspect the cockpit and storage areas.
 - **If you spot what you think may be an aquatic invasive species,** simply inform the boat owner about it. Mention that there is a law that prohibits the transport of aquatic invasive species. Handling a possible aquatic invasive species find needs to be done very carefully to avoid hostility or blame. Ask if you can remove the specimens.
 - **If you remove any plants or other debris from a boat or trailer:**
 - **Make a note on the survey form and include the boat bow number on the form.** (**NOTE:** The bow number may be used to contact the boat owner if additional information is needed from the boater, possibly in order to help locate an unknown infestation within a waterbody.)
 - Put the vegetation, animals, or other debris in the plastic sample bag – to be identified later. **DO NOT make the boat owner wait while you identify suspicious material.** If you remove vegetation/debris from more than one vessel during your shift, store the specimens in separate specimen bags.
 - Explain that after boating and before leaving the launch, in addition to removing hitchhiking plants and other debris, the boater should drain water from the motor, bilge, live wells, and bait buckets, and any other area where water collects. Explain that microscopic forms of aquatic invasive animals hitchhike from waterbody to waterbody in water droplets. (Do not drain or dry vessels—encourage boaters to do so.)
 - Explain that the boater should rinse the boat, trailer, and all recreational gear with water—the higher the temperature and higher the pressure of the rinse water the better—after leaving the launch in a location where rinse water will not flow into a waterbody. (Do not attempt to rinse vessels—encourage boaters to do so.)
 - Explain that the boat, trailer and gear should be left to dry for at least 5 days before being put into another waterbody. If 5 days is not possible, rinsing and towel drying boats, trailers and gear between waterbodies is recommended.
5. **Offer the boater the sticker and brochures and boating guide.**
- To help boaters remember to inspect their vessels every time (entering and leaving), offer the boater the **“Clean, Drain & Dry!” decal** and suggest that he/she place it on the left side of the windshield, not blocking the view from the steering wheel.
 - **NOTE: Do not affix the decal yourself,** as this is purely voluntary on the part of the boater.
 - Explain that boats with decals will undergo a streamlined process next time they launch at a ramp with a Lake Host, because it will be assumed that they are already aware of aquatic invasive species.
6. Check your survey sheet to make sure you have gotten answers and recorded all necessary information.
7. Thank the boat owner. Tell boat owners that they can make a difference by always cleaning, draining, and drying their boat, trailer, and recreational gear before and after they visit a waterbody. Say goodbye, and wish them a nice day.
8. **If you have not already done so,** record the data from that boat on the survey form—before you forget, and before you approach another boater.
9. **When/if you have time before the next boater arrives try to identify the suspicious material you have removed.**
- **If you suspect that a specimen is an aquatic invasive species,** place it in the official sample bag, label the sample with the bow number of the boat from which it came (from your survey). Include your name, the date, and launch site where it was discovered. Give the sample to your Point Person/Managing Lake Host, who will determine whether or not send it to the NH Dept. of Environmental Services for identification.
 - **If you do not suspect that a specimen is an aquatic invasive species,** dispose of it in an upland location (trash can, compost bin) where it will not flow back into the water.
10. **At the end of your shift** (these procedures may vary—check with your Point Person/Managing Lake Host):
- Use your 2015 Boater Survey sheet(s) to **completely** fill in the 2015 Daily Summary Sheet.
 - Fill in your timesheet or volunteer match sheet for that day.
 - Once every two weeks, give your Point Person/Managing Lake Host all Boater Surveys, Daily Summary Sheets, timesheets and volunteer match sheets.

