

NEW HAMPSHIRE DEPARTMENT OF  
ENVIRONMENTAL SERVICES

# EXOTIC AQUATIC SPECIES PROGRAM REPORT

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2009 - 2012



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## EXECUTIVE SUMMARY

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This report summarizes the spread and distribution of exotic aquatic species in New Hampshire and the activities of New Hampshire's Exotic Aquatic Plant Program to control these species. The program history is summarized in this report, and activities that occurred from 2009 through 2012 are described in detail.

"Exotic aquatic species" are plants or animals that are not part of New Hampshire's native aquatic flora and fauna. Since the first exotic aquatic plant infestation in New Hampshire was discovered in 1965 in Lake Winnepesaukee, exotic aquatic plant infestations have increased to a total of 87 infestations in 78 waterbodies in 2012. Species present include variable milfoil (70 waterbodies), Eurasian milfoil (6 waterbodies), fanwort (9 waterbodies), water chestnut (1 waterbody), Brazilian elodea (1 waterbody), Curly-Leaf Pondweed (3 waterbodies), European Naiad (3 waterbodies), and Didymo (4 waterbodies). Most of these exotic plants can propagate by fragmentation as well as by seed.

Exotic aquatic plant fragments can easily become attached to aquatic recreational equipment, such as boats, motors, and trailers and can spread from waterbody to waterbody through transient boating activities. Infestations can have detrimental effects on the ecological, recreational, aesthetic, and economic values of the state's surface waters, limiting use of the waterbodies and potentially decreasing shorefront property values by as much as 10-20 percent according to a UNH study (Halstead, et al., 2001).

Since its inception in 1981 with the passage of RSA 487:15, the Exotic Aquatic Plant Program has grown to become a cooperative effort among state agencies, lake organizations, and concerned citizens. At the state level, this involves a partnership among the New Hampshire Department of Environmental Services, the Fish and Game Department, the Department of Safety, the Department of Resources and Economic Development, and the Department of Agriculture, Markets, and Foods to prevent the spread of exotic plants to new waterbodies and to monitor and treat infestations. Many lake associations and other non-profit organizations, such as the New Hampshire Lakes Association and the New Hampshire Rivers Council, and individual lake and river associations, participate in monitoring, education, and control efforts.

Program funding is derived from a \$7.50 fee on boat registrations. A total of \$3/boat is allocated for program administration and control activities. A total of \$4 from each boat registration is used for implementing a prevention and research grant program. The final \$0.50/boat is allocated for implementation of the Clean Lakes Program.

### **Recent Program Activities**

Program activities fall into five focus areas: 1) Prevention of new infestations through education and outreach; 2) monitoring for early detection of new infestations; 3) control of new and established infestations; 4) research towards new control methods; and 5) regional/national cooperation with other exotic species programs.

Education, Outreach, and Prevention: Between 2009 and 2012, over 175 presentations and seminars were given to lake associations and professional organizations, and several live radio broadcasts and local news media events were also conducted. The program coordinator also participated in a local television broadcast focusing on aquatic ecology. The

Exotic Species Program was also highlighted twice on “The Exchange,” which is a segment on New Hampshire Public Radio.

Monitoring for Early Detection: Monitoring for early detection is done by DES staff biologists and by the Exotic Species Program Coordinator. Unfortunately, due to budget cuts, routine lake assessments (which were conducted on 30-40 random lakes each year) are no longer conducted, so this has reduced the early detection capacity of the program. In 2009 and 2012, staff biologists participated in the National Lake Assessment Program and surveyed 31 waterbodies across New Hampshire. They found variable milfoil growing in one of the waterbodies in 2009 (Goodwin Pond in Concord). The Exotic Species Program Coordinator performed 332 inspections on waterbodies across the state in this reporting period (many infested waterbodies had repeat surveys, and approximately 10 investigations were performed each year on waterbodies where complaints were received about potential infestations).

By 2012, there were over 750 Weed Watchers monitoring over 200 waterbodies for early detection of exotics. Weed Watchers are volunteers who are trained by DES to inspect their waterbodies regularly for any new invasives.

Control Activities for New and Existing Infestations: In this four-year reporting period, over \$1,895,648.00 has been spent on exotic aquatic plant control activities in New Hampshire. Control activities ranged from 66 individual projects in 2009, 82 in 2010, 93 in 2011 and 42 in 2012. Control measures for new, small infestations include hand pulling or benthic barriers, and may include designation of a Restricted Use Area in the vicinity of the infestation. Larger, established infestations are usually controlled with herbicides to first reduce the density and distribution of invasive plant growth, and other non-chemical means are incorporated to achieve an integrated management approach for better and longer term control and success.

Research: Initiating and participating in research activities is a key element in the Exotic Aquatic Plant Program. As variable milfoil is not a common nuisance species throughout the United States, little research has been conducted on the plant’s biology, ecological relationships, and potential control strategies. By working with local academic institutions, such as the University of New Hampshire, as well as consultants and federal researchers, DES is coordinating the field-testing of various hypotheses on New Hampshire waterbodies. DES also stays informed about emerging technologies and what other states are doing to manage exotic aquatic species.

Regional Cooperation: DES has worked on a regional level to standardize the key legislation and education initiatives between the New England states. If a standardized list of exotic plants can be prohibited in New England and neighboring states, the likelihood of success in preventing the spread of these species to new waterbodies is increased.

Looking to 2013 and beyond, DES would like to promote programs that meet the challenge of preventing new exotics infestations, controlling existing ones, and researching new techniques for control and even eradication of exotic aquatic species.

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## SECTION 1 - PROGRAM OVERVIEW

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### 1.1 Purpose and Overview

This report describes activities of New Hampshire's Exotic Aquatic Plant Program from 2009 through 2012. It also summarizes the spread and distribution of exotic aquatic plants in New Hampshire and the program history.

The primary purpose of New Hampshire's Exotic Aquatic Plant Program is to “prevent the introduction and further dispersal of exotic aquatic weeds and to manage or eradicate exotic aquatic weed infestations in the surface waters of the state” (RSA 487:17, II). The program focuses on submerged exotic aquatic plants, including variable milfoil (*Myriophyllum heterophyllum*), Eurasian milfoil (*Myriophyllum spicatum*), fanwort (*Cabomba caroliniana*), Brazilian elodea (*Egeria densa*), and water chestnut (*Trapa natans*), among other species (reference Env-Wq 1303.02 in Appendix 1 for full list of aquatic plants that are prohibited in New Hampshire).

The program, initiated in 1981, has five focus areas: 1) Prevention of new infestations, 2) Monitoring for early detection of new infestations to facilitate rapid control activities, 3) Control of new and established infestations, 4) Research towards new control methods with the goal of reducing or eliminating infested areas, and 5) Regional cooperation. The program is funded through a fee derived from New Hampshire boat registrations (details on revenues and expenditures can be found in Section 3).

### 1.2 The Problem

“Exotic aquatic plants” are plants living in lakes, rivers, and other waterbodies that are not part of New Hampshire's native aquatic flora. These plants are sometimes called ‘nuisance’ or ‘invasive’ species, or ‘weeds’ (and in the enacting legislation “exotic aquatic weeds”). Exotic aquatic plants pose a threat to the ecological, aesthetic, recreational, and economic values of lakes and ponds (Luken & Thieret, 1997, Halstead, 2000). Under some circumstances, dense growth and near monotypic stands of invasive aquatic plants have the potential to reduce overall species diversity in both plant and animal species, and can alter the physical and chemical characteristics of water and indigenous aquatic habitat structure.

Since January 1, 1998, the sale, distribution, importation, propagation, transportation, and introduction of key exotic aquatic plants have been prohibited (RSA 487:16-a) in New Hampshire. This law was designed as a tool for lake managers to help prevent the spread of nuisance aquatic plants. New Hampshire lists 27 exotic aquatic plant species as prohibited in the state (per Env-Wq 1303.02) due to their documented and potential threat to surface waters of the state.

According to the federal Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology (CALM), “exotic macrophytes are non-native, fast growing aquatic plants, which can quickly dominate and choke out native aquatic plant growth in the surface water. Such infestations are in violation of New Hampshire regulation Env-Wq 1703.19, which states that surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region” (DES, 2010). As such, waterbodies with exotic aquatic plants do not attain water quality standards and are listed as impaired. Exotic non-native species are considered

nonpollutants and cannot be expressed in terms of a loading, so Total Maximum Daily Load assessments are not required.

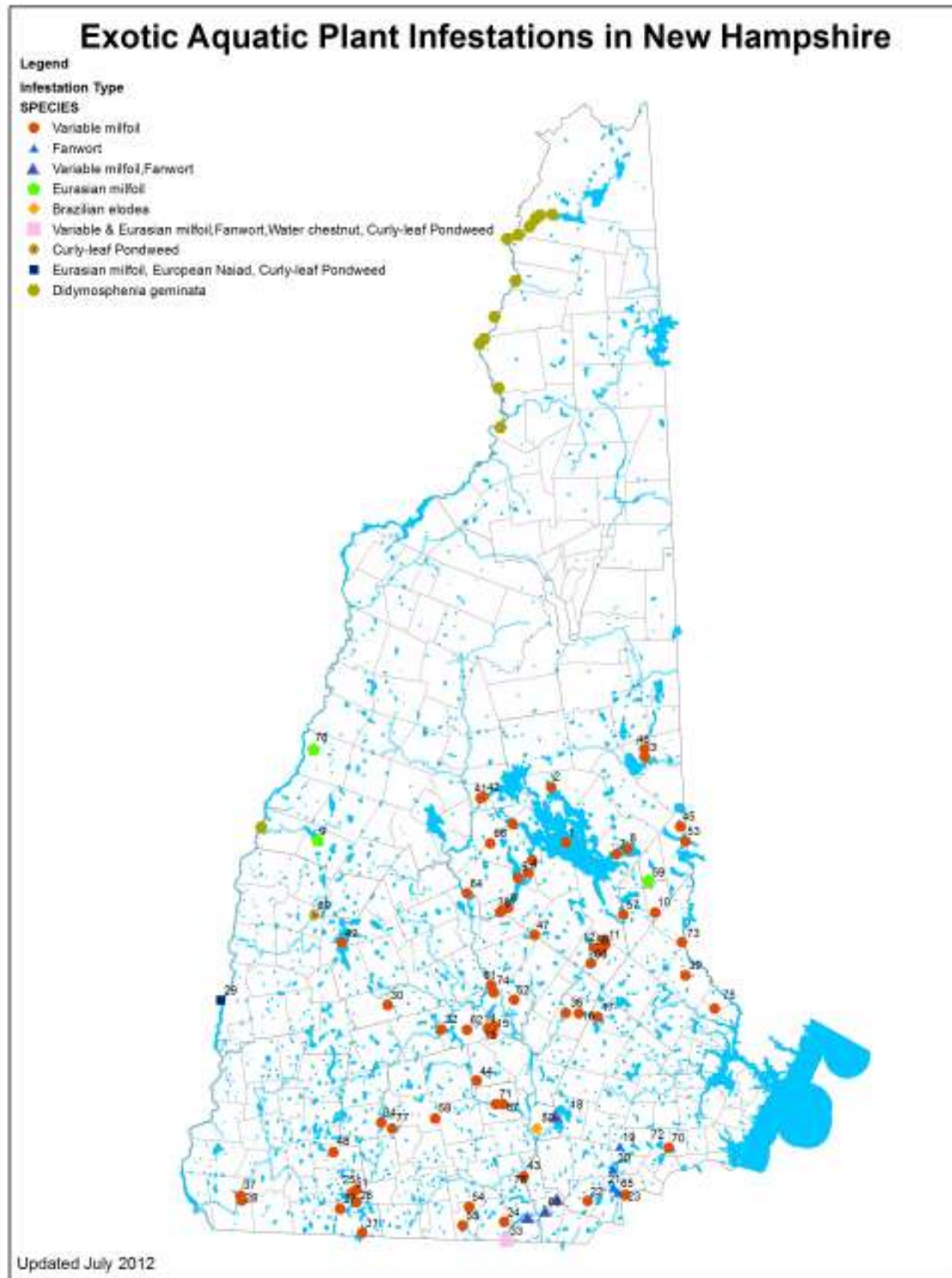
Exotic aquatic plants are adaptive in how they can expand their populations. Many aquatic plants propagate primarily by fragmentation, in which a stem broken from a mature plant can grow roots, settle in a new location, and begin growth of a new plant. Plant fragments, most often created by human activity (fishing, boating), can easily become entangled on boats, trailers, fishing equipment, or diving gear, thus spreading from waterbody to waterbody. Recreational boat registrations in New Hampshire have fluctuated between 95,000 to 103,000 over the years, and with this rise in transient boating, there is increased potential for the spread of exotic aquatic plants to new locations and waterbodies. In addition to fragmentation, many of the invasive aquatic plants can produce long-lived viable seeds and also expand their coverage through rhizomatous growth.

The first exotic aquatic plant infestation in New Hampshire was discovered in 1965 in Lake Winnepesaukee. By the end of 2012, there is a total of 87 infestations on 78 waterbodies (Figure 1).

Seven waterbodies now have more than one species of exotic aquatic plants: Mine Falls Pond, Nashua (variable milfoil, Eurasian water milfoil, fanwort, European naiad, curly-leaf pondweed), Robinson Pond and Otternic Pond, Hudson (milfoil and fanwort), Lake Massabesic, Auburn (milfoil and fanwort), the Nashua River, Nashua (variable milfoil, Eurasian milfoil, fanwort, curly-leaf pondweed and water chestnut), the Connecticut River south of Hanover (Eurasian water milfoil, two exotic water naiads, curly-leaf pondweed and Didymo), and Glen Lake in Goffstown (variable milfoil and exotic naiad). Figure 2 depicts the trend of exotic aquatic plant infestations by species from 1960-2012. Variable milfoil is still the most common and widespread exotic aquatic plant in New Hampshire.

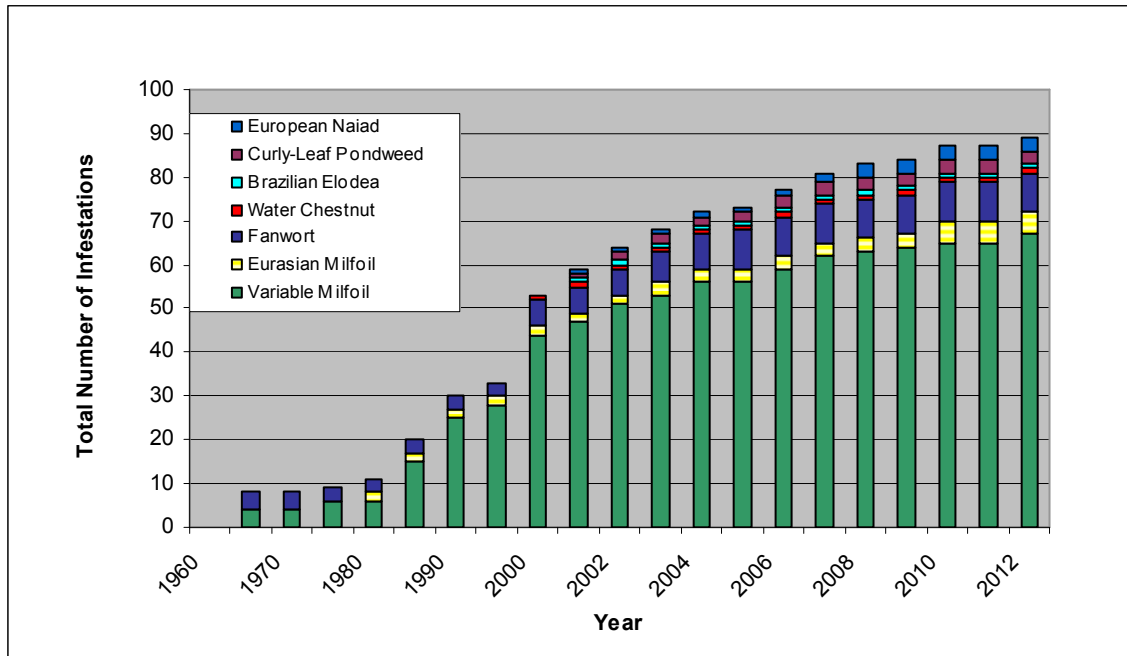
During the summer of 2007, a new species of invasive aquatic plant life was documented in New Hampshire. *Didymosphenia geminata*, commonly known as Didymo or “rock snot,” was identified in the Connecticut River in Pittsburg. Didymo is a microscopic alga in the diatom family and is free floating in the water column, usually in rivers and streams. Didymo is specially adapted to settle onto rocks, tip onto one end, and send out a stalk that attaches the alga to the bottom substrate. This stalk can reach lengths of several inches, and when many of the diatoms group together in an area, this stalk material forms a thick mat on the bottom of the river. Contrary to its nickname and the usual image one has when they think of algae, rock snot is not green and slimy; in fact, rock snot mats have the feel and texture of wet wool or a wet cotton ball, and are brownish, tannish, or whitish in color. And, unlike other algae that tend to bloom in slow flowing and nutrient rich conditions, Didymo is most often found in low nutrient, cold, fast moving streams. The alga is not toxic to aquatic life or humans, but it causes a decline in the ecological, aesthetic, and recreational values of waterbodies due to the thick mats it forms. In 2009, Didymo was documented in Mohawk Brook, Indian Stream and Halls Brook in Pittsburg, each a tributary to the Connecticut River. Blooms have been occurring each year since then, but have been less dense, particularly in 2011 and 2012. DES continues to monitor the status of Didymo each year through a collaborative with the New Hampshire Rivers Council, and through field checks by DES and Fish and Game staff.

Figure 1: Map of Exotic Aquatic Plant Infestations in New Hampshire (through 2012)





**Figure 2: Trend in Exotic Aquatic Plant Infestations over Time**



### 1.3 History

Activities associated with the control of exotic aquatic plants formally began in 1981 with the passage of an exotic plant control law, RSA 487:15. In 1998, RSA 487:16-a was adopted, establishing the current legislative basis for the Exotic Aquatic Plant Program. In September of 1999, Chapter Env-Ws 1300 was adopted, further defining the provisions of the exotic aquatic plant program, and listing certain aquatic plants as prohibited in New Hampshire.

In September of 2009, statutory changes went into effect that increased the fee on boat registrations to add an additional \$2.50 per boat, specifically to increase grant funds for control and prevention activities. Copies of the program legislation and regulations are included in Appendix 1. Table 1 provides a brief summary of key events and activities that have occurred since the beginning of the program. A more complete chronology of program events and activities from 1981 through 2012 is provided in Appendix 2.