Lake Host Behavior Expectations

1. **Be comfortable:** Make sure you have rain gear, an umbrella, a chair, water, bug spray, and sunscreen.
2. **Be alert:** Pay attention to the weather, traffic coming into and off the lake, and people who are visiting the ramp but are not boating. Napping, sleeping, or appearing to be napping or sleeping, sunbathing, or swimming when you are Lake Hosting is not acceptable. Wait for boaters in a visible location. Waiting in an automobile is not appropriate, unless the weather is rainy. Bring a lawn chair and an umbrella (if shade is not available at your ramp).
3. **Be observant:** Boaters who visit your lake may be coming in from other states that may not have aquatic invasive species prevention programs or may have worse invasive problems than we do – prioritize out of state boats.
4. **Be safe:** Follow all recommended safety and emergency procedures (see below).
5. **Be encouraging:** Urge boaters to inspect their own boats, trailers, and gear every time before they enter and after they leave a waterbody. Listen to a boater’s concern(s).
6. **Be professional:** Lake Host shirts/sweatshirts are mandatory. While interacting with the boater, take off headphones, sunglasses (unless they are prescription), do not answer/talk on the phone, and refrain from smoking. If a boater does not wish to speak with you, then you should offer a brochure and wish them a ‘good day.’
7. **Be independent:** Discourage company. Don’t let friends distract you from giving your shift your full attention.
8. **Be prepared:** Make sure you have a supply of survey sheets, decals, brochures, specimen bags, and a pen before you begin your shift. Know a little bit about where you are hosting as you may be asked questions.
9. **Be understood:** Speak clearly and slowly and write legibly.
10. **Be in touch:** Have a cell phone/know where the nearest phone is. Have the numbers of your coordinator and police.
11. **Be inspired:** Lake Hosting is important work, even though there will be slow times.

General Safety Precautions

1. NH LAKES recommends that Lake Hosts work in pairs.
2. If you have a cell phone, bring it with you to the boat launch site. It could be useful if an emergency occurs.
3. Always back away from an uncomfortable or potentially dangerous situation. *Lake Hosts are not enforcers of rules and should never jeopardize their own safety.*
4. If you are ever suspicious of someone (i.e., a loiterer or someone who does not appear to intend to boat someone who keeps driving by the launch, someone who asks if you have a cell phone or other odd question), **leave** the launch!
5. If possible, bring an automobile to your shift and have it nearby so that you can leave the ramp immediately if needed.
6. **If you feel that a boat launch site is unsafe in any way**, notify your Point Person/Managing Lake Host immediately.
7. Never confront an angry or uncooperative boater.
8. If a boater asks you not to record their bow number or any other information, comply with the boater’s request.
9. Do not help boaters launch or take their boats out of the water.
10. Do not direct traffic at the ramp and do not instruct boaters where to park their vehicles.
11. Contact your Point Person or police immediately to report any hostile/strange interactions.
12. **If you become injured while Lake Hosting if it is an emergency seek medical attention immediately**, then notify your Point Person/NH LAKES within 24 hours. If it is not an emergency, notify your Point Person/NH LAKES first before seeking medical attention. (If you are unable to reach your point person, contact NH LAKES at 603.226.0299. During weekends and before 8am/after 4pm, contact Andrea LaMoreaux of NH LAKES, at 603-731-0521.)

Potential Scenarios/Questions

Below are some possible questions you may encounter from the boater, and some suggested responses.

“Why are you out here wasting resources when milfoil or the Asian clam are going to get into the lake anyway?”

Suggested response: Even if we cannot keep aquatic invasive species out completely, we can prevent or slow down their spread. Since the Lake Host Program began in 2002, the rate of new invasive plant infestations has decreased from three to four per year, to none or one water body annually. Prevention also gives us time to adopt new control methods as they are developed in the future. The longer we keep aquatic invasive species out of a lake (through programs like this), the longer we put off the enormous costs of management and property devaluation.

“I understand that this program is partially funded through an increase in our boat registration fees. I don’t think this increase is fair because we boaters spend enough money as it is...”

Suggested response: New Hampshire passed a law in 2002 that created a milfoil prevention and research grant program. It funds prevention activities such as staffing public boat launch sites. It also funds much-needed research to better understand aquatic invasive species and how to control them. Because boats are the main vector in the spread of aquatic invasive species, it makes sense that boaters should help bear the cost.