**Table 1: Summary of Key Program Events and Activities**

Year	Activity/Event
1981	➤ Exotic Weed Legislation (RSA 149-F:3) enacted
1982	➤ Citizen Aquatic Weed Control Advisory Committee formed by a group of volunteers
1984	➤ Milville Lake dredged to control a fanwort infestation
1985	➤ Exotic plant control funding suspended due to changes in legislation. No control techniques employed this year
1986	➤ Exotic plant control funding became available once again due to legislative action
1987	➤ \$45,000 grant awarded to the Aquatic Biology Department at the University of New Hampshire, Durham to conduct a literature search to determine adequate control techniques for exotic aquatic plants
1988	➤ Weed Watcher Program initiated
1991	➤ Discovery of larval form of <i>Paraponyx allionealis</i> (an aquatic moth) on <i>Myriophyllum heterophyllum</i> (variable milfoil) in Lees Pond, Moultonborough, which led to research on the possible use of

Year	Activity/Event
	<p>this organism as a biological control for milfoil. The insect was not specific to milfoil, so it is not a good biological control option.</p> <ul style="list-style-type: none"> <li>➤ Exotic aquatic plants sign developed for posting at public access sites</li> </ul>
1992	<ul style="list-style-type: none"> <li>➤ First infestation of <i>Myriophyllum spicatum</i> (Eurasian milfoil) discovered in Mountain Pond, Brookfield, New Hampshire</li> </ul>
1993	<ul style="list-style-type: none"> <li>➤ First aquatic plant workshop held at DES for lake association members and volunteers</li> <li>➤ Presentation on exotic plants given to BASS Master Associations</li> </ul>
1995	<ul style="list-style-type: none"> <li>➤ Weed Watcher Wheel developed for use in identification of exotic plants</li> </ul>
1996	<ul style="list-style-type: none"> <li>➤ Exotic plant identification workshop held for Fish and Game Department</li> </ul>
1998	<ul style="list-style-type: none"> <li>➤ RSA 487:16-a became effective on January 1, 1998, increasing funding for the Exotic Species Program.</li> <li>➤ Env-Ws 1300 Exotic Weed Control Rules adopted on September 5, 1998. Fourteen species of exotic aquatic plants listed as prohibited plants in rules</li> <li>➤ A mailing to 700 aquatic plant retailers in New Hampshire conducted to inform them of prohibitions associated with 14 listed exotic aquatic plants</li> <li>➤ First Restricted Use Area (RUA) established on Lake Massasecum, Bradford</li> <li>➤ <i>Trapa natans</i> (water chestnut) found in Nashua River, Nashua</li> </ul>
1999	<ul style="list-style-type: none"> <li>➤ <i>Myriophyllum spicatum</i> (Eurasian milfoil) first identified in Lake Mascoma, Enfield</li> </ul>
2000	<ul style="list-style-type: none"> <li>➤ RSA 487:16-b relative to exotic aquatic plant penalties adopted</li> </ul>
2001	<ul style="list-style-type: none"> <li>➤ Amendment to Env-Ws 1304.01(a) passed to modify provisions for the use of Restricted Use Areas on waterbodies with limited infestations of exotic aquatic plants</li> <li>➤ First infestation of <i>Egeria densa</i> (Brazilian elodea) found in New Hampshire in Nutts Pond, Manchester</li> <li>➤ Restricted Use Areas installed in Lake Sunapee and Squam Lake</li> </ul>
2002	<ul style="list-style-type: none"> <li>➤ Significant expansion of Weed Watcher Program</li> <li>➤ Pilot Lake Host Program Launched by New Hampshire Lakes Association</li> </ul>
2003	<ul style="list-style-type: none"> <li>➤ RSA 487:23 became effective, establishing the Milfoil Prevention and Research Grant Program</li> <li>➤ First round of Milfoil Prevention Grants awarded to three applicants. Lake Host Program received state funding to staff 37 public access sites. Sixteen boats with milfoil detected and cleaned, preventing new infestations</li> </ul>
2004	<ul style="list-style-type: none"> <li>➤ New infestations of variable milfoil were documented in the Merrimack River in Penacook, Kimball Pond in Hopkinton, and the Pemigewasset River in Sanbornton. Fanwort was newly documented in Otternic Pond in Hudson.</li> <li>➤ The Department of Environmental Services was the recipient of a \$1 million federal appropriation to conduct research on variable milfoil. DES funded 6 projects with this funding.</li> <li>➤ The Exotic Aquatic Weeds and Species Committee was initiated by RSA-487:30 to evaluate the Exotic Aquatic Plant Program, and work on legislation to expand the scope and funding of the program.</li> </ul>
2005	<ul style="list-style-type: none"> <li>➤ No new milfoil infestations this year.</li> <li>➤ One new fanwort infestation was documented in Wilson Lake in North Salem.</li> <li>➤ The Lake Host Program continues to grow to cover 61 public access sites, and 54 boats with milfoil detected and cleaned, preventing new infestations.</li> </ul>
2006	<ul style="list-style-type: none"> <li>➤ MOA with Fish and Game signed regarding development of Long-Term Management Plans for exotic aquatic plants, for all infested waterbodies seeking to perform control activities</li> <li>➤ Three new infestations of exotic plants: 2 variable milfoil infestations and 1 curly-leaf pondweed infestation</li> </ul>
2007	<ul style="list-style-type: none"> <li>➤ Initiated rulemaking process to add new species to prohibited aquatic plant list, essentially doubling the list of species</li> <li>➤ Increased outreach activities with aquarium and water garden dealers in New Hampshire</li> </ul>

Year	Activity/Event
	<p>pursuant to newly amended exotic aquatic plant rules, including expanded list of prohibited aquatic plants</p> <ul style="list-style-type: none"> <li>➤ Two new infestations of variable milfoil: Lake Pemigewasset (New Hampton) and Glen Lake (Goffstown)</li> <li>➤ Commissioned the construction of a prototype diver-assisted suction harvester (DASH) for use by DES</li> <li>➤ Initiated the Weed Control Diver Program and Certification Course</li> </ul>
2008	<ul style="list-style-type: none"> <li>➤ Field trials and retrofitting the DES DASH unit</li> <li>➤ Two new infestations of variable milfoil documented: Long Pond (Danville) and Spaulding Pond (Milton)</li> <li>➤ Contracted work on developing an Underwater Surveillance Vessel (USV) to enhance mapping techniques of DES biologists.</li> </ul>
2009	<ul style="list-style-type: none"> <li>➤ Statutory change goes into effect increasing program funding to allow for increases in prevention and control grant awards</li> <li>➤ New variable milfoil infestation found in Upper Goodwin Pond in Concord</li> <li>➤ Didymo expands into Halls Stream, Mohawk Brook and Indian Stream</li> <li>➤ Field research study to examine low and double dose application rates of Navigate for variable milfoil control</li> <li>➤ Expansion of DASH use</li> </ul>
2010	<ul style="list-style-type: none"> <li>➤ New Eurasian water milfoil infestation in Post Pond in Lyme</li> <li>➤ New variable milfoil infestation in Willand Pond in Dover</li> <li>➤ No new Didymo expansion documented</li> <li>➤ Field research to examine three formulations of 2,4-D for variable milfoil control in portions of Lake Winnisquam.</li> </ul>
2011	<ul style="list-style-type: none"> <li>➤ New variable milfoil infestation in Rocky Pond in Hollis. Early detection and rapid response activities lead to likely eradication of the plants (not added to list of infested waters due to likely eradication).</li> <li>➤ No new Didymo expansion documented.</li> <li>➤ Field research to compare efficacy and target specificity of Renovate Max G on variable milfoil in SunRay Shores area of Lake Winnisquam, and Flints Pond.</li> </ul>
2012	<ul style="list-style-type: none"> <li>➤ Eradication of variable milfoil growth in Rocky Pond, Hollis (first documented in 2011) confirmed. No carryover growth into 2012, no new growth in waterbody found.</li> <li>➤ New infestation of variable milfoil reported in Otter Lake in Greenfield. Field survey confirmed widespread growth around pond, infestation likely 3 years old.</li> <li>➤ New infestation of variable milfoil reported in Naticook Lake in Merrimack. Field survey confirmed widespread growth in half of pond, infestation likely 2-3 years old.</li> <li>➤ Field research project on Mine Falls Pond in Nashua to evaluate a new aquatic herbicide (Clipper) to control multiple species of invasive aquatic plants in this system.</li> </ul>

## 1.4 Partnerships

Most of the activities for the Exotic Species Program listed above are conducted or directed by the Exotic Species Program Coordinator. The program employs a multi-faceted approach to prevent and control the spread of exotic aquatic plants. As the scope of the Exotic Aquatic Plant Program has grown over time, key cooperatives with various stakeholder groups have been developed through partnerships among state agencies, local government, and volunteer groups. The shared expertise, capacity, and knowledge base of the program activities built through these partnerships are key elements to program success. Partnerships have been based around research, education, outreach, and other activities.

Many state agencies and non-profit groups participate in program activities, including the Fish and Game Department, the Department of Safety, the Department of Agriculture Markets and Foods, the New Hampshire Lakes Association and the New Hampshire River Council. The roles of the partner organizations are briefly outlined in Table 2.

**Table 2: Partner Organizations and their Responsibilities**

<b>I. STATE AGENCIES</b>
<b>Department of Environmental Services (DES)</b> <ul style="list-style-type: none"> <li>• The DES Exotic Species Program coordinates all aspects of the Exotic Aquatic Plant Program</li> <li>• The DES Wetlands Bureau works with the DES Exotic Species Program to review projects where wetlands work is proposed that may cause or impact exotic plant infestations.</li> <li>• The DES Wetlands Bureau also works with the DES Exotic Species Program to amend/establish rules and regulations to allow for specific control activities in jurisdictional areas.</li> </ul>
<b>Fish and Game Department (NHF&amp;G)</b> <ul style="list-style-type: none"> <li>• Conducts reviews of special aquatic permits for herbicide application to determine potential impacts to aquatic animal habitat</li> <li>• Provides assistance in the designation and enforcement of restricted use areas on waterbodies</li> <li>• Coordinates and performs education/outreach activities that include information on exotic species</li> <li>• Displays aquatic plant signs at NHF&amp;G owned boat launch facilities</li> <li>• Collaborates with DES on the development and production of educational materials</li> </ul>
<b>Department of Safety (NHDOS)</b> <ul style="list-style-type: none"> <li>• Provides assistance in the designation and enforcement of restricted use areas on waterbodies</li> <li>• Collaborates with DES on the implementation of the Milfoil Prevention Grant Program</li> <li>• Includes exotic plant awareness in boater safety instruction courses</li> <li>• Ensures that all Marine Patrol officers are aware of exotic aquatic plant problems and know the protocols associated with inspecting their boats and trailers for attached plant fragments</li> </ul>
<b>Department of Agriculture, Markets and Food (NHDA)</b> <ul style="list-style-type: none"> <li>• Permits and oversees the application of herbicide for control of nuisance exotic plants</li> <li>• Provides technical information on aquatic herbicides</li> </ul>
<b>Department of Resources and Economic Development (NHDRED)</b> <ul style="list-style-type: none"> <li>• Provides information on rare and endangered species through the Natural Heritage Bureau in the event that an exotic aquatic plant may impact a threatened habitat or species</li> </ul>
<b>II. OTHER ORGANIZATIONS</b>
<b>Legislative Working Groups</b> <ul style="list-style-type: none"> <li>• The Exotic Aquatic Weeds and Species Committee was enacted by RSA-487:30 to evaluate the Exotic Aquatic Plant Program, and work on legislation to expand the scope and funding of the program. The Exotic Aquatic Plant Program meets with the members of this committee quarterly to review the program and funding needs.</li> </ul>
<b>Municipalities</b> <ul style="list-style-type: none"> <li>• Manchester Water Works performs a number of milfoil control activities on Lake Massabesic including installation of benthic barriers and designation of restricted use areas</li> </ul>
<b>New Hampshire Water Works Association (NHWWA)</b> <ul style="list-style-type: none"> <li>• NHWWA incorporates information on invasive aquatic plants (and other species) in their training sessions and information they share with water suppliers across the state. NEWWA has requested that the DES</li> </ul>

Exotic Species Program participate in various training sessions by giving presentations, providing educational information and/or points of contact for identification or management of invasive species in water supplies.
<b>University of New Hampshire, Durham</b> <ul style="list-style-type: none"> <li>• Makes specimens in Hodgdon Herbarium available for verification of species</li> <li>• Offers trained botanists' time to verify a species identification</li> <li>• Provides outreach and education materials through the NH Lakes Lay Monitoring Program (NHLLMP) and Cooperative Extension</li> </ul>
<b>New Hampshire Rivers Council (NHRC)</b> <ul style="list-style-type: none"> <li>• Works closely with individual river groups to expand the understanding of exotic species to improve early detection and rapid response, as well as spread prevention</li> <li>• Coordinates with DES for the implementation and funding for the various prevention activities</li> <li>• Assists with monitoring for Didymo and other invasive aquatic plants in river systems in New Hampshire</li> </ul>
<b>New Hampshire Lakes Association (NHLA)</b> <ul style="list-style-type: none"> <li>• Works closely with individual Lake Associations</li> <li>• Coordinates with DES for the implementation and funding for the Lake Host Program</li> <li>• Works with DES to draft appropriate legislation that pertains to exotic aquatic plants</li> </ul>
<b>Marinas</b> <ul style="list-style-type: none"> <li>• Provide information to boaters about exotic aquatic plants</li> </ul>
<b>Private Citizens</b> <ul style="list-style-type: none"> <li>• Participate in NH Weed Watchers Program by frequently monitoring the littoral zone of waterbodies during the growing season</li> <li>• Mail or deliver suspected exotic plants to DES for identification of species</li> </ul>

During this reporting period, a specific and multi-faceted cooperative initiative between state agencies was begun. An inter-agency group was formed concerning exotic aquatic plant control activities in New Hampshire. The group was charged with evaluating current processes and planning for future activities related to exotic aquatic plant management. This initiative came about as a result of philosophical differences between the state agencies related to exotic aquatic plants.

In January 2011, agency heads and key staff from the Department of Agriculture (Ag), the Department of Resources and Economic Development (DRED), the Fish and Game Department (F&G), and the Department of Environmental Services (DES) met for a facilitated session to evaluate current mechanisms to monitor, map, and control exotic aquatic plants. During this meeting, the issue of rare, threatened, and endangered species (RTE species) and how they interact with exotic plants was discussed. Other planned actions from this meeting included better sharing of data and information, development of an inter-agency Memorandum of Agreement (MOA), review and revision of Long-Term Management Plans, and implementation of the LEAN (streamlining) process on the pesticide permitting process, among others.

There was a consensus from this January meeting that Long-Term Management Plans are useful and appropriate to have for each infested waterbody. Agency staff from DES, DRED, F&G and Ag met to evaluate all components and contents of existing Long-Term Management Plans. During this meeting, it was determined that edits to the existing plan template were needed, and each of the agencies would work to contribute information from their respective areas of expertise for the plans.

In August 2011, agency staff and invited participants (public/lake representative, water supply staffer and an herbicide applicator) met again; this time to systematically work through the permitting process for herbicide applications to control exotic aquatic plants in what is termed a LEAN process. Outcomes from this meeting will result in some modifications to the pesticide permitting process, and in Long-Term Management Plans being integral in the process of exotic aquatic plant control.

The agencies formally agreed to all of the outcomes from the various meetings in an MOA which was signed in early spring 2012. A copy of the MOA is included in Appendix 3.

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## SECTION 2 - PROGRAM ACTIVITIES

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As outlined in Section 1, the Exotic Species Program has five focus areas: 1) Prevention of new infestations, 2) Monitoring for early detection of new infestations, 3) Control of new and established infestations, 4) Research towards new control methods with the goal of reducing or eliminating infested areas, and 5) Cooperation between regional and national groups. Activities in each focus area are discussed below.

Following is a summary of the activities associated with each focus area during the 2009-2012 reporting period.

### **2.1 Prevention of New Infestations – Education and Outreach**

Education and outreach activities are the key to prevention activities. On local, state, regional, and national levels, efforts are under way to boost the level of information that is available to the general public about exotic aquatic plant species. The more individuals are aware of the problems associated with exotic aquatic plants, the lesser the likelihood the plants will continue to be spread throughout the state. Education and outreach initiatives are targeted towards the users of our surface waters (boaters, personal water craft users, fishermen, and others), special interest groups (fishermen, boater groups, seaplane operator groups), and aquarium and water garden hobbyists.

Outreach efforts are aimed at educating the public and various interest groups about the characteristics of exotic plants, including:

- The negative environmental and economic impacts of exotic aquatic plants
- Exotic aquatic plant identification
- How exotic aquatic plants spread
- How to minimize the spread
- Control techniques
- New Hampshire's Exotic Aquatic Plant laws and regulations
- Listed prohibited exotic aquatic plants in New Hampshire

#### **2.1.1 Presentations**

From 2009 through 2012, the Exotic Aquatic Plant Program gave more than 175 presentations on exotic aquatic plants across the state and beyond. These presentations took place during annual lake association meetings, legislative committee meetings, municipal conservation commission meetings, lake management meetings, high school and college classes, and professional meetings.

The Exotic Aquatic Plant Program Coordinator also attended annual lake festivals, conferences, and environmental awareness festivals throughout the state, including the Naturally Newfound Day event and Wild New Hampshire Day events. At these events, written materials were provided for distribution while the coordinator interacted on an individual basis with interested members of the public. Live specimens of exotic plants and look-alike native plants were also on display for close examination and comparison. A list of fact sheets, pamphlets, and other materials, and links to each on the DES website, provided at these presentations are included in Appendix 4.

### **2.1.2 Dissemination of Exotic Aquatic Plant Information through the Media**

The Exotic Aquatic Plant Program was the focus of four live radio broadcasts during this reporting period. All were with NH Public Radio's show *The Exchange* and focused on special topics related to the problem of invasive species. Also, in 2010, the Exotic Species Program Coordinator participated in a National Public Radio story in Didymo in New Hampshire.

In 2009, DES published "Aquatic Plants and Algae of New Hampshire's Lakes and Ponds." This publication was co-authored by two of DES' limnologists and was intended as a field guide for plant identification for lake residents and lake enthusiasts in New Hampshire. The book was printed for hardcopy distribution, and the book was also posted electronically on the DES website at <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-05-30.pdf>. A reprint of the book was done in 2011 due to popular demand.

The Exotic Aquatic Plant Program maintains a regularly updated webpage on the DES website at <http://des.nh.gov/organization/divisions/water/wmb/exoticspecies/index.htm>. The website provides links to exotic plant identification information, Weed Watching information, exotic aquatic plant distribution maps, and copies of fact sheets and exotic aquatic plants legislation and regulations. The site is frequently updated with new information on lake and river infestations, facts and figures on exotic aquatic plants, and reports from various state and federally funded research projects.

To inform boaters and other users of our surface waters, DES, the Fish and Game Department, and the Department of Resources and Economic Development have collaborated to post signs at each of the state-owned public access sites. These signs warn boaters about exotic plant infestations and where to look on their recreational equipment for tag-along plant fragments. Additionally, DES has worked with municipalities, lake associations and marinas to have signage placed at locally or privately owned access sites around the state. Examples of each type of sign are included in Appendix 5.

### **2.1.3 Milfoil Prevention Activities**

Efforts to prevent the spread of invasive species are focused on people and their habits, as outlined above. A primary means for invasion is through unintentional transport of aquatic plants on boats, trailers, and other recreational equipment.

The Program also attempts to prevent the introductions of invasive species that have the potential to move into the state. To do so, the program identifies potentially invasive species in other areas of the country and around the world, predicts pathways of spread, and develops and implements solutions that reduce the potential for introduction and spread in New Hampshire. The list of prohibited species in the state includes several species that are not yet in New Hampshire yet, and these are considered species to watch for. Prevention efforts are often undertaken in collaboration with other states, agencies, and partners with similar concerns.

To further promote milfoil prevention activities and stimulate cooperative ventures with various interest groups, DES has implemented a milfoil and other exotic aquatic plant prevention grant program. Funding for this program was established through legislation (RSA 487:25-29), and as of January 1, 2003, \$3 from each boat registration fee was allocated towards this innovative grant program. In 2009, legislation added an additional \$1 to boat registration fees to provide more



funding specifically for prevention related activities since they are so critical to stopping new infestations (three quarters of the revenues from this program are used for prevention grants, the balance is used for research grants).

The intent of the milfoil prevention grants is to garner public support and participation in milfoil prevention activities. Activities include education and outreach initiatives, staffing public access sites to conduct inspections of aquatic recreational gear for attached aquatic plant fragments, and other similar projects.

#### **2.1.4 Listing of Exotic Aquatic Plants as Prohibited**

Earlier in program history (2007 and 2008), the Exotic Species Program worked to expand the list of prohibited exotic aquatic plants in New Hampshire; however, no modifications to the list were made during this reporting period. The reason for this earlier list expansion was to take into consideration species that were not previously included as prohibited in 1998, when the list was first developed, but that have recently shown a rapid expansion in their geographic range and an increased infestation rate in other nearby states. The update in 2007/2008 was comprehensive, and no further updates to the list have been needed, though monitoring for new species or species of concern is ongoing.

### **2.2 Early Detection- Monitoring and Identification**

DES takes an active role in monitoring both the natural environment and retailers of aquatic plants to prevent new introductions of nuisance species into New Hampshire's surface waters. Early detection efforts, coupled with rapid response initiatives, make control practices more successful because exotic plants are detected before they have an opportunity to expand. A process for early detection and rapid response was developed and incorporated into rule (Env-Wq 1305), and response activities are tailored to site specific conditions when an infestation is detected. Following is a summary of the monitoring activities conducted from 2009 through 2012.

#### **2.2.1 Field Monitoring by Biologists**

Field sampling by state biologists occurs through both scheduled surveys as well as in response to complaints about potential infestations. Examples of these types of monitoring activities follow.

In 2009 and 2012, DES biologists participated in the National Lake Assessment Program by sampling 31 (20 in 2009 and 11 in 2012) randomly selected ponds in New Hampshire. During these surveys and data collection activities, the biologists also patrolled the waterbodies searching for invasive aquatic plants. One of the ponds on the survey list in 2009 was found to have a new infestation of variable milfoil (Upper Goodwin Pond). In the past, DES biologists performed summer sampling on 30-40 randomly selected lakes across the state. This Lake Assessment Program was valuable in that it often focused on a number of waterbodies that did not have active lake associations or many residents around them. Biologists would perform plant surveys as part of their assessments. This resulted in additional finds of new infestations where they may otherwise have gone undocumented until the infestation was very large. This state lake assessment program was cut in 2009 due to lack of state funds.

In addition to the survey work for the National Lake Assessment by staff biologists, the DES Exotic Species Program biologist inspected 82 waterbodies in 2009, 80 waterbodies in 2010, 83 waterbodies in 2011 and 87 in 2012 for new or existing infestations of exotic plants. Many of these

were routine and repeat inspections for exotic plant growth, and some were the result of complaints filed by concerned shoreline residents or visitors to the waterbody.

During the surveys, GPS units were used to systematically map the extent of infestations in each waterbody, and more accurate and detailed electronic records of infestations were established using Geographic Information Systems (GIS). This allows DES to better plan for control activities, increase precision of field documentation of infestations, and to track the spatial and temporal characteristics of infestations and related control activities.

In addition to monitoring for infestations, DES has partnered with various researchers and contractors over the past several years (funded through exotic aquatic plant control grants) to conduct intensive mapping of both native and exotic aquatic plants before, during, and after control measures are implemented to document any impacts to non-target plants. A variety of reports are available upon request at DES relative to the findings of these studies.

### **2.2.2 Pet and Plant Nursery Store Monitoring**

In 1998, legislation went into effect banning certain activities associated with exotic aquatic plants in New Hampshire. Specifically, RSA 487:16-a states, “*No exotic aquatic weeds shall be offered for sale, distributed, sold, imported, purchased, propagated, transported, or introduced in the state of New Hampshire.*” To implement this program, the Department of Environmental Services adopted rules to prohibit a number of species of aquatic plants in New Hampshire. Retail store inspections are conducted to ensure that the listed prohibited plants are not offered for sale.

During the 2009-2012 summer seasons, DES staff performed 174 pet store investigations. During these visits, a thorough inspection of all fish tanks and ponds were checked for any prohibited plant species. The owner or the employee in charge during the inspections was given educational materials about invasive plants and the state laws prohibiting their sale. The owner or employee in charge was then asked to sign the inspection sheet confirming that they have received the appropriate information and are aware of the prohibited plant list.

During the 2009 summer season, 40 pet stores were inspected, two of which had prohibited plant sale violations (Table 3). During the 2010 summer season, 44 pet stores were inspected and three of them had prohibited plant sale violations (Table 3). During the 2011 summer season, 47 pet stores were inspected and two of them had prohibited plant sale violations (Table 3). During the 2012 summer season a total of 43 pet stores were inspected and three were found to have violations (Table 3).

**Table 3: Summary of Violations Identified During Retail Inspections**

<b>Date</b>	<b>Facility</b>	<b>Location</b>	<b>Exotic Plant</b>	<b>Action</b>
6/11/2009	Little Critters Pet Center	Exeter	Milfoil sp.	Removed from selling floor
6/11/2009	Little Critters Pet Center	Raymond	Milfoil sp. and fanwort	Removed and LOD issued
9/20/2010	Osborne's Agway	Hooksett	Miniature cattail	Removed and LOD issued
9/23/2010	One Stop Country Pet Supply	Keene	Milfoil sp. and parrot feather	Removed and LOD issued
10/1/2010	Fish Bowl	Milford	Milfoil sp.	Removed and

Date	Facility	Location	Exotic Plant	Action
				LOD issued
7/22/2011	Little Critters Pet Center	Raymond	Hydrilla	Removed and LOD issued
7/26/2011	Claremont Pet Center	Claremont	Milfoil sp.	Removed and LOD issued
7/10/2012	Petsmart	Nashua	<i>Typha minima</i> Mini cattail	Had product removed from sales floor
7/10/2012	Petsmart	Nashua	<i>Typha minima</i> Mini cattail	Had product removed from sales floor
7/27/2012	Petsmart	Concord	<i>Typha minima</i> Mini cattail	Had product removed from sales floor

### 2.2.3 Volunteer Weed Watcher Program

The goal of the Weed Watcher program is to promote a volunteer, grass-roots effort to monitor lakes, ponds, and rivers for the early detection of exotic aquatic plant infestations. Because eradication of established exotic plant infestations is rarely possible, early detection is of utmost importance. DES-trained Weed Watchers monitor waterbodies for new infestations once a month through the growing season, and report suspected new infestations to DES. This allows DES biologists to respond rapidly before the infestation has an opportunity to expand further, and lends a measure of efficiency to the program as volunteers are asked to send voucher specimens of suspect plants (either live plants dropped off or mailed in, or photographs of plants via email) for verification prior to a biologist's visit. Most often, suspect plants that are found are native look-alike species that do not require field inspection, and this system of voucher specimens helps to maximize the time that the program biologist can spend focusing on exotic aquatic plants.

Weed Watcher volunteers are trained by DES biologists to identify both exotic aquatic plants and native plants that are common in their waterbody. Training typically involves providing volunteer groups with photographic keys to native and exotic plant species and accompanying them in the field during a scheduled training session to instruct them how to identify plants within their chosen waterbody. If no exotics are present, the program coordinator will provide specimens of exotic aquatic plants for the volunteers to use as learning tools. Volunteers are also supplied with vegetation maps that were prepared by the DES Lake Assessment Program for their waterbody, a Weed Watcher Kit containing fact sheets on the exotic plants, instruction on how to Weed Watch, maps of infestations in the state, and laminated plant identification guides. Instructions on how to immediately report any suspected new infestations are also included in the kit, as well as how to collect and send samples of suspect plants to DES for positive identification.

In 2009, volunteers from 37 waterbodies received training in the program; in 2010, participants from 23 lakes were trained in Weed Watching, and in 2011 DES trained groups from 14 waterbodies. During the 2012 growing season 21 groups were trained or re-trained in Weed Watching methods. There are now over 750 trained Weed Watchers monitoring over 200 waterbodies for early detection of exotics. This does not include a number of volunteers from the Volunteer Lake Assessment Program that participate on an "unofficial" basis (some have not been trained by the Coordinator so they are not considered official Weed Watchers).

Between 2009-2012, over 1000 plants were sent to the DES Limnology Center for identification and verification. Most of these were derived from activities of the Lake Host Program (a prevention program funded in part by the Exotic Species Program, implemented by the NH Lakes Association), and some were from Weed Watcher activities around the state. No new infestations were found in waterbodies monitored by Weed Watchers in 2009 through 2012. Unfortunately the waterbodies that did have new infestations in these years would have benefited from volunteer Weed Watchers, as most infestations, when they were found, were quite expansive. Early detection efforts would have resulted in a rapid response action by DES, before infestations became widespread. As a result, the Exotic Species Program continues to regularly promote participation in this important early detection program.

#### **2.2.4 Lake Host Program**

The Lake Host Program was developed to educate transient boaters about the problem of invasive species, and to conduct courtesy boat inspections at public access sites with the goal of reducing the spread of invasive species. Transient boaters are the primary vector for spread of invasive aquatic species. The New Hampshire Lakes Association (NH LAKES) is a non-profit organization that runs the Lake Host Program with a state and federal grant funds, and local hard and soft match. NH LAKES recruits both paid and volunteer staff to implement to program at launches across the state, then coordinates trainings and support through the boating season to the groups. Lake Hosts remove any plant material they find on transient boats, and sends the material to DES for identification. Any invasive plants that are found are considered “saves,” whereby the invasive plant was removed before it was introduced into a new waterbody. In this four-year reporting period, over 400 “saves” were documented.

### **2.3 Control Activities**

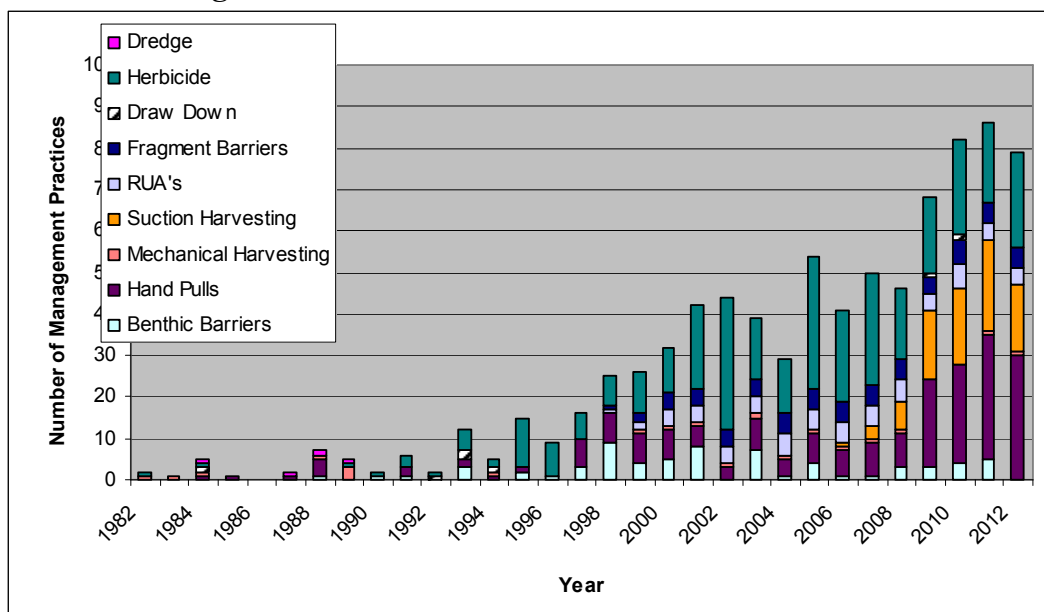
The Exotic Aquatic Plant Program relies on a number of methods to control exotic plant infestations, including physical control, chemical control, biological control, and habitat manipulation. DES typically integrates one or more of these control strategies, when appropriate, for each waterbody, in a method termed ‘Integrated Pest Management’ (IPM). IPM strategies generally result in more effective and longer term control than any one control method used alone.

For nearly every infested waterbody in New Hampshire, a Long-Term Management Plan (LTMP) has been prepared by DES (with input from other state agencies and local entities) to help guide management efforts over time. The plans outline the history and status of the infestation, chemical and biological characteristics of the waterbody, evaluate control options, and provide a five year IPM strategy for controlling the infestation(s) within the subject waterbody. LTMPs are based on a general template for structure and content, but the information within each plan is tailored to individual waterbodies.

State grant funds are available each year to help local groups implement the control strategies. A variety of DES funded (at full or partial levels) control projects have been conducted on a variety of waterbodies each year, with an increasing number of control projects conducted annually over the years, due to rising numbers of infestations and desire to reduce the overall footprint and impact of infestations in waterbodies. Figure 3 summarizes the historical trends in control practices since 1981 (note that this graph does not account for multiple uses of a control technique in a waterbody in a given year, but this information is conveyed in more detail in Tables 5a-5d). A trend in diversification of control method is evident, particularly in the last five years as

new methods have come in to play and as Long-term Management Plans (LTMPs) have required integrated approaches at management be employed.

**Figure 3: Historical Trends in Control Practices over Time**



Following is a summary of the various control strategies that are used in New Hampshire. Descriptions for the control activities are closely modeled after those prescribed by the Aquatic Ecosystem Restoration Foundation (AERF). This publication can be found online at <http://www.aquatics.org/bmp.htm>. Additional information can also be obtained from a document prepared for the State of Massachusetts called the Generic Environmental Impact Report for Lakes and Ponds, available at <http://www.mass.gov/dcr/watersupply/lakepond/geir.htm>.

Appendix 6 outlines these recognized control methods, including information on target plant specificity, advantages, disadvantages, and approximate cost (cost analysis provided by Aquatic Control Technologies, Inc.). Criteria for the selection of control techniques in New Hampshire are presented in Appendix 7.

### 2.3.1 Restricted Use Areas and/or Fragment Barriers

A Restricted Use Area (RUA) is a tool that can be used to quarantine a portion of a waterbody if an infestation of exotic aquatic plants is isolated to a small cove, embayment, or section of a waterbody. RUAs generally consist of a series of buoys and ropes or nets strung to establish an enclosure (or exclosure). RUAs can be used to prevent access to these infested areas while control practices are being done, and provide the benefit of restricting boating, fishing, and other recreational activities within these areas, so as to prevent fragmentation and spread of the plants outside of the RUA. RUAs are demarcated with specialized navigation buoys.

Fragment barriers are used alone or in concert with RUAs. Fragment barriers are erected when there are small isolated areas of dense milfoil (or other exotic plant) growth. The areas are generally small enough to surround or cordon-off with a fragment net suspended in the water column and marked with buoys. Navigation is not restricted in the area, as with an RUA, but the enclosure still serves to trap fragments and limit use of the area while control efforts are under way.

RUAs often require regular maintenance and inspection to remove built-up plant material and organic debris which may accumulate on lines and nets. Usually, local groups or volunteer monitors serve as tenders to ensure that the nets remain clear and functional through the growing season.

Table 4 lists the locations of active Restricted Use Areas and/or fragment barriers and the years in which they were initiated.

**Table 4: Locations of Restricted Use Areas and/or Fragment Barriers (2009-2011)**

<b>Waterbody</b>	<b>Town</b>	<b>Date Installed</b>	<b>Date Removed</b>
Lake Massabesic	Auburn	1996	Still in place
Lake Massasecum	Bradford	1998	Still in place
Little Squam Lake*	Ashland	2001	Removed for 2003 season, reinstalled in 2004, removed in 2007
Lake Sunapee	Georges Mill	2001	2002
Balch Lake*	Wakefield	2002	Still in place
Big Squam Lake	Holderness	2005	Still in place
Otternic Pond*	Hudson	2010	Still in place
Lees Pond	Moultonborough	2010	Still in place
Lake Winnepesaukee	Moultonborough	2012	Still in place

\*This RUA is more of a containment device for fragments. Access is not restricted.

### **2.3.2 Diver Hand Removal**

Hand-pulling exotic aquatic plants is a technique used on both new and existing infestations, as circumstances allow. Divers carefully hand-remove the shoots and roots of plants from infested areas and place the plant material in mesh dive bags for collection and disposal. This technique is suited to small patches or areas of low density exotic plant coverage.

For a new infestation, hand-pulling activities are typically conducted several times during the first season, with follow-up inspections for the next 1-2 years or until no re-growth is observed. For existing infestations, hand-pulling may be done to slow the expansion of plant establishment in a new area or where new stems are removed in a portion of the waterbody that may have previously been uninfested. It is a routine follow-up technique that is included in most management plans because it can effectively control very small-scale plant growth.

In 2007, a new program was created through a cooperative between a volunteer monitor who is a certified dive instructor and the DES Exotic Species Program. A Weed Control Diver (WCD) Course was developed and approved through the Professional Association of Dive Instructors (PADI) and the DES Wetlands Bureau to expand the number of certified divers available to assist with hand-pulling activities. DES has only two certified divers in the Limnology Center to handle problems with aquatic plants, and more help was needed. There is indeed a skill involved with hand-removing plants from the lake bottom, and if the process is not conducted correctly, the plants could spread. For this reason, training and certification are needed to help ensure success.

Furthermore, the Exotic Species Program worked with the DES Wetlands Bureau to amend the rules pertaining to the requirement of Wetlands Permits for hand removal projects. Typically a

permit would be needed to do any plant removal from the lake bottom, through hand-removal or otherwise. Now, WCDs may perform hand-removal activities for exotic aquatic plants without a permit, as long as they follow guidelines in Wetlands rules, including notification requirements to the Exotic Species Program. Those divers that are not WCD certified must still obtain a Wetlands Permit to do any hand-removal.

The WCD course involves a day of classroom training and then a series of open water dives to train the diver in the field on how to remove exotic aquatic plants and properly dispose of them. By the end of 2012, over 120 divers were certified through this program. DES maintains a list of these divers and shares them with waterbody groups and municipalities that may be seeking diver assistance for controlling exotic aquatic plants. Classes are offered two to three times per summer.

### **2.3.3 Diver Assisted Suction Harvesting (DASH)**

Diver Assisted Suction Harvesting (DASH) is an evolving control technique in aquatic plant management. The technique employs divers that perform hand removal actions as described above, however, instead of using a dive bag, a mechanical suction device is used to entrain hand-harvested plants and bring them topside where a tender accumulates and bags the material for disposal. Because of this variation, divers are able to work in moderately dense stands of plants that cover more bottom area, with increased efficiency and accuracy.

Each year DES has been modifying and retrofitting the DASH device that is owned by the state, and expanding the program to new waterbodies. The DASH unit has been demonstrated for other lake groups in New Hampshire, too, and they have begun to construct their own unit for local and/or regional sharing to control growths of exotic aquatic plants. In 2010, a tri-town effort was begun to build two DASH units for regular use in Moultonborough, Tuftonboro and Wolfeboro areas of Lake Winnepesaukee, as part of an large-scale cooperative at variable milfoil reduction in that lake. In 2011 and 2012, such initiatives were expanded to other waterbodies across the state, thanks to federal grants implemented by the New Hampshire Lakes Association.

There are a few companies that are in existence now that provide DASH services on a consulting basis for New Hampshire and surrounding states, and their services have been regularly employed on various waterbodies across the state in recent years.

### **2.3.4 Benthic Barriers**

Benthic barriers are pieces of fiberglass-coated screening material that can be applied directly to the lake bottom to cover and compress aquatic plant growth. Screening is staked or weighted to the bottom to prevent it from becoming buoyant or drifting with current. The barriers also serve to block sunlight and prevent photosynthesis, thereby killing the plants with time. While a reliable method for small areas of plants (roughly 100 sq. ft. or less), larger areas are not reasonably controlled with this method due to a variety of factors (labor intensive installation, cost, and gas accumulation and bubbling beneath the barrier that is hard to maintain).

### **2.3.5 Dredging**

Dredging is the process of mechanically removing bottom sediment from a lake. This method can deepen the lake bottom beyond the photic zone and also result in the physical removal of plants from a waterbody. Because this method is not completely effective in removing all exotic plants or their seeds, and because it is often cost prohibitive, it is not a method that is regularly considered for exotic aquatic plant management.

### **2.3.6 Targeted Application of Aquatic Herbicides**

Application of aquatic herbicides is a proven tool for controlling exotic aquatic plants. Generally, herbicides are used when infestations are too large to be controlled using other alternative non-chemical controls, or if other techniques have been tried and have proven unsuccessful. Each aquatic plant responds differently to different herbicides and concentrations of herbicides, but research performed by the Army Corps of Engineers has isolated target specificity of a variety of aquatic herbicides for different species. Collaborative research between DES and the Corps of Engineers, as well as contractors employed by DES have resulted in the further refinement of herbicide selection and dosing for site specific applications.

Generally, 2,4-D (in various formulations) is the herbicide that is recommended for control of variable milfoil. Based on laboratory data, this is the most effective herbicide in selectively controlling variable milfoil in New Hampshire's waterbodies.

Another herbicide, Fluridone, is sometimes also used in New Hampshire, mainly to control growths of fanwort (*Cabomba caroliniana*). Fluridone is a systemic aquatic herbicide that inhibits the formation of carotenoids in plants. Reduced carotenoids pigment ultimately results in the breakdown of chlorophyll and subsequent loss of photosynthetic function of the plants.

Other aquatic herbicides are also used in New Hampshire when appropriate (glyphosate, copper compounds, etc). The product of choice will be recommended based on what the target species is, and other waterbody-specific characteristics that are important to consider when selecting a product.

A special aquatic permit is needed before an herbicide can be applied to a surface water in New Hampshire, and only licensed aquatic applicators can perform these treatments. The Department of Agriculture is the permitting agency for aquatic herbicides.

### **2.3.7 Extended Drawdown**

Extended drawdown serves to expose submersed aquatic plants to dessication and scouring from ice (if in winter), physically breaking down plant tissue. Some species can respond well to drawdown and plant density can be reduced, but for invasive species drawdown tends to yield more disturbance to bottom sediments, something to which exotic plants are most adapted. In waterbodies where drawdown is conducted exotic plants can outcompete native plants for habitat and come to dominate the system.

Some waterbodies that are heavily infested with exotic plants do conduct drawdowns to reduce some of the invasive aquatic plant density. During this reporting period both Northwood Lake (Northwood) and Jones Pond (New Durham) coordinated deep winter drawdowns to reduce growths of variable milfoil (the drawdown on Northwood Lake is primarily for flood control purposes, but they do see some ancillary benefits from the technique for variable milfoil control).

Tables 5a-5d provide information on the control activities that took place from 2009 through 2012. Note that these tables include activities that were funded with and without state match, and are intended to be comprehensive in terms of showing what management was performed across the state for exotic aquatic plants, and the number of times they were performed in each waterbody in a given year.