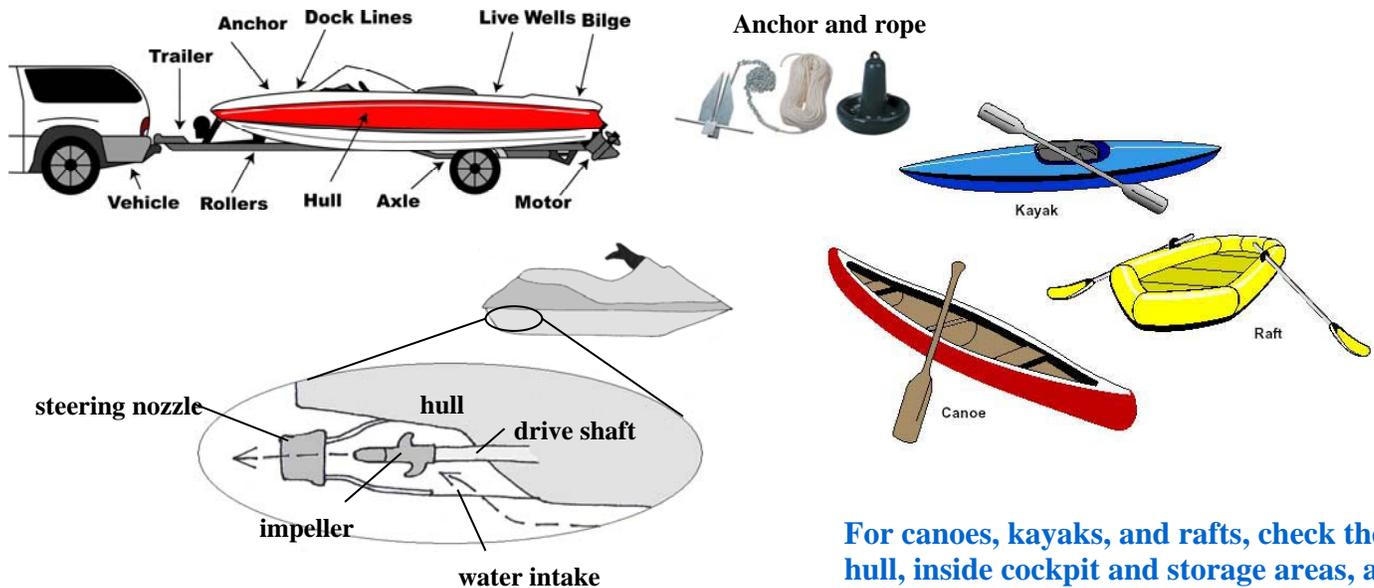
“Clean, Drain & Dry!” - A guide for Lake Hosts

CLEAN:

- **Inspect** boat and trailers before entering *and* after leaving the water.
- **Remove** all visible plants, animals, mud, and other debris.
- **Dispose** of all removed debris and **encourage** boaters to dispose of all unused bait and unwanted fish parts in a proper container away from the water.
- **Encourage** boaters to inspect all live wells, recreational gear, including fishing gear, and anchor and to remove all debris. (*It is possible that Asian clams are transported on anchor sediment.*)
- **Inspecting Jet Powered Craft:** Personal watercraft have a jet drive system which requires some extra precautions to avoid spreading aquatic invasive species. A pump pulls water in through an opening under the craft, and the impeller (an internal propeller) forces water out, moving the craft forward. Invasive species can become stuck in the jet drive system and get transported from one waterbody to another.
 - Before entering and after leaving the water, ask the boat owner to start and run the engine for a second or two to blow out any excess water and debris. (Make sure no one is standing directly behind the watercraft!)
 - After the engine has stopped, pull out any plants or other debris that is still in the steering nozzle.
 - Check under the craft for the water intake for plant fragments.

Watercraft Inspection Check Points:

Check these areas and remove all hitchhiking debris!



For canoes, kayaks, and rafts, check the hull, inside cockpit and storage areas, and all paddles and the trailer it came in on.

DRAIN:

- **Encourage boaters to:**
 - **After boating and before leaving the launch:** Drain water from the motor, bilge, live wells, bait buckets, and other locations where water collects.
 - **After leaving the launch:** Flush/rinse boats, trailers, bait buckets and other recreational gear with clean water (the higher the temperature and higher the pressure of the rinse water the better) in a location where the rinse water will not flow into a waterbody, catch basin, or other storm drain structure.

DRY:

- **Encourage boaters to** allow their boat, trailer, and recreational gear to dry for at least 5 days before being used in another waterbody.
- **If boaters do not have 5 days drying time:** Encourage boater to rinse off boat, trailer, and all gear with clean water where the runoff water will not flow into a waterbody or storm drain system) and then towel dry.