**Table 5a: Exotic Plant Control Activities in 2009**

<b>Waterbody</b>	<b>Town</b>	<b>Hand<sup>1</sup> Pulls</b>	<b>DASH<sup>1</sup></b>	<b>Benthic Barrier</b>	<b>Mechanical Harvesting</b>	<b>RUA/ Fragment Barrier</b>	<b>Herbicide</b>
Balch Lake	Wakefield	1	1			1	1
Belleau Lake	Wakefield	17	1			1	1
Big Island Pond	Derry/Atkinson	1	37			1	
Cobbetts Pond	Windham						1
Contoocook Lake	Rindge		12				
Dublin Lake	Dublin	1		1			
Forest Lake	Winchester	1	1				1
Halfmoon Pond	Barnstead	1		1			
Lake Massabesic	Auburn	1	1	1			
Lake Massasacum	Bradford	2				1	1
Lake Monomonac	Rindge	1					1
Lake Pemigewasset	New Hampton	1	1			1	
Lake Sunapee	Sunapee	1	1				
Lake Wentworth	Wolfeboro	1	1				1
Lees Pond	Moultonborough	1	3				
Long Pond	Danville						1
Melendy Pond	Brookline	1	1				
Otternic Pond	Hudson						1
Phillips Pond	Sandown	1	1				
Rocky Pond	Gilmanton	1	1				
Rockybound Pond	Croydon	1					
Scobie Pond	Francestown	1	1				
Suncook River System	Barnstead	1					1
Turkey Ponds System	Concord						1
Winnepesaukee	Wolfeboro	1	1				1
Winnepesaukee (Castle Shore Dr)	Moultonborough						1
Winnepesaukee (Gilford Docks)	Gilford		2				
Winnepesaukee (Island Marina/Minge Cove)	Alton						1
Winnepesaukee (Lakeshore Park)	Gilford						1
Winnepesaukee (Meredith Yacht Club)	Meredith						1

Waterbody	Town	Hand <sup>1</sup> Pulls	DASH <sup>1</sup>	Benthic Barrier	Mechanical Harvesting	RUA/ Fragment Barrier	Herbicide
Winnepesaukee (Round Cove)	Meredith						1
Winnepesaukee (Smith Cove)	Gilford		1				
Winnisquam (Jay's Marina)	Belmont						1
Winnisquam (North End)	Meredith	1	2				
<b>2009 Totals</b>		<b>38</b>	<b>69</b>	<b>3</b>	<b>0</b>	<b>5</b>	<b>18</b>

<sup>1</sup>Denotes the total number of times the activity was performed at this site in given year

**Table 5b: Exotic Plant Control Activities in 2010**

Waterbody	Town	Hand <sup>1</sup> Pulls	DASH <sup>1</sup>	Benthic Barrier	Mechanical Harvesting	RUA/ Fragment Barrier	Herbicide
Belleau Lake	Wakefield	4	1			1	1
Big Island Pond	Derry/Atkinson	1	3			1	
Cobbetts Pond	Windham	2	1				1
Contoocook Lake	Jaffrey	1	12				1
Crescent Lake	Wolfeboro	1	1				1
Danforth Pond	Freedom		2				
Forest Lake	Winchester	1		1		1	
Jones Pond	New Durham	1	1				1
Lake Massabesic	Bradford	1	1	1		1	
Lake Massasacum	Bradford	1		1		1	1
Lake Monomonac	Rindge	1					1
Lake Opechee	Laconia	1					1
Lake Pemigewasset	New Hampton	2					
Lake Potanipo	Brookline						1
Lees Pond	Moultonborough	2	8	1		1	1
Long Pond	Danville	1	1				1
Namaske Lake	Manchester						1
Northwood Lake	Northwood	1					1
Pearly Pond	Rindge	1					1
Phillips Pond	Sandown	1	2				
Post Pond	Lyme	2	1				
Powwow Pond	Kingston		3				
Robinson Pond	Hudson						1
Suncook Pond (Upper)	Barnstead	1	1				1
Suncook River System	Barnstead		1			1	1
Turkey Pond System	Concord						1

Waterbody	Town	Hand <sup>1</sup> Pulls	DASH <sup>1</sup>	Benthic Barrier	Mechanical Harvesting	RUA/ Fragment Barrier	Herbicide
Winnepesaukee (Alton Bay)	Alton	1	1				1
Winnepesaukee (Fish/Round Coves)	Meredith	1	1				
Winnepesaukee (Gilford Docks)	Gilford		3				
Winnepesaukee (Lakeshore Park)	Gilford	1					1
Winnepesaukee (Meredith Bay/MYC/ Hawkins Bk)	Meredith						1
Winnepesaukee (Several Moultonborough Areas)	Moultonborough						1
Winnepesaukee (Smith Cove)	Gilford		1				
Winnepesaukee (Wolfeboro Bay)	Wolfeboro	1	1				
Winnisquam (North End)	Meredith	1					1
<b>2010 Totals</b>		<b>31</b>	<b>46</b>	<b>4</b>	<b>0</b>	<b>7</b>	<b>23</b>

<sup>1</sup>Denotes the total number of times the activity was performed at this site in given year

**Table 5c: Exotic Plant Control Activities in 2011**

Waterbody	Town	Hand <sup>1</sup> Pulls	DASH <sup>1</sup>	Benthic Barrier	Mechanical Harvesting	RUA/ Fragment Barrier	Herbicide
Balch Lake	Wakefield	1	1			1	1
Belleau Lake	Wakefield	12	1			1	1
Big Island Pond	Derry	1	1			1	
Captains Pond	Salem		1				
Contoocook Lake	Jaffrey	1	19				
Danforth Ponds	Freedom	1	1				1
Flints Pond	Hollis						1
Forest Lake	Winchester	1					
Jones Pond	New Durham	1					1
Lake Massasecum	Bradford	3		1			
Lake Monomonac	Rindge						1
Lake Opechee	Laconia	3	2	1			
Lake Pemigewasset	New Hampton	2					
Lake Potanipo	Brookline	4	1				

Waterbody	Town	Hand <sup>1</sup> Pulls	DASH <sup>1</sup>	Benthic Barrier	Mechanical Harvesting	RUA/ Fragment Barrier	Herbicide
Lees Pond	Moultonborough	1	2			1	
Locke Lake	Barnstead	1	1				1
Long Pond	Danville	1					
Namaske Lake	Manchester		1				
Nashua River	Nashua				1		
Northwood Lake	Northwood	1	1	1			1
Ossipee Lake System (Broad Bay/Leavitt Bay)	Ossipee	1	1			1	1
Phillips Pond	Sandown	2					1
Post Pond	Lyme	5		1			1
Powwow Pond	Kingston	1					1
Robinson Pond	Hudson	1	3				
Rocky Pond	Gilmanton	1					1
Rocky Pond	Hollis	3		1			
Scobie Pond	Francestown						1
Sunrise Lake	Middleton		3				
Turkey Pond System	Concord						1
Willand Pond	Dover	1					1
Winnepesaukee	Alton		6				
Winnepesaukee (Back Bay/Wolfeboro Bay)	Wolfeboro	1	1				
Winnepesaukee (Christmas Island)	Laconia						1
Winnepesaukee (Lakeshore Park)	Gilford	1	1				
Winnepesaukee (Meredith Bay/Hawkins Bk)	Meredith						1
Winnepesaukee (Moultonborough Areas)	Moultonboro	1	1				2
Winnepesaukee (Smith Cove)	Gilford	1	1				
<b>2011 Totals</b>		<b>53</b>	<b>49</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>19</b>

<sup>1</sup>Denotes the total number of times the activity was performed at this site in given year

**Table 5d: Exotic Plant Control Activities in 2012**

<b>Waterbody</b>	<b>Town</b>	<b>Hand<sup>1</sup> Pulls</b>	<b>DASH<sup>1</sup></b>	<b>Benthic Barrier</b>	<b>Mechanical Harvesting</b>	<b>RUA/ Fragment Barrier</b>	<b>Herbicide</b>
Balch Lake	Wakefield	3	3			1	1
Belleau Lake	Wakefield	20				1	1
Big Island Pond	Derry		12				
Captains Pond	Salem	1					1
Cobbetts Pond	Windham		3				
Contoocook Lake	Jaffrey		21				
Danforth Ponds	Freedom		3				1
Flints Pond	Hollis	3					
Forest Lake	Winchester	1					1
Gorham Pond	Dunbarton						1
Horseshoe Pond	Merrimack						1
Jones Pond	New Durham		1				1
Lees Pond	Moultonbor ough		5			1	1
Locke Lake	Barnstead		1				1
Long Pond	Danville						1
Lake Massasecum	Bradford	5		1			
Melendy	Brookline	1					1
Mine Falls Park Pond	Nashua						1
Lake Monomonac	Rindge						1
Namaske Lake	Goffstown/ Manchester		1				1
Nashua River	Nashua				1		
Naticook Lake	Merrimack	1	3				
Lake Opechee	Laconia		8				
Ossipee	Ossipee/ Freedom		3				
Otternic Pond/Robinson Pond	Hudson		5			1	
Lake Pemigewasset	New Hampton	1					
Post Pond	Lyme	3					1
Potanipo	Brookline		1				1
Powwow Pond	Kingston	1					1
Robinson Pond	Hudson		10				
Rocky Pond	Hollis		3				
Rockybound Pond	Croydon	1					

Waterbody	Town	Hand <sup>1</sup> Pulls	DASH <sup>1</sup>	Benthic Barrier	Mechanical Harvesting	RUA/ Fragment Barrier	Herbicide
Scobie Pond	Francestown						1
Suncook River	Barnstead						1
Sunrise Lake	Middleton		2				1
Turkey Ponds	Concord						1
Willand Pond	Dover	1					
Winnepesaukee	Alton		30				1
Winnepesaukee	Meredith		17				1
Winnepesaukee	Tuftonboro		12				1
Winnepesaukee	Laconia						
Winnepesaukee	Glendale/ Gilford		10				
Winnepesaukee	Wolfeboro		5				
Winnepesaukee	Moultonboro		30				2
<b>2012 Totals</b>		<b>42</b>	<b>189</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>27</b>

<sup>1</sup>Denotes the total number of times the activity was performed at this site in given year

## 2.4 Research

Research activities are a key element in the Exotic Aquatic Plant Program. Variable milfoil is the most common exotic aquatic plant in New Hampshire but not a common nuisance species in most of the United States, therefore little research nationwide has been conducted on the plant's biology, ecological relationships, and potential control strategies. By performing research activities, the Program can address the needs for finding viable control solutions that apply to existing infestations and the development of more effective prevention mechanisms.

### 2.4.1 State Funded Research Projects

Several exciting research endeavors were initiated between 2009 and 2012 with Milfoil Research Grants, which were established under RSA-487:23. Table 6 provides a summary of each project.

**Table 6**  
**List of State Funded Milfoil Research Projects**

Year	Grantee	Project Summary	Grant Amount
2009	Aquatic Control Technology, Inc.	The focus of this project was to collect field data to evaluate different concentrations of a choice aquatic herbicide in controlling variable milfoil. Three waterbodies were selected for experimental treatment (Lake Massasecum in Bradford, Long Pond in Danville, and Fish and Round Coves on Lake Winnepesaukee). In each experimental waterbody areas were selected for 100 lbs/acre or 200 lbs/acre treatment rates. Two "control" waterbodies were selected where no herbicide treatment was performed.	\$27,243.75

Year	Grantee	Project Summary	Grant Amount
		<p>Valuable data was obtained to show that there was no statistically significant difference between higher or lower doses of the herbicide, showing that the lower dose can be used in an effort to reduce the overall use of the product when controlling variable milfoil while still achieving good control of the plant.</p> <p>The study also provided valuable information about the growth and expansion of both milfoil stems and the root systems in both treated and untreated waterbodies.</p>	
2010	Aquatic Control Technology, Inc.	<p>The purpose of this study was to collect field data on the efficacy of three different formulations of 2,4-D in controlling variable milfoil in three sites within Lake Winnisquam. Good laboratory data was available on these herbicides, but their value in field use for reducing milfoil growths had yet to be tested in New Hampshire.</p> <p>Results showed that all three formulations were effective in reducing milfoil growth, and will be used to determine treatment regimes for future New Hampshire milfoil control projects.</p>	\$25,900.00
2011	Aquatic Control Technology, Inc.	<p>The purpose of this study was to collect field data on the efficacy of a newer herbicide product in controlling variable milfoil in Flints Pond in Hollis. The herbicide (MaxG) was used in Lake Winnisquam in 2010, and follow-up work on the product was conducted in 2011 to check for target specificity to variable milfoil (i.e., the effectiveness of controlling the invasive plant while maintaining the native plants in the lake).</p> <p>Results showed that the product is very effective in controlling variable milfoil with very little impact to non-target native plant species.</p>	\$24,222.50
2012	Aquatic Control Technology, Inc.	<p>The purpose of this study was to collect field data to evaluate the efficacy of Clipper (active ingredient flumioxazin) for the control of fanwort, variable milfoil and other aquatic invasive species that have become established in the Mine Falls Park canal system in Nashua, New Hampshire. Comprehensive surveys were performed pre treatment, four weeks post treatment, and 12 weeks post treatment to document the level of invasive species control achieved, and impacts to non-target species. The final report of this project is not yet in (due February 2013), but field visits performed by DES staff showed good control of the target invasive species, and minimal impacts to non-target vegetation.</p>	\$27,752.50

As a follow-up to a 2008 research project on variable milfoil seed viability (as introduced in the 2006-2008 program report), following is an excerpt from the final project report authored by Dr. Michael Netherland of the Army Corps of Engineers:

“The main objective of this project was to determine the relative viability of variable milfoil seeds. All germination studies point to variable milfoil seeds having a high level of viability, even two years after collection. Exposure to herbicides did not appear to have any effect on the seed viability or germination of the seed. Seed production in dense variable milfoil beds can be high. We estimated that in dense variable milfoil beds seed stalk numbers per square foot range from 10 to 40 seed stalks, producing ~871,000 seed heads (assuming 20 seed stalks per square foot) and ~209,000,000 seeds (assuming 15 nodes per stalk) per acre of infestation. Given the significant number of seeds that can be produced each season and the concomitant viability of these seeds, there is a strong possibility that seeds could contribute to variable milfoil recovery in an area following herbicide or other management techniques.”

Given this information, DES is now more aware of potential milfoil regrowth as a result of seed bank germination, and factors that element into survey work and volunteer Weed Watching activities. Knowing that it can be expected that plants may grow from seed helps in the long-term control of variable milfoil.

## **2.5 Regional Cooperation**

A primary goal of regional cooperation is to standardize the activities associated with exotic aquatic plants among New England states, including the establishment of common legislation, regulations, prohibited species lists, educational materials, and rapid response protocols with neighboring states.

Until 2003, the only states in the northeastern region to pass legislation prohibiting the sale or transport of certain listed exotic plants were New Hampshire, Vermont, and Maine. Now, other states are becoming interested in creating programs and legislation, and in fact, Connecticut passed new legislation in 2003 that prohibited certain activities associated with exotic aquatic plants. Massachusetts and Rhode Island have yet to pass state legislation about invasive species, though they do have active programs in place to monitor for and control invasive aquatic plants, and continue to try annually to enact legislation and regulations related to the issue. If a standardized list of prohibited exotic plants within each state can be developed in the New England area, it would help to reduce the presence of these species in the area.

During 2009-2012, New Hampshire's Exotic Aquatic Plant Program Coordinator attended various planning meetings in other states, at their request, to assist in developing exotic plant legislation and promoting successful programs like Weed Watchers.

Additionally, in an effort to promote further cooperation among the New England states and the northeast area in general, New Hampshire is active in various professional organizations associated with exotic species control and outreach activities. Goals of these organizations include fostering partnerships between states to reduce the transport of exotic plants, sharing success and failure information with regards to control practices, and strategizing to enhance existing programs and laws to reduce the impacts of invasive plants. Following is a list of the regional, national, and international organizations with which NHDES is involved:

- **Northeast Aquatic Plant Management Society (NEAPMS)**- State and regional government officials, academia, and plant management specialists are represented with the goal of sharing resources and information concerning management practices and innovative technologies, as well as providing a forum for interaction between government, academia,



and managers.

- In 2009-2012, four regional conferences took place that allowed for the exchange of information on various management strategies employed within the various states, as well as the development of new legislation and regulations, and the certification of new aquatic herbicides for use on exotic aquatic plants. Information gained from the meeting is used to streamline New Hampshire's activities associated with preventing and controlling exotic aquatic plants.
- **North American Lake Management Society (NALMS)-** This organization focuses on a variety of holistic lake management issues, including exotic plant management and impacts to lake ecology as a result of exotic aquatic plant infestations. This organization is representative of state, federal, and regional, and international government officials, academia, professional research organizations, and miscellaneous non-government officials and organizations. NALMS meets twice annually and also has regional chapters throughout North America that meet at least on an annual basis.
  - In 2009-2012, NALMS offered special extended sessions on invasive species management, and a number of presentations on outreach and education initiatives associated with exotic aquatic species. The NH Exotic Species Program contributed to and/or moderated some of these key sessions.
- **NH Invasive Species Committee (ISC)-** This committee was established by RSA 430:54 in 2000. This committee is comprised of one representative from each state agency (including the Departments of Agriculture, Fish and Game, Environmental Services, and Resources and Economic Development), one representative from academia (UNH), one from the nursery industry, and three members at large from the public. The group is charged with developing a list of prohibited species to include terrestrial plants and animals (aquatic plants are already coordinated through DES, and aquatic animals through Fish and Game) in New Hampshire, finding ways to enforce compliance with listed species, and developing education and outreach materials for target audiences that are affected by the plants and animals. This group meets regularly in the Concord, NH area.
- **Northeast Aquatic Nuisance Species Panel (NEANS)-** This group is a regional panel of the National Aquatic Nuisance Species Task Force. The goals of this group are to assist the northeastern states and Eastern Canadian provinces in developing state, provincial, and regional Aquatic Nuisance Species Management Plans and standardize educational messages and materials in the region. The group is represented by state agencies across the northeast, and meets two times each year (May and November).
  - During 2009-2012 this group worked on a number of initiatives, including a hydrilla action plan, developing new educational materials for the region, developing a model rapid response plan for invasive species, and held numerous 'Spotlight on Species' presentations to educate participants about species on the move and new threats to the region.
- **Northern Tier Hydrilla Workgroup-** During 2012, as a result of an expanding hydrilla presence in the region, a working group was formed of state and federal agency personnel, academia, and management contractors. The purpose of the group is to share resources on monocious hydrilla, including data, management strategies, and other information, in an

effort to prevent further spread of the plant in the region, and to control and potentially eradicate existing infestations.

- During 2012, two meetings on this topic took place. One in May 2012 was an informational and scoping meeting to plan for a larger and more intensive session that was planned for September 2012. DES took notes from both meetings and distributed them throughout the region, and the notes will be used as a basis for a white paper that will be prepared by Dr. Michael Netherland with the Army Corps of Engineers for release early in 2013. The information that was exchanged at both meetings focused on the physiology, biology, ecology and other facets of both monoecious and dioecious hydrilla.

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## SECTION 3 – PROGRAM REVENUE AND EXPENDITURES

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### 3.1 Funding History

Beginning in 1981, exotic plant control activities were funded by a \$0.50 fee added to boat registrations. In 1998, the legislature established the Lake Restoration and Preservation Fund and a fee of \$1.50 per boat registration was deposited in the fund for the Exotic Aquatic Plants Program. In 2003, program funds were again increased with the enactment of RSA 487:26, which established a Milfoil and Other Exotic Aquatic Plant Prevention and Research Fund. This new legislation added an additional \$3 fee per boat registration in the state. In 2009, new fees went into effect, adding an additional \$2.50 per boat registration to increase revenues for prevention and control activities. Table 7 summarizes the breakdown of the boat registration fee.

**Table 7 Program Funding**  
**(per boat registration, effective September 1, 2009)**

Program	Funding	Activities
Clean Lakes Program	\$0.50	<ul style="list-style-type: none"><li>• Lake and watershed studies</li><li>• Sampling</li><li>• Administrative costs/staff</li></ul>
Invasive Aquatic Plant Control Program	\$3.00 (\$1.50) <sup>1</sup>	<ul style="list-style-type: none"><li>• Monitoring for exotic plants</li><li>• Control grants</li><li>• Benthic barrier supplies</li><li>• Educational materials</li><li>• Administrative costs</li></ul>
Milfoil and other Exotic Plant Prevention and Research Grant Program	\$4.00 (\$3.00) <sup>1</sup>	<ul style="list-style-type: none"><li>• Funding for prevention grants</li><li>• Funding for research grants</li><li>• Program staff</li></ul>

<sup>1</sup>Number in parentheses was funding level prior to September 1, 2009 effective date of fee increase.

Most of the revenues for the program are used for grants back to communities and various entities for control, prevention, or research work. Administrative costs are used to support the salary and benefits of two full-time employees (one for the Exotic Species Program and one for the Clean Lakes Program) and two summer/seasonal interns. Some funds are also allocated towards administrative costs for education and outreach activities as well.

A full summary of the 2009-2012 budgets (including income, expenditures and encumbrances) for the Exotic Aquatic Plants Program can be found in Appendix 8.

### 3.2 Control Grants

Control grants are those that are awarded to local entities (municipalities, lake associations and other such groups) for projects to control exotic aquatic plant growth in waterbodies in the state.

Cost sharing on control grants for exotic plant control activities is outlined under RSA 487:21. Specifically, RSA 487:21 II states, “for implementation of restoration or preservation projects where the federal government has made financial assistance available in the amount of 50 percent of the costs, the department may provide an amount not exceeding 35 percent of the total

eligible costs, as determined by the department. Where no federal funding is available, the department may provide an amount not exceeding 80 percent of the total eligible costs; and RSA 487:21, III. For water quality maintenance programs, the department may provide an amount of funding not to exceed 80 percent of the total eligible costs, as determined by the department, except for the control of new infestations of exotic aquatic weeds the state may assume 100 percent of the cost.”

Unfortunately, during this reporting period a combination of funding shortfalls (due to reduced boat registrations that resulted from a sagging economy and high gas prices) and high demand (increased desire to control exotic plants) resulted in grants that were less than 50% of the total project cost in 2009 through 2011, leading to local groups and municipalities contributing the balance of the funds for control projects. Table 8 outlines control project grant fund requests and actual allocations over several years (including years prior to this reporting period, for reference).

**Table 8: Control Grant Requests and Actual Available Grant Funds**

<b>Year</b>	<b>Requests for Grants</b>	<b>Cumulative Cost of Projects</b>	<b>Available to Grant</b>	<b>Grants Awarded</b>
2005	22	\$175,673.00	\$50,000.00	16 <sup>1</sup>
2006	23	\$256,322.00	\$70,000.00	22 <sup>1</sup>
2007	14	\$140,000.00	\$70,000.00	14
2008	33	\$370,000.00	\$110,000.00	18
2009	34	\$575,000.00	\$60,000.00	13 <sup>1</sup>
2010	32	\$471,000.00	\$88,500.00	17 <sup>1</sup>
2011	32	\$362,000.00	\$93,000.00	22 <sup>1</sup>
2012	40	\$487,648.00	\$243,824.00 <sup>2</sup>	28

<sup>1</sup>Grants were awarded at a much reduced rate, generally only 30-35% match, rather than the normal 50% match to allow funds to stretch further.

<sup>2</sup>In 2012, surplus (unbudgeted funds) were transferred into the grant line item to allow for grant funds to be expended for exotic plant control activities. Surplus funds are derived from liquidated contracts when expenditures are less than grant amounts in a given year.

Figure 4 illustrates the DES expenditures for exotic plant control grants and matching grants from municipalities, businesses, and lake associations for each year of the program.

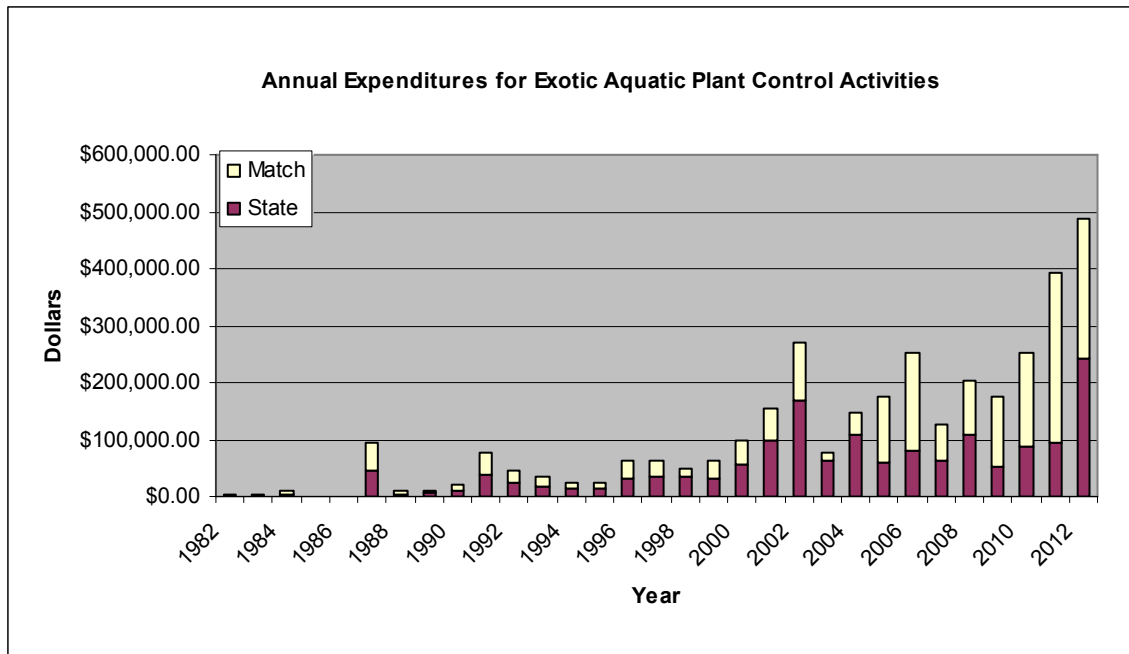
The requests for control grants are expected to continue to exceed the current budgeted amount for control activities, so DES developed a priority-rating model in 2004. In 2008, this objective rating model was adopted into administrative rules. A copy of the rating model is included in Appendix 9.

As mentioned previously, boat registration fees increased in 2009, which resulted in more income for control, prevention and research grant programs, but it is expected that there will continue to be budget shortfalls as both the need and cost increases for plant control activities.

### **3.3 Prevention and Research Grants**

In 2002, 487:26 went into effect establishing a prevention and research grant program. The grant program, as indicated above, is funded by a portion of the lake restoration and preservation fund, established in RSA 487:25, and allocated to the milfoil and other exotic aquatic plants prevention program.

**Figure 4: DES Expenditures for Exotic Plant Control Over Time**



Approximately 3/4 of the moneys distributed from the fund to the milfoil and other exotic aquatic plants prevention program are used for the purposes of awarding milfoil and other exotic aquatic plants prevention grants, and the remainder are allocated to milfoil and other exotic aquatic plants remediation research, as appropriate, based on grant requests.

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## SECTION 4 – THE FUTURE

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The goals of the Exotic Aquatic Plant Program are to limit the further spread of exotic aquatic plants, control new and existing infestations, and to research new ways to contain or even decrease the spread of these plants. Objectives in the five focus areas are:

Education and Outreach: Foster increased partnerships among lake associations, state agencies, regional groups, and other aquatic interests to provide and disseminate innovative and proactive educational materials that inform the public about exotic aquatic plants, how they are spread, and how they can be controlled.

Monitoring for Early Detection and Rapid Response: Expand the Weed Watcher Program and coordinate training activities with volunteer monitors from other lakes management programs. Map infestations using global positioning systems to more accurately document and track the occurrence and distribution of infestations over time.

Control: Develop a more streamlined process, including appropriate monitoring and environmental assessment, for conducting herbicide applications.

Research: Send out Requests for Proposals for specialists to conduct research on long-term control methods and potential means for eradication of exotic aquatic plants. Develop DNA gene sequencing methods for positive identification of variable milfoil during all life stages. Provide this technology to the DES Limnology Center so samples will not have to be sent out to other universities for analyses. Encourage state universities and colleges to submit proposals for research on exotic aquatic plants.

Regional Cooperation: Foster partnerships with other states across the northeast region to better promote an understanding of exotic aquatic plants and their impacts on our water resources. Assist other states in developing and/or enhancing exotic species legislation.

Looking to 2013 and beyond, we would like the program to grow to meet the challenge of preventing new exotic infestations, controlling existing ones, and researching new techniques for control and even eradication of exotic aquatic plants. We expect the recent dramatic increase in requests for control grants to continue, spurred by increased public awareness and interest. There is much to be done.

The sections below summarize a vision for program activities in SFY 2013-2015.

### 4.1 Education and Outreach Goals

- Develop new reporting metrics for relaying information on exotic plant infestations in New Hampshire, and for tracking trends over time.
- Explore the possibility of using already-established billboards along major state highways during the boating season to post messages about exotic aquatic plant spread prevention.

- Explore the possibility of developing sandwich boards for popular boat launch sites, with one side used to announce if a Lake Host is present to do inspections, and the other directing boaters how to self-inspect their gear if a Lake Host is not on staff at the access site.
- Update and revise the “Attention Boater” pamphlet to include a revised list and map of infestations in New Hampshire.
- In partnership with NH Lakes Association, work to continue annual implementation and expansion of the Lake Host Program.
- In partnership with NH Lakes Association, work to provide educational information about invasive species to angler groups around the region.
- Continue to publish a “Weed Watchers” newsletter each summer.
- Update fact sheets and educational materials for distribution to the public, as needed.
- Develop educational materials and reach out to sea plane dealers and users in the region to inform them about the threat of invasive species transport on sea planes and their gear.
- Conduct plant identification and Weed Watcher workshops in conjunction with the annual Volunteer Lake Assessment Program Refresher Workshop and Lake Host trainings.
- Give educational presentations to lake associations and other stakeholder groups.
- Update and reprint *Aquatic Plants and Algae of New Hampshire’s Lakes and Ponds*.
- In 2016 prepare a 2013-2015 Program Report.

#### **4.2 Prevention, Monitoring, and Identification Goals**

- Expand the Weed Watcher Program to include more lakes and train additional volunteer Weed Watchers to locate new exotic plant infestations earlier in the growing season.
- Train Volunteer Lake Assessment Program (VLAP) volunteers in both native and exotic aquatic plant identification.
- In partnership with Fish and Game, develop and implement standard operating procedures for volunteers to use to determine the presence/absence of Asian clam (and invasive aquatic bivalve) in their waterbody.
- Update mapping technology and techniques based on successful methods developed by other researchers and field experience of DES biologists.

- Prepare and/or update long-term management plans for each lake with an exotic aquatic plant, outline the status of the infestation, special species of concern, and management goals and timetables.
- Assist the Pesticide Control Board of the Department of Agriculture with aquatic herbicide permits and evaluations and special studies.
- Continue to conduct annual inspections of aquarium stores and nurseries to investigate illegal sales of exotic aquatic plants.
- Continue to track spread of infestations in region and beyond and update list of prohibited species in New Hampshire as appropriate.
- Work with the New Hampshire Invasive Species Committee to scope statewide database options for tracking invasive species of all types.
- Continue to support the efforts of Lake Hosts and other groups that monitor public access sites to prevent the further introduction of exotic aquatic plants.
- Develop reportable metrics for exotic aquatic plant program for inclusion in the surface water quality monitoring reports.

#### **4.3 Rapid Response and Long-Term Management Goals**

- Continue to explore avenues to increase funding for control practices through legislation, grants, and federal appropriations.
- Continue to improve the application process for control grants, including an RFP and timelines that encourage permit application submittal by early fall of each year.
- Continue to explore alternative methods of control through participation in regional and national conferences associated with exotic aquatic plant and lake management and through scientific literature reviews.
- Award Research Grants to research entities to explore new avenues for aquatic plant management.
- Update, as necessary, Milfoil Control Grant Review Matrices for all future control activity requests for funding.

#### **4.4 Research**

- Provide grants for innovative research projects related to exotic aquatic plants from funds derived from the Milfoil Research Grant Program.
- Partner with state colleges and universities to conduct biological and ecological research on variable milfoil.



#### **4.5 Regional Cooperation**

- Attend invasive species conferences to keep up with current research methods, educational activities, control measures, and exotic aquatic plants programs and share New Hampshire information.
- Give presentations on New Hampshire's programs to impart information on both the successes and needs for improvement in the various categories within the Exotic Aquatic Plant Program.
- Assist neighboring and nearby New England states in promoting and drafting exotics legislation by giving presentations to appropriate legislative committees, if asked, and provide copies of New Hampshire's legislation and annual reports, among other resources.
- Continue to actively participate in regional groups and organizations to expand resources and the knowledge base for New Hampshire's program.

#### **4.6 Legislation and Regulations**

- Continue to work with the Exotic Aquatic Weeds and Species Study Committee to refine and expand the DES Exotic Species Program through legislation.
- Work with the Exotic Aquatic Weeds and Species Committee to craft legislation that seeks to increase funding for control activities.
- Work with the Department of Agriculture and the Pesticide Control Board to develop a rapid response protocol and expedited permit application review process to address new infestations of exotic aquatic plants that are detected mid season or late in the season, to allow for herbicide use if needed, using a shorter than normal review time under a specific set of circumstances.
- Scope and implement restrictions relative to felt-soled waders relative to didymo spread.

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## APPENDIX ONE- PROGRAM LAWS AND RULES

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### CHAPTER 487 CONTROL OF MARINE POLLUTION AND AQUATIC GROWTH NEW HAMPSHIRE CLEAN LAKES PROGRAM

**487:15 Purpose.** – The general court recognizes that rapidly escalating pressures of shorefront development and recreational uses of public waters have placed increasing strains upon the state's lake resources, thereby accelerating the eutrophication process in many of our public lakes through nuisance growths of aquatic macrophyton and phytoplankton (algae) and thus posing a threat to water quality. The general court further recognizes the need to restore, preserve and maintain the state's lakes and ponds in order that these significant environmental, aesthetic and recreational assets will continue to benefit the social and economic well-being of the state's citizens.

**Source.** 1990, 143:2, eff. June 18, 1990.

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**Source.** 1990, 143:2, eff. June 18, 1990.

**487:16 Definitions.** – In this subdivision:

- I. "Department" means the department of environmental services.
- II. The term "exotic aquatic weeds" includes only those species of vascular aquatic plants which were not part of New Hampshire's native aquatic flora before 1950. *Cabomba caroliniana* and *Myriophyllum heterophyllum* are examples of exotic aquatic weeds.
- III. "Federal program" means the federal Water Pollution Control Act, 33 U.S.C.A. 1324, the federal clean lakes program (P.L. 92-500, section 314), as amended, now known as the Water Quality Act of 1987 (P.L. 100-4), as amended.
- IV. "Commissioner" means the commissioner of the department of environmental services.

**Source.** 1990, 143:2. 1996, 228:98, 99. 1997, 185:2, eff. Jan. 1, 1998.

**487:16-a Exotic Aquatic Weed Prohibition.** – No exotic aquatic weeds shall be offered for sale, distributed, sold, imported, purchased, propagated, transported, or introduced in the state. The commissioner may exempt any exotic aquatic weed from any of the prohibitions of this section consistent with the purpose of this subdivision.

**Source.** 1997, 185:3, eff. Jan. 1, 1998.

**487:16-b Exotic Aquatic Weed Penalties.** – 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. Notwithstanding RSA 487:7, any person engaging in such an activity shall be guilty of a violation.

**Source.** 1999, 204:3, eff. Jan. 1, 2000.

**487:17 Program Established.** –

I. A program for the preservation and restoration of New Hampshire lakes and ponds eligible under RSA 487:20 shall be established and administered within the department of environmental services. Said program shall function to limit the eutrophication process in New Hampshire lakes by reducing nuisance growths of macrophyton and phytoplankton. It shall reinforce and complement the program authorized by the federal program and shall serve 3 basic purposes:

(a) To diagnose degraded lakes and ponds and implement long-term solutions for the purpose of restoring water quality where such solutions are feasible and cost effective.

(b) To diagnose lakes and ponds and implement methods for long-term preservation of the water quality when such measures can be shown to be feasible and cost effective.

(c) To provide short-term remedial actions which can effectively maintain water quality conditions adequate for public recreation and enjoyment, including, but not limited to, the control or eradication of exotic aquatic weeds pursuant to paragraphs II and III.

II. The department is directed to prevent the introduction and further dispersal of exotic aquatic weeds and to manage, control, or eradicate exotic aquatic weed infestations in the surface waters of the state. The department is authorized to:

(a) Display and distribute promotional material and engage in educational efforts informing boaters of the problems with exotic aquatic weed control.

(b) Control or eradicate infestations of exotic aquatic weeds, according to the following criteria:

(1) The department shall have determined that the exotic aquatic weed can in fact be controlled or eradicated in the waterbody.

(2) The most environmentally sound treatment technique relative to the specific infestation will be used, which also meets the requirements of state rules, including rules adopted under RSA 430. Notwithstanding any law or interagency agreement to the contrary, the department's recommendation to use herbicide applications shall be made in consultation with the fish and game department and shall be implemented only if the department of agriculture, markets, and food issues the permit pursuant to RSA 430:33, with or without the concurrence of the department of fish and game.

(c) Develop an emergency response protocol to control or eradicate small new infestations. The protocol may include contractual agreements with one or more licensed pesticide applicators that would enable the prompt treatment of exotic aquatic weeds with herbicides consistent with the criteria provided in subparagraph (b).

(d) Designate, in consultation with the department of fish and game and the division of state police, department of safety, restricted use of exotic aquatic weed control areas.

III. After notice and opportunity for hearing and comment, the department may make financial grants to lakefront associations, private businesses, citizens, and local governmental agencies for

the management of exotic aquatic weeds. All applications for grants by such groups shall be approved by the department, in consultation with the fish and game department, and shall meet state rule requirements.

**Source.** 1990, 143:2. 1996, 228:100, 106. 1997, 185:4, eff. Jan. 1, 1998. 2002, 201:4, eff. Jan. 1, 2003. 2006, 144:1, eff. May 22, 2006. 2007, 263:102, eff. July 1, 2007. 2011, 224:273, eff. July 1, 2011.

**487:18 Project Prioritization.** – Project approval shall be based upon prioritization factors to be established by rules adopted under RSA 541-A. Such rules shall give first priority for expenditure of available funds to the control or eradication of new infestations of exotic aquatic weeds pursuant to RSA 487:17, II(b). Otherwise, preference shall be given to lakes that have public access or that serve as a public drinking water supply. Implementation measures shall be based upon an assessment of potential success, technical feasibility, practicability, and cost effectiveness. Restoration and preservation projects shall include watershed management plans to control and reduce incoming nutrients wherever possible through best management practices. Repeated short-term solutions shall be discouraged where long-term solutions are feasible and cost effective. Treatments shall be designed to minimize any adverse effect upon fish and wildlife, their habitats, and the environment.

**Source.** 1990, 143:2, eff. June 18, 1990. 2002, 201:5, eff. Jan. 1, 2003. 2007, 263:103, eff. July 1, 2007.

**487:19 Public Hearings.** – No project for the implementation of a lakes restoration or preservation program shall be approved or initiated until at least 2 public hearings have been held on the project. Said hearings shall be held in one or more of the affected municipalities.

**Source.** 1990, 143:3, eff. June 18, 1990.

**487:20 Eligibility.** – To be eligible for funding under this subdivision, a body of water shall be any freshwater lake or pond which meets priorities established under RSA 487:18. Lakefront associations, private businesses, citizens and local government agencies shall be eligible to apply for funding under this subdivision.

**Source.** 1990, 143:3, eff. June 18, 1990.

**487:21 Cost Sharing.** –

I. For diagnostic and feasibility studies where the federal government has made financial assistance available in the amount of 70 percent of the cost, the department may provide an amount not exceeding 30 percent of the total eligible costs as determined by the department. Where no federal funding is available, the department may provide an amount not exceeding 80 percent of the total eligible costs.

II. For implementation of restoration or preservation projects where the federal government has made financial assistance available in the amount of 50 percent of the costs, the department may provide an amount not exceeding 35 percent of the total eligible costs, as determined by the department. Where no federal funding is available, the department may provide an amount not

exceeding 80 percent of the total eligible costs.

III. For water quality maintenance programs, the department may provide an amount of funding not to exceed 80 percent of the total eligible costs, as determined by the department, except that for the control of new infestations of exotic aquatic weeds the state may assume 100 percent of the cost.

IV. The local cost share shall be the cost of a project remaining after taking into account any state and federal funding.

V. An amount up to 10 percent of the total available funding may be expended on research that addresses the problems of lake eutrophication and exotic aquatic weeds.

**Source.** 1990, 143:3. 1996, 228:106, eff. July 1, 1996. 2002, 201:6, eff. Jan. 1, 2003.

**487:22 Municipal Agreements.** – Whenever a project requires a commitment of cooperative action or local cost sharing involving 2 or more municipalities, all participating municipalities shall execute an intermunicipal agreement relative to their respective obligations. No project which requires a local match shall be initiated with state funding until such an agreement, if applicable, has been approved by the legislative bodies of all the involved municipalities.

**Source.** 1990, 143:3, eff. June 18, 1990.

**487:23 Agency Cooperation.** – The department shall make a concerted effort to integrate and coordinate the clean lakes program with other environmental management programs involving lakes and their watersheds, whether such programs fall within the jurisdiction of the department of environmental services or within that of another state department. The university system and the department shall maintain regular communication for the purpose of sharing data bases and other relevant information.

**Source.** 1990, 143:3. 1996, 228:101, eff. July 1, 1996.

**487:24 Rulemaking.** – The commissioner shall adopt rules, under RSA 541-A, relative to:

- I. The criteria to be used in the prioritization of grants for diagnostic or feasibility studies.
- II. The criteria used to determine the priority of implementation projects and maintenance projects.
- III. Contracting procedures with local governments or private businesses.
- IV. Application procedures to participate in the program.
- V. Criteria for the determination of project eligibility.
- VI. Criteria governing the conduct of and reporting requirements on diagnostic and feasibility studies, implementation projects and maintenance projects.
- VII. Designation of plants as exotic aquatic weeds as defined in RSA 487:16, II.
- VII-a. Administration and enforcement of, and exemptions to, the exotic aquatic weed prohibition under RSA 487:16-a.
- VII-b. Criteria governing the emergency response protocol under RSA 487:17, II(c).
- VII-c. Designation of restricted use exotic aquatic weed control areas under RSA 487:17, II(d).
- VIII. Any other matters that are necessary to implement the provisions of this subdivision.

**Source.** 1990, 143:3. 1997, 185:5. 1999, 204:4, eff. Jan. 1, 2000.

**487:25 Lake Restoration and Preservation Fund; Addition to Boat Fee. –**

I. The fee of \$7.50 collected under the provisions of RSA 270-E:5, II(a) shall be paid to the director of the division of motor vehicles. The director of the division of motor vehicles shall pay over said fee to the state treasurer who shall keep the fee in a special fund to be expended by the department of environmental services. The department shall use \$.50 of the fee for lake restoration and preservation measures, exclusive of exotic aquatic weed control, \$3 of the fee for the control of exotic aquatic weeds, and \$4 of the fee for the milfoil and other exotic aquatic plants prevention program. The department shall deposit the \$4 into a special account within the lake restoration and preservation fund which shall be used to administer the milfoil and other exotic aquatic plants prevention program. The special fund shall be nonlapsing. All funds received under this section are continually appropriated to the department for the purposes of this subdivision.

II. The department is authorized to utilize such methods of control and to employ such personnel, consultant services, and equipment as, in its judgment, will control aquatic nuisances in the surface waters of the state as defined in RSA 485-A:2.

III. The department shall be the agency to receive and utilize federal funds, gifts, or grants from any person or association, which may be made available for the purposes of this subdivision.

**Source.** 1990, 143:3. 1996, 228:102, 106. 1997, 185:6, eff. Jan. 1, 1998. 2002, 201:2, eff. Jan. 1, 2003. 2009, 144:149, eff. Aug. 28, 2009.