How to Successfully Submit a Suspicious Specimen

Front

Back



Aquatic Plant Specimen for Identification

Plant collection:

- ✓ Collect a representative piece of the aquatic plant (full stem, flowers or fruits if available)
- ✓ Wrap the plant neatly in a moist (not dripping) paper towel
- ✓ Seal the specimen in this sample bag
- ✓ Deliver or mail the specimen immediately to:

★ send to DES
 not
 NH LAKES!

Amy P. Smaglia
 Exotic Species Program
 NH DES
 29 Hazen Drive
 Concord, NH 03301

Please do not mail specimens on Thursdays or Fridays. Specimens will decay quickly in the mail. If you collect this specimen late in the week, please refrigerate or keep on ice until you are able to mail it.



Please be sure to complete this section before sending the plant to DES. This section will help us to identify a location for the plant, as well as how to contact you once we've identified the specimen.

Waterbody: Name of waterbody where
 Name: inspection conducted
 Town: _____

Location of Collection: Name of launch
where inspection conducted

Date Collected: _____

Program: VLAP Weed Watcher Lake Host

Other: _____

If Lake Host: _____

Arriving _____ Departing _____

Include boat
 ↓ bow number.
 (Bow Number) If no
 bow number, include the
 license plate
 number
 of the
 towing
 vehicle.

Your Name: Lake Host Name

Phone #: _____ E-mail: _____

Comments: Please write the
name, town and state
of the waterbody the
boat had just come from.

INSTRUCTIONS: DO NOT EMAIL/FAX THIS TO NH LAKES.

Lake Hosts: Complete one row for each boat inspection. A boat that was inspected being launched and retrieved should take up two rows.
Point Persons: Indicate what specimens were sent to DES. Staple all Boater Survey sheets to the corresponding daily summary sheet and mail on "payroll Monday Afternoon" to NH LAKES.

NH LAKES 2015 Lake Host Program Boater Survey

Local Group Name: _____ **Date:** _____

Lake Name: _____ **Ramp Name:** _____

Lake Host Name: _____ **Shift Start Time:** _____ **Shift End Time:** _____

Time Surveyed (indicate am or pm)	Indicate if vessel is being launched or retrieved	State of motor boat registration	Type of boat	For ALL vessels being launched OR retrieved – BEFORE originally being launched into this waterbody...					Boater's awareness of AIS plant & animal problem?	Specimen found? Y=Yes N=No	If 'suspicious' specimen found:	
				LAST waterbody visited BEFORE ORIGINALLY launching into this waterbody? (name, state)	Met a Host before? Y=Yes N=No	Drained ? Y=Yes N=No	Rinsed ? Y=Yes N=No	Dry for at least 5 days? Y=Yes N=No			If motorboat: Full Bow #	Sent to DES? Y=Yes N=No
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N
	<input type="checkbox"/> Launched <input type="checkbox"/> Retrieved		<input type="checkbox"/> inboard/outboard (I/O) <input type="checkbox"/> PWC/jet ski/jet boat <input type="checkbox"/> sail <input type="checkbox"/> canoe/kayak <input type="checkbox"/> other		Y N	Y N	Y N	Y N	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	Y N		Y N

SUBTOTAL	# inspect	State of Boat Registration								Type of Boat					Met Host before?		Drain?		Rinse?		Dry?		Awareness of AIS			Specimen Found?		Specimen to DES?			
		NH	MA (MS)	ME	VT	CT	RI	NY	Other	I/O	PWC jet	Canoe kayak	Sail	Other	Y	N	Y	N	Y	N	Y	N	H	M	L	Y	N	Y	N		

NH LAKES 2015 Lake Host Program Ramp Daily Summary Sheet

Instructions: A DAILY SUMMARY SHEET IS NOT NEEDED IF ONLY ONE SURVEY SHEET PER RAMP IS USED ON A DAY. For each day that MORE THAN ONE survey sheet is used per ramp, complete ONE daily summary sheet. Enter the subtotal in each category from ALL Boater Survey sheets for the ramp for the day and total the information below. **Point Persons:** *Ensure accuracy of the completed form*, and then **MAIL** all the Boater Survey sheets **stapled** to the corresponding Daily Summary Sheet for each 2-week payroll period on "Payroll Monday Afternoon." **MAIL TO:** NH LAKES, 14 Horseshoe Pond Road, Concord, NH 03301. **DO NOT SUBMIT THIS SHEET BY FAX OR EMAIL.**