**487:26 Grant Program Established. –** There is hereby established a grant program to be administered by the department of environmental services for the allocation of money to state agencies, non-profit organizations, and municipalities or political subdivisions of the state which seek to administer a milfoil and other exotic aquatic plants prevention program, and to institutions of higher learning which seek to conduct research on milfoil and other exotic aquatic plants remediation techniques. The grant program shall be funded by the portion of the lake restoration and preservation fund, established in RSA 487:25, and allocated to the milfoil and other exotic aquatic plants prevention program. Approximately 3/4 of the moneys distributed from the fund to the milfoil and other exotic aquatic plants prevention program shall be allocated for the purposes of milfoil and other exotic aquatic plants prevention and the remainder shall be allocated to milfoil and other exotic aquatic plants remediation research, as appropriate, based on grant requests. Of the moneys in the milfoil and other exotic aquatic plants prevention program, the moneys allocated specifically for the purposes of the milfoil and other exotic aquatic plants prevention shall be distributed upon approval of the commissioner of the department of environmental services and the commissioner of safety. Of the moneys in the milfoil and other exotic aquatic plants prevention program, the moneys allocated specifically for the purposes of milfoil and other exotic aquatic plants remediation research shall be distributed upon approval of the commissioner of the department of environmental services.

**Source.** 2002, 201:3, eff. Jan. 1, 2003. 2010, 352:1, eff. Sept. 18, 2010.

**487:27 Management Plan.** – The commissioner of the department of environmental services, or designee, in consultation with the commissioner of safety, or designee, shall establish a management plan to implement the grant program. The management plan shall include, but not be limited to:

- I. Eligibility determination criteria and procedures.
- II. Application requirements and procedures.
- III. Project selection and prioritization requirements and procedures.
- IV. Stewardship requirements and procedures, including annual reporting to the department by the grantee.

**Source.** 2002, 201:3, eff. Jan. 1, 2003.

**487:28 Eligible Applicants; Matching Funds.** –

I. The department of environmental services shall distribute funds for projects to further the purposes of this program only to eligible applicants. Eligible applicants shall include:

- (a) Publicly-supported nonprofit corporations exempt from federal income taxation under Section 501(c) of the Internal Revenue Code.
- (b) Municipalities or other political subdivisions of the state.
- (c) Institutions of higher learning.
- (d) State agencies.

II. All eligible applicants shall provide a minimum level of matching resources equal to 50 percent of the proposed program budget. The department may exempt institutions of higher learning from the required match. The cost-sharing match may be met through the use of in-kind services. Qualifying matching funds from the applicant may include, but are not limited to, municipal appropriations, private donations, federal funds, and the value of goods and services provided by the applicant.

**Source.** 2002, 201:3, eff. Jan. 1, 2003.

**487:29 Milfoil and Other Exotic Aquatic Plants Prevention; Grant Fund Report and Budget.** – The department of environmental services shall submit an annual report, beginning on January 1, 2004, to the speaker of the house, president of the senate, and the governor and council which shall include, but not be limited to, a description of prevention and research projects funded by the milfoil and other exotic aquatic plants prevention program and the extent of aid to municipalities or subdivisions of the state, non-profit corporations, and research institutions.

**Source.** 2002, 201:3, eff. Jan. 1, 2003.

**487:30 Exotic Aquatic Weeds and Species Committee.** –

I. There is established a committee to study exotic aquatic weeds and species in the state of New Hampshire.

- II. (a) The members of the committee shall be as follows:
  - (1) Five members of the house of representatives, appointed by the speaker of the house.
  - (2) One member of the senate and 2 public members, appointed by the president of the senate.

(3) One member of the New Hampshire Lakes Association, appointed by the chairman of the board of that association with the concurrence of the chairperson of the committee.

(b) Legislative members of the committee shall serve terms which are coterminous to their terms on the general court and shall receive mileage at the legislative rate when attending to the duties of the committee.

III. The committee shall:

(a) Study the spread of exotic aquatic weeds and exotic aquatic species in the waters of New Hampshire including education, management, and potential means to eliminate the spread of these weeds and species; and

(b) Aid the department in the control and eradication of milfoil.

III-a. The committee may solicit, hold, and expend gifts, grants, and donations from any source to carry out the purposes of the committee.

IV. The members of the committee shall elect a chairperson from among the members. The first meeting of the committee shall be called by the first-named house member. The first meeting of the committee shall be held within 45 days of the effective date of this section. Four members of the committee shall constitute a quorum.

V. The committee shall report its findings and any recommendations for proposed legislation to the speaker of the house of representatives, the senate president, the house clerk, the senate clerk, the governor, and the state library on or before November 1 of each year.

**Source.** 2004, 115:1, eff. May 17, 2004. 2005, 240:2, eff. July 14, 2005. 2009, 167:5, 6, eff. June 30, 2009. 2011, 90:1, 2, eff. May 27, 2011.



## **CHAPTER Env-Wq 1300 NEW HAMPSHIRE CLEAN LAKES PROGRAM**

Statutory Authority: RSA 487:18 and 24

Revision Note: Document #8703-A, effective 9-5-06, readopted with amendments and redesignated former Chapter Env-Ws 1300 entitled Exotic Aquatic Weed Control as Env-Wq 1300, pursuant to a rules reorganization plan for Department rules approved by the Director of the Office of Legislative Services on 9-7-05 and changed the chapter heading to New Hampshire Clean Lakes Program.

Former Chapter Env-Ws 1300 was filed under document #6852, effective 9-5-98.

### **PART Env-Wq 1301 PURPOSE AND APPLICABILITY**

Env-Wq 1301.01 Purpose. The purpose of these rules is to implement the following statutory provisions:

- (a) RSA 487:16-a, which prohibits the sale, distribution, importation, purchase, propagation, transportation, or introduction of exotic aquatic weeds into the state;
- (b) RSA 487:17 relative to limiting the eutrophication of lakes and ponds, controlling exotic aquatic weeds, designating restricted use areas, and making financial grants for management of exotic aquatic weeds;
- (c) RSA 487:18 relative to project prioritizations;
- (d) RSA 487:20 relative to eligibility requirements;
- (e) RSA 487:21 relative to cost sharing; and
- (f) RSA 487:22 relative to municipal agreements.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1301.02 Applicability. These rules shall apply to people who live, work, and recreate on the surface waters of New Hampshire, as well as people who own or manage places of business that offer the sale or other distribution of exotic aquatic weeds.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

### **PART Env-Wq 1302 DEFINITIONS**

Env-Wq 1302.01 “Bottom barrier” means a semi-permeable, fine mesh screening, laid over an area of sediments in a surface water to shade and physically inhibit plant growth.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.02 “Commissioner” means the commissioner of the department of environmental services.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.03 “Cultivar” means a cultivated species of plant for which there is no wild form.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.04 “Department” means the department of environmental services.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.05 “Diagnostic and feasibility study” means a study as contemplated by RSA 487:21, I, to identify sources of pollution to a surface water and recommend the most cost effective practices to restore or preserve water quality.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.06 “Exotic aquatic weeds” means “exotic aquatic weeds” as defined by RSA 487:16, II, namely “only those species of vascular aquatic plants which were not part of New Hampshire’s native aquatic flora before 1950. *Cabomba caroliniana* and *Myriophyllum heterophyllum* are examples of exotic aquatic weeds.”

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.07 “Herbaria” means collections of dried, pressed plants for the purposes of education and scientific study.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.08 “Infested waters” means water and water bodies having populations of prohibited exotic aquatic weeds such as milfoil or fanwort.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.09 “Integrated pest management (IPM)” means an aquatic plant management approach that includes:

- (a) Defining the problem or need;
- (b) Identifying the desired exotic aquatic plant management goals;
- (c) Making decisions based on site-specific information;
- (d) Using ecosystem, watershed, and cost perspectives to determine long-term strategies;

(e) Developing a system of integrated exotic plant control methods, including mechanical-physical, biological, chemical, and cultural BMPs; and

(f) Quantitatively assessing the results of the control methods.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.10 “Limited infestations” means an infestation of 5 acres or less.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.11 “Maintenance project” means a project designed to remediate a water impairment through the short-term control of an exotic aquatic weed infestation or a water quality problem by treating the problem but not the underlying cause.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.12 “New infestation” means an infestation that was not previously reported to or otherwise identified by the department.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.13 “Public access” means “public access” as defined by RSA 271:20-a, I, namely “legal passage to any of the public waters of the state by way of designated contiguous land owned or controlled by a state agency, assuring that all members of the public shall have access to and use of the public waters for recreational purposes.”

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.14 “Public boat access area” means an area adjacent to a public body of water that is owned or controlled by the state, is accessible by the public, and has been designated by the fish and game department as a boat launching area under the statewide public boat access program.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.15 “Public bodies of water” means:

- (a) Public waters as defined in RSA 271:20;
- (b) Any impoundment of a stream, lake, pond, or tidal or marine waters of 10 acres or more; and
- (c) Any other body of water owned by the state or by a state agency or department.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.16 “Restricted use area” means a marked area or marked areas of a water body where infestations of exotic aquatic weeds have been delineated in accordance with Env-Wq 1304, which is

closed to entry by boaters, anglers, or other water users and their equipment except in emergency situations where property or human life is endangered.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1302.17 “Surface waters of the state” means “surface waters of the state” as defined by RSA 485-A:2, XIV, namely, “perennial and seasonal streams, lakes, ponds, and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial.”

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### PART Env-Wq 1303 LISTING OF PROHIBITED EXOTIC AQUATIC WEEDS; EXEMPTIONS

Env-Wq 1303.01 Criteria for Listing Exotic Aquatic Weeds as Prohibited. The department shall list an aquatic plant species as prohibited if it meets any of the following criteria:

- (a) The species does not naturally occur in New Hampshire and will cause or is likely to cause economic or environmental harm or harm to human health or safety if introduced to the area, because it grows or is likely to grow more rapidly than native plants so as to impair an ecosystem’s ability to function by altering its productivity, decomposition, water fluxes, nutrient cycling and loss, soil fertility, erosion, dissolved oxygen concentrations, or its ability to maintain its existing species diversity;
- (b) The species is known to invade and disrupt aquatic and wetland ecosystems in other geographic areas where the climate is similar to that of New Hampshire;
- (c) The species is able to create dense, monospecific stands or monotypic stands that displace or destroy native plant habitat, destroy fish and wildlife habitats, inhibit water circulation, hinder navigation or irrigation, or severely restrict the recreational use of waterways; and
- (d) The species resists effective control by present technology or available management practices.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1303.02 Prohibited Exotic Aquatic Weeds. Subject to Env-Wq 1303.03, the following exotic aquatic weeds, identified in “A Manual of Aquatic Plants” by Norman C. Fassett and “Aquatic and Wetland Plants of Northeastern North America” by Garrett Crow and C. Barre Hellquist, both copyrighted by The University of Wisconsin Press, shall be prohibited from being offered for sale, distributed, sold, imported, purchased, propagated, transported, or introduced in the state, pursuant to RSA 487:16-a, because they pose a substantial threat to native species in the state:

- (a) All *Myriophyllum* species, including but not limited to *Myriophyllum heterophyllum*, *Myriophyllum spicatum*, and *Myriophyllum aquaticum*, and commonly referred to as milfoils or feather-foils;
- (b) All *Cabomba* species, including but not limited to *Cabomba caroliniana* and commonly referred to as fanworts;
- (c) *Hydrilla verticillata*; commonly referred to as *Hydrilla* or *Anacharis*;
- (d) All *Trapa* species, commonly referred to as water chestnuts;
- (e) *Potamogeton crispus*, commonly referred to as curly leaf pondweed;
- (f) *Lythrum salicaria*, *L. virgatum*, *L. alatum* and their cultivars, commonly referred to as purple loosestrife;
- (g) *Phragmites australis* or *P. communis*, commonly referred to as common reed;
- (h) *Egeria densa*, commonly referred to as Brazilian elodea;
- (i) *Hydrocharis morsus-ranae*, commonly referred to as frogbit;
- (j) *Butomus umbellatus*, commonly referred to as flowering rush;
- (k) *Najas minor*, commonly referred to as European naiad;
- (l) *Nymphoides peltata*, commonly referred to as yellow floating heart;
- (m) *Crassula helmsii*, commonly referred to as swamp stonecrop;
- (n) *Epilobium hirsutum*, commonly referred to as great willow herb or hairy willow herb;
- (o) *Glyceria maxima*, commonly referred to as reed sweet grass or manna grass;
- (p) *Hygrophila polysperma*, commonly referred to as East Indian hygrophila;
- (q) *Ipomoea aquatica*, commonly referred to as water spinach;
- (r) *Iris pseudocarus*, commonly referred to as yellow iris or yellow flag iris;
- (s) *Lagarosiphon major*, commonly referred to as African oxygen weed;
- (t) *Limnophila sessiliflora*, commonly referred to as ambulia;
- (u) *Marsilea quadrifolia*, commonly referred to as water fern;
- (v) *Myosotis scorpioides*, commonly referred to as water forget-me-not;

- (w) *Sagittaria japonica*, commonly referred to as double flowering arrowhead, Japanese arrowhead, or old world arrowhead;
- (x) *Sagittaria sagittifolia*, commonly referred to as giant sagittaria;
- (y) *Typha gracilis*, commonly referred to as slender cattail;
- (z) *Typha laxmanii*, commonly referred to as dwarf cattail or Laxman's cattail; and
- (aa) *Typha minima*, commonly referred to as miniature cattail or micro-mini cattail.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1303.03 Synonymy. The prohibited status of exotic aquatic weeds shall apply not only to the most recent and accepted scientific and common names of the species as listed in Env-Wq 1303.02 but also to undesignated synonyms for the listed species. Plant status shall be determined using the Latin name of the species.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1303.04 Inspections.

- (a) For purposes of this section, "business" means a commercial establishment that is open to the public and maintains stocks of aquatic plants for sale or other distribution, including pet stores and nurseries.
- (b) The department shall inspect, during a business's normal business hours, the aquatic plants on display to the public.
- (c) If the department's inspector observes plants that are on the list of prohibited species, the inspector shall inform the on-site manager of the business of the prohibitions of RSA 487:16-a and request the manager to discontinue the sale or other distribution of the plants.
- (d) If the department's inspector observes plants that could be on the list of prohibited species, the inspector shall inform the on-site manager of the business of the prohibitions of RSA 487:16-a and request the manager to provide a sample of the questionable aquatic plant material of sufficient size to allow identification of the plant material at no compensation.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1303.05 Exemptions for Transportation. Transportation of any exotic aquatic weed(s) on any road or highway in the state shall be exempt from the transportation prohibition of RSA 487:16-a, if:

- (a) The transportation is for the purpose of disposal as part of a harvest control activity under the supervision of the department; or

(b) The transportation is for the purpose of identifying a species or reporting the presence of a species, and the plant material is in a sealed container.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1303.06 Acceptable Means of Disposal.

(a) Any exotic aquatic weed shall be immediately disposed of away from water or moist areas where it might survive.

(b) Acceptable means of disposal shall include:

- (1) Burning or incinerating;
- (2) Land filling;
- (3) Disposing in a trash container whose contents are destined for incineration or land filling;
- (4) Desiccating;
- (5) Composting, if applied away from surface waters; and
- (6) Any other method that ensures the plant material will not enter surface waters.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1303.07 Exemptions for Preserved Specimens, Research or Education, and Field Experimentation.

(a) Subject to (b) and (c), below, and as authorized by RSA 487:16-a, the following uses of exotic aquatic weeds shall be exempt from the prohibitions of RSA 487:16-a:

- (1) Exotic aquatic weeds in the form of herbaria or other preserved specimens;
- (2) Exotic aquatic weeds being used in a controlled environment, such as in a laboratory for research or for educational display; and
- (3) Exotic aquatic weeds that are subjected to experimental processes or equipment in the field for the purpose of finding control mechanisms for such exotic aquatic weeds.

(b) All specimens shall be destroyed as specified in Env-Wq 1303.06 when they are no longer used as specified in (a), above.

(c) For plants subjected to experimental processes or equipment in the field, the exemption shall apply only if such experimental processes or equipment are conducted in a way that prevents the spread of such weeds.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1303.08 Notification Requirement.

- (a) Any person, other than an employee of the department acting in his or her official capacity, who participates in any of the activities exempted pursuant to Env-Wq 1303.05 and Env-Wq 1303.07, shall notify the department prior to or within 24 hours after performing such activity, by calling 271-3503 and asking for the Exotic Species Program or Limnology Center.
- (b) Notification shall not be required for disposal after removal from recreational watercraft and equipment such as trailers, motors, fishing equipment, or diving gear.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### PART Env-Wq 1304 RESTRICTED USE AREAS

##### Env-Wq 1304.01 Designation and De-listing of Restricted Use Areas.

- (a) Subject to (e), below, the commissioner shall designate as a restricted use area any area that contains a limited infestation of exotic aquatic weeds, such as:
  - (1) Areas with new infestations;
  - (2) Infestations in areas with a high risk of fragmentation; and
  - (3) Areas in waterbodies with previously documented infestations where treatments or management practices have removed all but a small area of exotics that can be contained with the establishment of a restricted use area until such time that other management practices can remove the remainder of the population.
- (b) After designation, a restricted use area shall be in place until the area is no longer infested as determined using the criteria in (a), above, or until a period of 3 years has expired since the time of designation, whichever is sooner.
- (c) Subject to (e), below, when an infestation has been eradicated or cannot be successfully treated or managed within the 3-year time limit, or the 3-year time limit has been reached, the commissioner shall evaluate the designated area to determine whether the area will be de-listed or the area's designation as restricted use will be extended.
- (d) The commissioner shall issue press releases to the newspapers in the towns surrounding the water body(ies) in which a restricted use area is designated or de-listed and post the list of waterbodies with restricted use areas or de-listed areas on the department's website by June 1 of each year.
- (e) In considering whether to designate a restricted use area pursuant to (a), above, or whether to extend the designation pursuant to (c), above, the commissioner shall proceed as directed by RSA 487:17, II(d).



Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.02 Notice of Restricted Use Areas.

(a) The department shall post signs and place buoys warning of a restricted use area in accordance with Env-Wq 1304.03 and Env-Wq 1304.04.

(b) The commissioner shall post on the department's website a list of restricted use areas that includes the following information:

- (1) The town(s) in which the water body containing the restricted use area is located;
- (2) The name of the water body containing the restricted use area;
- (3) The specific location of the infestation within the water body;
- (4) The type of infestation; and
- (5) The general dimensions of the restricted use area.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.03 Delineation and Markers for Restricted Use Areas. The department or its designee shall mark restricted use areas using buoys and signs as specified below:

(a) At least one sign meeting the requirements of Env-Wq 1304.08 shall be posted at each public access site and public boat access area on the surface water in which the restricted use area is located;

(b) A minimum of 3 buoys shall be placed around the actual restricted use area;

(c) The buoys shall:

- (1) Be placed not more than 300 feet apart;
- (2) Be connected by rope with small floats every 8 feet; and
- (3) Meet the requirements of Env-Wq 1304.04; and

(d) Buoys and signs shall be removed at the end of each growing season, unless removed sooner pursuant to the de-listing process.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.04 Type of Warning Buoy. The buoy used to warn of a restricted use area shall:

(a) Be a standard state danger buoy;

- (b) Be white and international orange in color;
- (c) Have an orange diamond symbol with an X through it; and
- (d) Read as follows: “Restricted Use Area, pursuant to RSA 487. NH Dept. of Environmental Services 603-271-3503.”

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1304.05 Marking of Restricted Use Areas by Municipalities.

- (a) Any municipality with a method of marking restricted use areas within municipal surface water supplies that is similar to the method described in Env-Wq 1304.03 and Env-Wq 1304.04 may request the department to approve the use of the method in lieu of Env-Wq 1304.03 and Env-Wq 1304.04, by submitting a request in writing to the department.
- (b) The request shall describe the municipality’s method of marking restricted use areas and identify the area(s) to which it is to be applied.
- (c) The department shall authorize the municipality to mark municipal surface water supplies using the municipality’s method if the municipality’s method is equivalent to or more stringent than the method identified in Env-Wq 1304.03 and Env-Wq 1304.04.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.06 Navigation Prohibition. Subject to Env-Wq 1304.07, no person or equipment, including boaters, anglers, or other water users and private or commercial watercraft of any type, shall enter a restricted use area except in emergency situations where property or human life is endangered.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.07 Public Access and Public Boat Access. If an infestation occurs at an access point to a marina, private residence, or public or private boat access ramp, a bottom barrier shall be put over the infestation to keep it from spreading and the access point may remain open.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.08 Signs. The signs posted pursuant to Env-Wq 1304.03(a) shall:

- (a) Be at least 8 ½ by 11 inches in size;
- (b) Include a picture of a warning buoy; and
- (c) Inform people that the purpose of the buoys is to mark a restricted use area and that the area must not be entered except in emergencies where property or human life is endangered.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1304.09 Installation and Removal of Buoys.

- (a) The department shall install buoys during weekday office hours.
- (b) The department shall remove the buoys at the end of each growing season, unless removed sooner pursuant to the de-listing process.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### PART Env-Wq 1305 RESPONSE PROTOCOLS FOR NEW INFESTATIONS OF EXOTIC AQUATIC WEEDS

Env-Wq 1305.01 Emergency Response Protocol for Small New Infestations.

- (a) Upon notification of a possible new infestation of exotic aquatic weeds, the department shall:
  - (1) Document the infestation in accordance with Env-Wq 1305.02; and
  - (2) Determine whether the infestation is small enough that eradication is reasonably possible based on the criteria specified in (b), below.
- (b) The department shall determine that eradication is reasonably possible if:
  - (1) The infestation is present as:
    - a. A small patch or scattered individual stems, such that the infestation can be controlled by hand-pulling the subject plant stems using snorkeling or SCUBA diving activities; or
    - b. A single dense mat or a series of separate dense mats wherein each mat covers an area less than 400 square feet, such that the infestation can be controlled by installing bottom barriers; and
  - (2) The infestation is a new infestation in a previously-uninfested water body or in a previously-uninfested area of a water body having already-controlled or otherwise minimal infestations.
- (c) If the infestation meets the criteria specified in (b), above, the department shall undertake hand-pulling or install bottom barriers, or both, as is most likely to control the infestation.
- (d) If the infestation is not small enough to be controlled with hand-pulling or bottom barriers, the department shall develop a recommendation for an appropriate non-emergency response in accordance with Env-Wq 1305.03.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1305.02 Documentation of Infestation. To document a new infestation, the department shall:

- (a) Conduct a site inspection of subject waterbody within 72 hours of a new report;
- (b) Collect a specimen of the suspect plant;
- (c) Determine if the plant is a native or exotic species per RSA 487:16, II, as follows:
  - (1) When fruit or flower is present, the department shall make an identification directly; and
  - (2) When no fruit or flower is present, the department shall send the specimen for DNA analysis to verify the species level identification;
- (d) Map and characterize the extent of the infestation;
- (e) Document any native plant abundances and community structure around and dispersed within the exotic plant population; and
- (f) Identify potential impacts to downstream habitats as a result of the infestation or possible control activities.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1305.03 Recommendation for Non-Emergency Response.

- (a) If the infestation does not qualify as a small new infestation per Env-Wq 1305.01, the department shall develop a management plan in consultation with interested stakeholders, including affected municipalities and lake associations, to address the infestation over the longer-term.
- (b) If the management plan developed pursuant to (a), above, calls for action by the department, the department shall implement the portion(s) of the plan calling for department action.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### PART Env-Wq 1306 MAINTENANCE PROJECT GRANTS

Env-Wq 1306.01 Eligibility for Maintenance Project Grant. The following criteria shall be met in order to be eligible for a grant under RSA 487:21, III for a maintenance project:

- (a) The subject water body shall:
  - (1) Be a surface water of the state; and
  - (2) Be infested with an exotic aquatic weed listed in Env-Wq 1303.02; and
- (b) The proposed maintenance project shall incorporate integrated pest management (IPM) strategies.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06; ss by #9488, eff 6-23-09

#### Env-Wq 1306.02 Application for Maintenance Project Grant.

(a) The applicant for a maintenance project grant shall submit a completed application for funding assistance on a form provided by the department to the department's Exotic Species Program by November 1 of the year preceding the year for which the grant is requested.

(b) The application shall include the following information:

(1) The applicant's name and mailing address and the name, mailing address, and daytime telephone number of an individual who can be contacted on behalf of the applicant with questions regarding the application;

(2) The amount of the grant being requested and the amount of the local match;

(3) The name of the surface water for which the grant is sought and whether it is public or private;

(4) The type and availability of public access sites and public boat access sites on the surface water;

(5) The predominant use(s) of the surface water;

(6) The type(s) of exotic aquatic species with which the surface water is infested;

(7) The size and location of the infestation;

(8) The impact of the infestation to recreational, ecological, and economic values of the surface water; and

(9) Which IPM strategies will be used.

(c) The application shall be signed by a responsible official of the organization or political subdivision that is applying for the grant. Such signature shall constitute certification that the information contained in the application is true and complete to the signer's information and belief.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1306.03 Funding Determinations.

(a) The department shall review the grant applications, rank them using the prioritization criteria specified in Env-Wq 1306.04, and assign funding amounts based on available funds.

(b) The department shall notify each applicant in writing regarding whether or not a grant was awarded. If a grant is not awarded, the written notice shall specify the reason(s) for the decision.

(c) Upon notification of grant award, the applicant shall provide the following to the department:

- (1) A new or updated W-9 form, as appropriate;
- (2) An original Certificate of Good Standing or a Certificate of Existence from the New Hampshire Secretary of State's Office;
- (3) A signed and notarized standard state contracting form; and
- (4) A signed and notarized certificate of authority.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1306.04 Prioritizing Maintenance Projects. Pursuant to RSA 487:18, project priority shall be determined by totaling the points assigned under each of the following categories:

(a) Based on the type of infestation in the surface water, points shall be assigned as follows:

- (1) A surface water having one or more widespread and well-established infestations shall receive one point;
- (2) A surface water having one or more established infestations that are showing signs of spreading to uninfested portions of the waterbody shall receive 2 points;
- (3) A surface water having one or more infestations that have remained small or localized shall receive 3 points; and
- (4) The score for this category shall be multiplied by a weighting factor of 4;
- (5) The score for this category shall be multiplied by a weighting factor of 4;

(b) Based on the type of proposed treatment, points shall be assigned as follows:

- (1) Projects where only herbicides will be used shall receive 0 points;
- (2) Projects where herbicide treatment will be followed by non-chemical management efforts, such as hand removal or bottom barriers, shall receive one point;
- (3) Projects where only non-herbicide controls will be used shall receive 2 points;
- (4) Projects where a new or innovative approach will be tried shall receive 3 points; and
- (5) The score for this category shall be multiplied by a weighting factor of 3;

(c) Based on the type and availability of public access sites and public boat access sites, points shall be assigned as follows:

- (1) Private ponds shall receive 0 points;

- (2) Public bodies of water with no known access point shall receive one point;
- (3) Public bodies of water where public access exists only as open land or beach and there is no public boat access area shall receive 2 points;
- (4) Public bodies of water where a public boat access area exists shall receive 3 points; and
- (5) The score for this category shall be multiplied by a weighting factor of 2;
- (d) Based on the predominant use(s) of the surface water, points shall be assigned as follows:
  - (1) Surface waters where less than 30% of the shorefront is developed shall receive 0 points;
  - (2) Surface waters where the surrounding land use is mostly residential and boating is predominantly small boats and canoes shall receive one point;
  - (3) Surface waters where the surrounding land use is both residential and transient and boating is a mix of large and small boats, including unmotorized boats, shall receive 2 points;
  - (4) Surface waters designated as public water supplies shall receive 3 points; and
  - (5) The score for this category shall be multiplied by a weighting factor of 2;
- (e) Based on the impact of the infestation to recreational and economic values of the surface water, points shall be assigned as follows:
  - (1) Infestations in mostly-undeveloped areas of a surface water where there is little cultural impact shall receive 0 points;
  - (2) Infestations with mostly residential impacts shall receive one point;
  - (3) Infestations with impacts to residential boat access or beaches as well as to residents shall receive 2 points; and
  - (4) Infestations with impacts to commercial operations, such as marinas, public beaches, motels, restaurants, and public docks, shall receive 3 points;
- (f) Based on the impact of the infestation to ecological values of the surface water, points shall be assigned as follows:
  - (1) Infestations that are physically contained and do not threaten the life cycle of native aquatic plant or animal communities shall receive 0 points;
  - (2) Infestations that are rapidly spreading and threaten the life cycle of native plant and animal communities shall receive 2 points; and

(3) Infestations that pose a risk to rare, threatened, or endangered plant or animal species within a surface water shall receive 4 points;

(g) Based on the treatment history of the surface water, points shall be assigned as follows:

(1) Projects funded within the last 2 years shall receive 0 points;

(2) Projects not funded within the last 2 years where there was no request for funding in those 2 years shall receive one point;

(3) Projects not funded within the last 2 years where funding was requested and denied shall receive 2 points; and

(4) Projects not previously funded shall receive 3 points; and

(h) Based on the amount of local match, points shall be assigned as follows:

(1) Projects where the applicant proposes to provide not more than 50% match for the project shall receive 0 points;

(2) Projects where the applicant proposes to provide at least 50% but less than 65% match for the project shall receive one point;

(3) Projects where the applicant proposes to provide at least 65% but less than 80% match for the project shall receive 2 points; and

(4) Projects where the applicant proposes to provide 80% or more match for the project shall receive 3 points.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06; amd by #9488, eff 6-23-09

Env-Wq 1306.05 Contracting Procedures. All contracts for control or eradication of exotic aquatic weeds shall be advertised, bid, and contracted in accordance with applicable state contractual procedures established by the New Hampshire department of administrative services.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1306.06 Reporting Requirements.

(a) For maintenance projects using aquatic herbicides, the grant recipient shall submit a report at the end of the growing season on the type of herbicide, rate of chemical application, success of the treatment, total project cost, and impacts to any non-target aquatic or land-based plant or animal species, as well as a summary of IPM strategies used during the grant period.

(b) To satisfy the reporting requirement of (a), above, the grant recipient may submit a photocopy or electronic copy of the report submitted to the department of agriculture, markets and foods



pursuant to Pes 603.03(c)(26) that has been supplemented with the information not already contained in the report that is otherwise required by (a), above.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1306.07 Recordkeeping Requirements. All grant recipients shall keep detailed records of documented grant disbursements, match, and project tasks and deliverables for a period of 3 years from the end of the contractual period for the grant.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

## PART Env-Wq 1307 DIAGNOSTIC AND FEASIBILITY STUDIES

Env-Wq 1307.01 Eligibility for Diagnostic and Feasibility Studies. To be eligible for participation in the diagnostic and feasibility study program established under RSA 487:21, I, the subject water body shall:

(a) Be a surface water of the state and be:

(1) Listed as impaired on the current or draft list prepared pursuant to §303(d) of the federal Clean Water Act as specified in 40 CFR 130.7;

(2) Identified as being at risk of being impaired in documented Volunteer Lake Assessment Program (VLAP) data demonstrating a statistically-significant decline in water quality; or

(3) Experiencing change(s) within its boundaries or within its watershed that are deemed a significant risk to the water quality and designated water uses by the department pursuant to section 305(b) of the federal Clean Water Act as specified in 40 CFR 130.8;

(b) Be sponsored by an organized association or a municipality providing matching funds and volunteer time; and

(c) Be the subject of an organized and coordinated water quality monitoring program that has collected water quality data spanning 10 or more consecutive years, such that:

(1) The surface water is monitored at least 3 times from May 15 through October 1, with the samples taken at least 30 days apart; and

(2) All analyses were performed by the department's laboratory or a laboratory certified by EPA or another government agency using National Environmental Laboratory Accreditation Committee standards.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06; amd by #9488, eff 6-23-09

Env-Wq 1307.02 Application to Participate in Diagnostic and Feasibility Study.

- (a) The application to participate in a diagnostic and feasibility study shall be filed:
  - (1) By a municipality or an organization, such as a lake association, that is in good standing with the New Hampshire Secretary of State; and
  - (2) For a surface water that is eligible to participate as specified in Env-Wq 1307.01.
- (b) The application shall be in writing and addressed to the DES Limnology Center Director and Clean Lakes Program Coordinator.
- (c) The application shall include the following:
  - (1) The applicant's name and mailing address and the name, mailing address, and daytime telephone number of an individual who can be contacted on behalf of the applicant with questions regarding the application;
  - (2) The name of the surface water that would be the subject of the study and whether it is public or private;
  - (3) Certification that the surface water meets the eligibility criteria specified in Env-Wq 1307.01;
  - (4) The reason for request;
  - (5) Observations related to declines in the recreational, ecological, and economic value of the surface water due to impairment;
  - (6) Specific areas of concern in the surface water or watershed, or both;
  - (7) Desired outcomes for surface water and watershed conditions; and
  - (8) The level of financial support and volunteer participation donated by the applicant during the study and implementation phases.
- (d) The application shall be signed by a responsible official of the organization or political subdivision that is applying to participate. Such signature shall constitute certification that the information contained in the application is true and complete to the signer's information and belief.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

#### Env-Wq 1307.03 Participation Determinations.

- (a) The department shall review the participation applications to:
  - (1) Determine whether they meet the criteria of Env-Wq 1307.02; and
  - (2) Rank them using the prioritization criteria specified in Env-Wq 1307.04.

(b) The department shall notify each applicant in writing regarding whether or not the proposed project was selected for participation. If the proposed project was not selected, the written notice shall specify the reason(s) for the decision.

(c) The department shall maintain a ranked list of accepted applications.

(d) As funds become available, the department shall conduct diagnostic and feasibility studies in the order on the ranked list.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

Env-Wq 1307.04 Prioritizing Diagnostic and Feasibility Studies. Pursuant to RSA 487:18, project priority shall be determined by totaling the points assigned under each of the following categories:

(a) Based on the degree of impairment of the surface water, points shall be assigned as follows:

(1) Lakes and ponds not listed as impaired on the current or draft list prepared pursuant to section 303(d) of the federal Clean Water Act as specified in 40 CFR 130.7 shall receive 0 points;

(2) Lakes and ponds not listed as impaired on the current or draft list prepared pursuant to section 303(d) of the federal Clean Water Act as specified in 40 CFR 130.7, but identified as being at risk of being impaired in documented Volunteer Lake Assessment Program (VLAP) data demonstrating a statistically-significant decline in water quality shall receive one point;

(3) Lakes and ponds listed as impaired on the current or draft list prepared pursuant to section 303(d) of the federal Clean Water Act as specified in 40 CFR 130.7 shall receive 3 points; and

(4) The score for this category shall be multiplied by a weighting factor of 4;

(b) Based on the type and availability of public access sites and public boat access sites, points shall be assigned as follows:

(1) Private lakes and ponds shall receive 0 points;

(2) Public bodies of water with no known access point shall receive one point;

(3) Public bodies of water where public access exists only as open land or beach and there is no public boat access area shall receive 2 points;

(4) Public bodies of water where a public boat access area exists shall receive 3 points; and

(5) The score for this category shall be multiplied by a weighting factor of 2;

(c) Based on the predominant use(s) of the surface water, points shall be assigned as follows:

(1) Surface waters where less than 30% of the shorefront is developed shall receive 0 points;

(2) Surface waters where the surrounding land use is mostly residential and boating is predominantly small boats and canoes shall receive one point;

(3) Surface waters where the surrounding land use is both residential and transient and boating is a mix of large and small boats, including unmotorized boats, shall receive 2 points;

(4) Surface waters designated as public water supplies shall receive 3 points; and

(5) The score for this category shall be multiplied by a weighting factor of 2;

(d) Based on the impact of the impairment or potential impairment to recreational and economic values of the surface water, points shall be assigned as follows:

(1) The impairment is to mostly-undeveloped surface water where there is little cultural impact shall receive 0 points;

(2) The impairment is on lakes and ponds with mostly residential impacts shall receive one point;

(3) The impairment impacts residential or public beaches shall receive 2 points; and

(4) The impairment impacts commercial operations, such as marinas, public beaches, motels, restaurants, and public docks, shall receive 3 points;

(e) Based on the impact of the impairment or potential impairment to ecological values of the surface water, points shall be assigned as follows:

(1) Impairments to mostly non-native plant or animal communities in the lake or pond shall receive 0 points; and

(2) Impairments to native plant or animal species, such that the identified impairment would reduce the habitat for those species to the point where their abundance may be altered, shall receive 2 points; and

(f) Based on the amount of local match, points shall be assigned as follows:

(1) Projects where the applicant proposes to provide no more than 50% match for the project shall receive 0 points;

(2) Projects where the applicant proposes to provide at least 50% but less than 65% match for the project shall receive one point;

(3) Projects where the applicant proposes to provide at least 65% but less than 80% match for the project shall receive 2 points; and

(4) Projects where the applicant proposes to provide 80% or more match for the project shall receive 3 points.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06

## Appendix

### Rule

#### State Statute(s) Implemented

Env-Wq 1301/RSA 487:15-23

Env-Wq 1302/RSA 487:15-23

Env-Wq 1303/RSA 487:16-a; RSA 487:24, VII

Env-Wq 1304/ RSA 487:17, II (d); RSA 487:24, VII-c

Env-Wq 1305/ RSA 487:17, II (c); RSA 487:24, VII-b

Env-Wq 1306/ RSA 487:17, I (c), II, & III; RSA 487:18, :20, :21; RSA 487:24, II-VI

Env-Wq 1306.01/ RSA 487:17, I(c), II, & III; RSA 487:18, :20, :21

Env-Wq 1306.04(a)/ RSA 487:17, :18

Env-Wq 1307 / RSA 487:17, I (a) & (b); RSA 487:18, :20, :21, :22; RSA 487:24, I-VI

Env-Wq 1307.01/ RSA 487:17, I(c), II, & III; RSA 487:18, :20, :21

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## **APPENDIX TWO: CHRONOLOGY OF PROGRAM ACTIVITIES**

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### **1981**

- The exotic aquatic weed control legislation (RSA 487-17 formally RSA 149-F:3) became law on August 22, 1981.
- Fifty thousand brochures describing the exotic aquatic weed control program were distributed to boat license agents, state rest areas, marinas and lake associations.
- Waterproof posters depicting how to stop the spread of exotic weeds to other waterbodies were designed and distributed by DES personnel. Posters were placed at high use boat launching facilities throughout the state.
- A television commercial describing the exotic weed control program aired on Channel 9, in Manchester.
- Articles on exotic weed control were placed in several of the states most read newspapers.
- Personnel from this department discussed the exotic weed control problem at many lake association meetings.
- Several exotic weed complaints were field investigated by DES personnel.

### **1982**

- The Citizen Aquatic Weed Control Advisory Committee was formed.
- Educational material was distributed throughout the state to keep the public up to date on milfoil control. Boat license agents, state rest areas, boat marinas and lake associations received this material.
- Matching funds were awarded to Smith Cove Lake Association for mechanical harvesting of milfoil in Lake Winnepesaukee.
- Fifty lakes were surveyed for the presence of exotic weeds.
- A new infestation of milfoil was discovered in the outlet of Lake Waukegan by DES personnel. It was successfully eradicated with an aquatic herbicide.

### **1983**

- The Smith Cove Lake Association in Gilford and the Wolfeboro Conservation Commission were awarded matching fund grants for the harvesting of milfoil in Lake Winnepesaukee.
- Educational material was distributed throughout the state.
- Fifty lakes were surveyed for exotic weed life by DES personnel.
- Several complaints or inquiries pertaining to exotic weeds were either field investigated or handled through correspondence.
- DES personnel presented several talks on weed control at lake association meetings during the summer.
- Correspondence to other states and countries experiencing exotic aquatic weed problems was initiated in order to obtain new or existing aquatic weed control techniques.

## 1984

- The Towns of Alton, Gilford, Meredith and Wolfeboro were awarded matching grants to mechanically harvest exotic milfoil in Lake Winnepesaukee.
- The West Alton Marina was awarded a matching grant to apply aquatic herbicide to their dock area to control milfoil.
- Educational material was distributed throughout the state.
- Fifty exotic weed surveys were performed throughout the state.
- A new infestation of milfoil was hand pulled at the boat launching facilities on Crescent Lake in Wolfeboro. SCUBA equipment was utilized during the operation.
- Several aquatic weed complaints were field investigated by DES personnel.
- Personnel from DES monitored a lake drawdown and dredging project that was undertaken to control exotic fanwort in Millville Lake in Salem.
- Several newspaper articles were published state wide pertaining to exotic aquatic weed control. The Boston Sunday Globe did an extensive feature story on exotic milfoil in Lake Winnepesaukee. "The Laker" in Wolfeboro printed an excellent article explaining the problem.
- DES personnel addressed the exotic plant control problems at lake association meetings during the summer.

## 1985

- Funding for exotic weed control was suspended due to a previously unknown legislative footnote. No weed control projects were funded this year.
- Fifty exotic weed surveys were performed on lakes throughout the state.
- Millville Lake was inspected for Cabomba growth following a dredging operation.
- Educational material was distributed throughout the state.
- DES SCUBA team removed a small patch of milfoil from Crescent Lake boat landing area in Wolfeboro.
- DES personnel addressed aquatic weed problems at lake association meetings.

## 1986

- Aquatic weed control program funds became available due to legislative action. However, no projects were funded that summer due to funds not being available in time.
- Fifty exotic weed surveys were undertaken during the summer months.
- Two papers entitled "A Review of Current and Experimental Methods for the Control and Management of Aquatic Milfoil" and "Answers to Questions Concerning Aquatic Milfoil in New Hampshire Surface Waters" were written for distribution to the public.
- Educational material was distributed to lake associations, boat marinas, and the general public.
- Millville and Crescent Lakes were intensely surveyed for exotic weeds.
- Personnel from DES addressed aquatic weed problems at lake association meetings during the summer months.