Local Group Name: _____ Date: _____

Lake Name: _____

Ramp Name: _____ Town: _____

Lake Host Name(s): _____

Host Names (cont.) _____ 1st Shift Start Time: _____ Last Shift End Time: _____

Page #	# Inspect	State of Boat Registration								Type of Boat					Met with LH before?		Drain after last water-body?		Rinsed after last water-body?		Dry for at least 5 days since last water-body?		Boater Awareness AIS Problem?			Specimen Found?		Sent to DES?	
		NH	MA (MS)	ME	VT	CT	RI	NY	Other	I/O	PWC jet	Canoe kayak	Sail	Other	Y	N	Y	N	Y	N	Y	N	H	M	L	Y	N	Y	N
1																													
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
TOTAL																													

Of 'suspicious' specimens sent to NH Department of Environmental Services (DES), indicate the following information:

Bow #(motorboat)/towing vehicle plate # &state: _____ Indicate if found when launching/retrieving: ____ Last waterbody visited/town/state: _____

Bow #(motorboat)/towing vehicle plate # &state: _____ Indicate if found when launching/retrieving: ____ Last waterbody visited/town/state: _____

NH LAKES 2015 Lake Host Program Volunteer Match Sheet

INSTRUCTIONS:

Volunteers: As you volunteer, keep track of your time and/or any out-of-pocket expenses by filling in one row each time you volunteer time or incur an expense. Give your sheet(s) to your Point Person/Managing Lake Host at the end of the payroll period every two weeks. *Be sure to sign your sheet.*

Point Persons/Managing Lake Hosts: Verify and sign off on each volunteer match sheet, and mail to NH LAKES at the end of every two week pay period (NH LAKES, 14 Horseshoe Pond Lane, Concord, NH 03301).

Questions: Contact NH LAKES at (603) 226-0299 or lakehost@nhlakes.org.

Name of Local Organization: _____

Name of Volunteer: _____

Pay Period #: _____
(2015 Payroll Periods: #1 May 11–May 24; #2 May 25–June 7; #3 Jun. 8–Jun. 21; #4 Jun. 22–Jul. 5; #5 Jul. 6– Jul. 19; #6 Jul. 20–Aug. 2; #7 Aug. 3 –Aug. 16; #8 Aug. 17–Aug. 30; #9 Aug. 31–Sept. 13; #10 Sept 14–Sept 27; #11 Sept. 28 – Oct.12)

Column 1 Date of Volunteer In-kind Match	Column 2 Time Activity <i>(specify ramp time, travel time, admin time)</i> <i>(round to nearest 0.25 of hour)</i>	Column 3 Volunteer Time in Hours <i>(round to nearest 0.25 of hour)</i>	Column 4 Volunteer Hour Cash Equivalent Rate <i>(\$22.86 per hour)</i>	Column 5 TOTAL Cash Equivalent of Volunteer Hours <i>(Multiply column 3 by column 4)</i>	Column 6 Out-of-Pocket Expense Item <i>(Specify postage, copies, mail, miles, or other)</i>	Column 7 Out-of-Pocket Expense Amount (\$) <i>(Do not include mileage)</i>	Column 8 Mileage <i>(enter distance traveled in miles)</i>	Column 9 Mileage Rate <i>(\$0.575 per mile)</i>	Column 10 Cash Equivalent of Mileage <i>(Multiply column 8 by column 9)</i>	Column 11 TOTAL Out-of-Pocket Expenses <i>(Add column 7 and column 10)</i>	Column 12 TOTAL MATCH <i>(Add column 5 and column 11)</i>
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
			\$22.86					\$0.575			
TOTAL =			---		---			---			

I hereby certify that the above is correct (*Volunteer signature*): _____ Date: _____

Certified by (*Point Person signature*): _____ Date: _____