## 1987

- Matching funds were awarded to the Town of Alton to undertake a milfoil dredging project in Lake Winnepesaukee.
- SCUBA divers removed small milfoil infestations at the Crescent Lake boat landing in Wolfeboro and in a section of the Winnepesaukee River in downtown Laconia.
- Two mechanical harvesting projects were planned for the summer. However, town officials could not obtain the necessary local funding to match the state's share.
- An attempt to dredge 10,000 square feet of milfoil and bottom substrate was canceled in Opechee Lake in Laconia. Heavy duty equipment became mired down in the deep mud near the milfoil infestation.
- Educational material was distributed throughout the state.
- Intensive exotic weed surveys were undertaken in seventeen lakes and ponds near Lake Winnepesaukee. These ponds were considered to be vulnerable to a milfoil infestation.
- Fifty exotic weed searches were performed on other state lakes.
- A grant of \$45,000 was awarded to the University of New Hampshire in Durham for Research on how to control exotic weed growth. Research was conducted in Back Bay in Wolfeboro on Lake Winnepesaukee.
- Private citizens participating in the New Hampshire State Assisted Lay Monitoring Program were instructed to report the sighting of any new weed growths in their respective lakes and ponds. The manual used by these lay monitors has a special section on exotic weed life.
- Millville Lake in Salem was checked for any regrowth of fanwort after a dredging operation. There has been no sign of fanwort in the lake to this date.
- A news release concerning exotic weeds and their potential spread to other lakes was distributed throughout the state media system.
- DES personnel participated in a workshop entitled "Nuisance Aquatic Weeds in New England". This workshop was sponsored by the New England Association of Environmental Biologists.
- A 4" x 6" educational handout card depicting how exotic weeds can be spread to other lakes through boating activity was distributed to boat owners during registration of their respective boats.

## 1988

- The state initiated a "Weed Watcher Program" for lake residents. Volunteer weed watchers were given instruction kits which taught them how to look for exotic weeds in their respective lakes. Any weeds that were suspected to be milfoil or fanwort were submitted to the DES Biology Bureau for verification. The program was well received by the public.
- Fifty exotic weed surveys were performed during the summer as well as many field investigations of exotic weed complaints.
- Matching funds were awarded to the Smith Cove Lake Association for the harvesting of exotic milfoil in Lake Winnepesaukee.
- Benthic barriers were installed in Lake Opechee to control a small area infested with milfoil.
- DES personnel assisted on a private dredging project to control milfoil in Lake Opechee.
- Hand pulling of small infestations of milfoil were undertaken in Flints Pond, Crescent Lake,



Lake Opechee and the Winnepesaukee River.

- A boat inspection program to detect "stowaway" exotic plant fragments was initiated during the summer of 1988. Participating towns were given \$2.00 per boat inspection. A questionnaire was also filled out by each person going through the inspection. Educational material was handed out to all boaters using these inspection launch sites. Towns participating were Meredith, Alton, Center Harbor (Winnepesaukee) and Sunapee (Lake Sunapee).
- Exotic milfoil was found in Turkey Pond, Concord and Flints Pond in Hollis during routine exotic weed surveys.
- Several boat docking facilities and launch sites were checked for the presence of exotic weeds during the summer.

### 1989

- A matching grant was awarded to the Locke Lake Association in Barnstead for the purpose of chemically treating 40 acres of exotic milfoil. The chemical called Diquat was used to control the milfoil.
- Lake shore residents along the northwestern section of Opechee Lake were awarded a matching grant to dredge milfoil and the bottom mud that sustain the exotic weeds. This was undertaken during a fall drawdown of the lake.
- St. Paul's School, located in Concord, was awarded a matching grant to mechanically harvest and hydrolake milfoil in Library Pond and Lower School Pond. The grant also provided for the application of lime to selected milfoil beds to determine if there was a reduction in biomass. The lime experiment was intended to supplement the work previously undertaken on Lake Winnepesaukee in 1987.
- Fifty lake surveys were performed which included intensive searches for exotic weeds.
- Several complaints were investigated relative to sightings of exotic plants.
- A matching grant was awarded to lake residents in Paugus Bay in Laconia for the purpose of controlling milfoil with a mechanical weed harvester. Boat movement through the area was impeded by the large amounts of exotic milfoil.
- Milfoil was confirmed to be growing in Contoocook Lake in Rindge. DES biologists spent a whole day mapping the extent of the problem in Contoocook Lake. Several meetings were scheduled between lake association residents and DES biologists to determine a course of action to curtail the milfoil infestation. After discussing the problem thoroughly with all concerned, it was decided that the use of an aquatic herbicide would be the most efficient milfoil management tool available. During the winter months, plans were drawn up, permits obtained, and a weed control firm was hired to complete the plan.

### 1990

- Exotic milfoil was found in Northwood Lake during a routine inspection. Initially it was thought to be a small localized infestation. A SCUBA team revealed later that the milfoil encompassed a larger area not seen during the boat inspection. Since this was a pioneer infestation of milfoil it was decided that the best course of action to control the problem would be through the use of the herbicide called Diquat. The entire lake was surveyed for the presence of milfoil towards the end of the summer. The survey revealed that the initial

infestation had spread to about 75 acres of the lake shore. Invitation for bids to control this problem were sent out and the necessary permits were obtained with a target date set for the spring of 1991 for the application of the chemical Diquat. DES funded 100% of the project.

- Contoocook Lake in Rindge received a matching grant from DES to treat 70 acres of milfoil. Aquatic Control Technology Inc. was selected to treat the lake with liquid Diquat. Milfoil had entered the lake about three to four years earlier but was not brought to the state's attention until 1989.
- A small patch of milfoil (50'x10') was found at the Mast Landing boat launching site in Crescent Lake, Wolfeboro. To prevent boats from transporting the milfoil into nearby Wentworth Lake, DES personnel used Aqua Screen, a bottom barrier, to smother the plants. The screen effectively killed the milfoil and is still in place to prevent further plant growth.
- Fifty lake water quality surveys were completed during the summer. During the survey, aquatic weeds were noted.

### 1991

- During the month of June, approximately 75 acres of exotic milfoil in Northwood Lake was treated with the herbicide called Diquat. Since the milfoil was new to the lake system, the entire cost of the weed control operation was funded by the Department of Environmental Services (DES).
- The Fish Cove Lake Association and Mt. View Marina, both located on Lake Winnepesaukee, had severe infestations of exotic milfoil that precluded the recreational and commercial value of the waters. They each received matching grants to fund the application of the herbicide Diquat. Crescent Lake in Wolfeboro, also received a grant to treat 35 acres of milfoil with Diquat.
- A "weed watcher" on Lake Winnisquam notified DES that exotic milfoil was found in the northern section of the lake. DES personnel confirmed the milfoil sighting and sent two SCUBA divers to cover the small milfoil infestation with Aqua Screen. Any "straggler" plants were hand pulled by the SCUBA divers.
- A "weed watcher" from Lees Pond in Moultonborough noticed that some stands of milfoil in the pond were being eaten by some unknown animal. Closer inspection by DES personnel revealed that an aquatic moth was responsible for the apparent decline in the milfoil biomass. The aquatic moth was subsequently identified as Paraponyx allionealis. DES SCUBA divers observed and monitored the progress of the insect and mapped out the areas affected by the insect.
- A new sign warning lake residents that milfoil was growing in their respective lakes was designed and placed at the milfoil infested lakes, usually at the boat launching facility.
- Fifty lakes were surveyed for the presence of milfoil or other exotic weeds.
- DES personnel presented several talks on exotic weed control at lake association meetings during the summer months.
- Professional divers were hired to hand pull a new infestation of milfoil in Round Cove on Lake Winnepesaukee. This was a fifty-fifty match with the local residents. DES biologists monitored the project.

## 1992

- Round Cove located on Lake Winnepesaukee was given a matching grant to control a small encroachment of milfoil. A weed control firm was hired to apply liquid Diquat to the 5 acre cove. Mt. View Marina in Gilford was also given a grant to chemically control the obnoxious milfoil that interfered with boating activities.
- DES and the Town of Wolfeboro provided money for Brewster Academy to study the aquatic moth currently eating milfoil in Lees Pond in Moultonborough. The study examined the fundamental characteristics of the aquatic moth, such as food preferences, biomass consumption, and the life cycle. These studies were performed in Back Bay in Wolfeboro and Lees Pond. Initial tests performed in "live cages" showed that the insects will decrease milfoil if in sufficient numbers. DES personnel assisted the researchers at Brewster Academy during the summer.
- A new exotic weed Myriophyllum spicatum was discovered growing in Mountain Pond in the Town of Brookfield. Otherwise known as Eurasian milfoil, this plant can spread very quickly to other ponds. A decision was made to drain the small shallow pond in an attempt to freeze and dry out the hardy plants. The beaver dam holding back the lake was breached during the fall. The plan is to let the pond stay down for at least two years. Several trips were made to the pond to insure that local beaver were not plugging the opening in the dam. As a last resort the pond may need a spot treatment of herbicides to insure that it does not spread to other nearby waterbodies.
- Exotic milfoil was found growing in Lake Winnisquam in the Towns of Tilton and Belmont. The combined total affected area was 7.81 acres. Since this was a new infestation of exotic weeds, the state was mandated to fund 100% of the weed control process. The decision was made to treat the two small areas with the herbicide 2,4-D. A request for bids to treat the two areas was sent out during the fall of 1992. A contractor was hired to obtain all the necessary permits from the Division of Pesticide Control and to apply the granular 2,4-D to the sites in Lake Winnisquam. Unfortunately, the project ran into difficulties over the issue of a nearby business using the lake as a drinking water source. The treatment area was too close to the drinking water source. The project was denied by the Division of Pesticide Control.
- The Wentworth Lake association applied for a matching grant from the state to chemically treat thirty five acres of milfoil in nearby Crescent Lake, Wolfeboro. This project also was denied due to a drinking water issue and the use of the aquatic herbicide 2,4-D.
- As in previous years, educational material was distributed to the public, exotic weed signs were placed at boat launching sites, and talks relating to the exotic weed problem were given by DES personnel. Also, many weed specimens were submitted to DES for identification. Fifty weed surveys were performed on selected lakes in conjunction with a survey of the current water quality status of each waterbody.

## 1993

- The following were awarded matching grants from the state for the purpose of controlling exotic milfoil:
  - a. Mt. View Marina - Gilford; herbicide; 2,4-D

- b. Lake Shore Park - Gilford; herbicide; 2,4-D
- c. West Alton Marina - Alton; herbicide; 2,4-D
- d. Contoocook Lake Association - Rindge/Jaffrey; herbicide; Diquat

Each site was severely infested with exotic milfoil to the point that recreational and commercial activities were impaired.

- "Weed Watchers" found three more lakes that harbored suspected stands of milfoil. Lower Suncook Lake, Lake Wentworth and Broad Bay were the latest victims of the milfoil encroachment. DES personnel covered the small stand of milfoil in Lake Wentworth with a benthic bottom barrier. The barrier physically constrains the weeds and ultimately smothers the plants within a month. Suncook Lake in Barnstead had scattered stands of milfoil near the outlet section of the lake. DES SCUBA divers placed bottom barriers on the milfoil. Each of the 5 stands of milfoil took about 300 square feet of bottom barrier. Any separately growing plants were hand pulled by the divers. During the fall drawdown of Lower Suncook Lake, DES personnel patrolled the affected area searching for new milfoil growths missed during the summer. Any patches larger than 25 square feet were covered with barrier while "straggler" plants were individually hand pulled. The milfoil in Broad Bay (Bay Marina) seems to be confined to an area not larger than two acres. Local residents concerned about the problem are hand raking and pulling the milfoil plants. This area will be looked at more extensively next spring in order to decide what type of management approach will be undertaken to control the problem.
- In 1991, Northwood Lake was chemically treated to control exotic milfoil. The plants came back during the summer of 1992 and 1993. After a meeting with the lake association and DES personnel, it was decided to draw down the water in Northwood below the normal winter drawdown level. It is hoped that a cold winter will kill the newly exposed plant life.
- Officials from the Lake Wentworth Lake Association found milfoil growing in a small cove near Albee Beach in Wolfeboro. They notified DES officials of its presence and location on the lake. The plants did not have all the necessary taxonomic features needed to correctly identify the milfoil to species. However, since the milfoil was suspected to be an exotic species, it was decided that something should be done to ensure that it does not spread to the rest of the lake. DES personnel decided to cover the small area with bottom barrier. Approximately 1500 square feet of bottom barrier (Aqua Screen) were installed over the milfoil plants.
- Each year a Volunteer Lake Monitoring Workshop is held at DES headquarters in Concord. This year an aquatic weed workshop was given as well as an overview of the exotic weed program. These two programs were well attended by lake volunteers.
- Lake association members from New York state concerned about the current milfoil spread in their state asked a representative of DES to give a talk on the New Hampshire exotic weed program. They are trying to get a similar program started in New York.
- A representative from DES gave a major exotic weed presentation at the annual "Bass Master" state chapter meeting held in Concord. Major emphasis was given to cleaning weeds from boats during the "Bass Master" competitions held at many lakes during the summer months.
- An exotic weed control talk was given at the annual "Lakes Congress" held at St. Paul's School in Concord. About one hundred representatives from the many lakes of New

Hampshire attended the conference.

- A grant was given to Brewster Academy in Wolfeboro to do follow up studies on the insects that eat milfoil. DES personnel assisted on this project by supplying a dive team to perform some of the experiments. Local lake association people also got involved on this project.
- Approximately 300 weed watcher kits were given out to various lake associations throughout the state. Requests for the "kits" were received from other states.
- DES personnel periodically checked on the status of the Mountain Pond drawdown in Brookfield. Occasionally, beaver would attempt to plug up the breach in the dam. The mini drought experienced this summer took its toll on the exposed Eurasian milfoil plants. Once the plants dried up, land plants took their place.
- NH Fish & Game became the lead agency for the "Statewide Public Access Program." They have agreed to place DES exotic weed warning signs at all their new and existing public access points.
- Currently, a new exotic weed sign is being developed for distribution during the summer of 1994.
- Several routine exotic weed complaints were field investigated by DES personnel. Many suspect weeds were sent to the DES Limnology Center for identification.
- Fifty lake surveys to determine current water quality status were performed by DES biologists during the summer. A weed survey was undertaken during the survey. A search for exotic weed species was also performed on each lake or pond.
- Problems associated with milfoil and other exotic plants in NH generated several newspaper articles during the summer. This "free publicity" helped get the word out to the public informing them to be careful not to spread exotic weeds to other lakes and ponds through boating activities.
- A weed watcher from the northern section of Lake Winnisquam notified DES biologists that a small patch of milfoil had appeared in one of the coves. SCUBA divers successfully hand-pulled the plants before they spread to other sections of the lake.

## 1994

- Pioneer infestations of exotic milfoil were found in Lake Waukegan, Meredith; Cheshire Pond, Jaffrey; Broad Bay, Freedom; and Silver Lake in Tilton.

**Lake Waukegan, Meredith** -DES biologists found approximately 1.5 acres of the exotic milfoil in the outlet/canal section of Lake Waukegan during a routine water quality inspection. This same general area had milfoil in 1981 and was successfully treated and controlled with a chemical herbicide in 1982.

**Cheshire Pond, Jaffrey** -A resident on Cheshire Pond in Jaffrey reported sighting milfoil in a beach area. A DES biologist confirmed the milfoil to be exotic. The milfoil probably floated downstream from nearby Contoocook Lake ultimately taking hold in the pond. A temporary drawdown of the pond was initiated during the month of December in an attempt to freeze the milfoil plants.

**Silver Lake, Tilton** - Exotic milfoil was found in Silver Lake in Tilton by the University of New

Hampshire lay monitoring officials. DES responded to the problem quickly by hand pulling the plants and digging up the remaining plants during a fall drawdown of the lake. This site will be inspected in the spring of 1995 for signs of regrowth.

**Broad Bay, Freedom** -DES biologists had trouble identifying the milfoil at this site in 1993 because the plant did not exhibit flowers which are critical to a positive identification. However, in 1994 flowers did appear and the plant was identified as exotic milfoil. This site will be chemically treated in 1995.

- Three matching grants were awarded to lake associations in 1994 for the purpose of exotic weed control. They were as follows:

<u>Association</u>	<u>Lake</u>	<u>Town</u>	Type <u>Exotic</u>	Control <u>Method</u>
a. Locke Lake Assoc.	Locke Lake	Barnstead	milfoil	chemical
b. Meredith Yacht Club	Winnepesaukee	Meredith	milfoil	chemical
c. St. Paul's School	Turkey Ponds	Concord	milfoil	mechanical harvesting

- DES biologists performed several underwater exotic weed surveys with the aid of SCUBA equipment. These surveys were done to get an accurate assessment of the milfoil infestations.
- A new sign designed to educate boaters was made and placed at many boat launches throughout the state.
- Northwood Lake in Northwood was lowered in November so that the state could replace the old dam. The lake was drawn down all winter and did slow down the milfoil growth along the shoreline.
- Several informational talks were presented at lake association meetings by DES biologists. A radio talk show on exotic weeds was aired in Lebanon, while a local TV station did a major news segment on the exotic weed control program.
- DES personnel went to a meeting in Vermont to discuss new methods of controlling exotic weeds.
- Several hundred "weed watcher kits" were requested by the public. This volunteer program has been very successful over the past few years.
- Several suspected exotic weed sightings by weed watchers or other concerned lake residents were investigated by DES biologists. Many samples were sent to the Limnology Lab for identification.
- Fifty more exotic weed surveys were performed during the summer. These surveys supplement the weed watcher efforts performed by volunteers.
- Five milfoil contracts were put out to bid in 1994. These weed control projects will occur during the spring of 1995.
- Mountain Pond in Brookfield, which originally had Eurasian milfoil, is still empty. There is no sign of any milfoil in the small stream that flows through the empty pond.

## 1995

- The outlet section of Lake Waukegan in Meredith was treated with the herbicide called

Aqua Kleen. Aquatic Control Technology, Inc. of Northborough was hired by DES to undertake the project. If the milfoil had not been controlled there was a good chance it may have spread through the rest of the lake. It would have been impossible to treat the main lake since the Town of Meredith uses the lake for drinking water. An inspection of the treatment area with SCUBA gear did not reveal any milfoil plants. The treatment was a success.

- Lower Suncook Lake in Barnstead had six acres of milfoil treated with the herbicide called Reward. Lycott Environmental Research, Inc. of Southbridge Massachusetts was hired by DES to perform the treatment.
- Crescent Lake in Wolfeboro was also treated with the herbicide called Reward. An inspection of the treated area in the fall revealed no milfoil. To date, treatment efforts have kept milfoil from invading the main section of nearby Lake Wentworth.
- Mountain Pond in Brookfield is still drained. Still no signs of Eurasian milfoil.
- Eurasian milfoil was found growing in the Connecticut River in Charlestown. A large boat launching facility on the Vermont side of the river is used by fishermen from both states. Vermont officials were notified of the milfoil. They posted warning signs near the launch site. Leaflets informing the public about the milfoil were handed out to the boating public at a toll booth as they crossed from New Hampshire into Vermont.
- A “weed watchers wheel” was developed to distribute to the public to aid them in their search for exotic weeds. The wheel accompanied the standard “weed watcher kit” used by lake monitors.
- The proposal to treat Broad Bay in Freedom with herbicides was terminated due to time constraints and permitting problems.
- Contoocook Lake Association received a matching grant from the state to chemically treat small areas of milfoil. The herbicide called Diquat was used in this project.
- Several milfoil talks were given to lake associations during the summer.
- Benthic barriers were installed in a small cove on Wentworth Lake to control a small stand of milfoil.
- Milfoil was hand pulled in Lower Suncook Lake by SCUBA divers from DES.
- Eight proposed herbicide applications for the purpose of milfoil control were submitted to the Governor and Council for approval. The projects were as follows:
 

<ul style="list-style-type: none"> <li>a. Broad Bay, Freedom</li> <li>b. Lakeshore Park, Gilford</li> <li>c. Mt. View Marina, Gilford</li> <li>d. West Alton Marina, Alton</li> </ul>	<ul style="list-style-type: none"> <li>e. Winnisquam Lake, Belmont</li> <li>f. Silver Lake, Belmont</li> <li>g. Cobbetts Pond, Windham</li> <li>h. Fish Cove, Meredith</li> </ul>
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- Exotic milfoil was found at Claire's Boat Landing on Lake Massabesic in Auburn. This lake is Manchester's water supply. Benthic barriers were placed on a large portion of the milfoil. The use of herbicides was not allowed due to the drinking water status of the lake. Manchester Water Works personnel moved the benthic barriers to other milfoil sites as needed.

## 1996

- Eight herbicide applications to control milfoil occurred during the month of June. They are as follows:

- a. Broad Bay, Freedom
- b. Lakeshore Park, Gilford
- c. Mt. View Marina, Gilford
- d. West Alton Marina, Alton
- e. Winnisquam Lake, Belmont
- f. Silver Lake, Belmont
- g. Cobbetts Pond, Windham
- h. Fish Cove, Meredith
- Two new infestations of milfoil were confirmed by the DES staff. Captain Pond in Salem and Lake Massasecum in Bradford now possess the nuisance weed.
- SCUBA divers checked Lake Waukewan for any signs of milfoil regrowth one year after it was treated. No milfoil plants were observed during the dive.
- Milfoil was discovered growing in the northern end of Lake Winnisquam.
- A milfoil education display was presented at the Fish and Game Department “Discover Wild New Hampshire Day.”
- A similar display was also presented at “Celebrate Your Lakes Day” held this summer in Meredith.
- Milfoil informational talks were given throughout the summer at many lake association meetings.
- A talk was given to the Fish and Game Department volunteer fishing instructors on how to look for exotic weeds throughout the state.
- Ken Warren attended a National Weed Control Conference held in Burlington Vermont in July. Several papers on new promising control techniques were presented.
- Benthic barriers were placed on a small infestation in Lake Winnisquam.
- Mountain Pond in Brookfield was checked for any regrowth of Eurasian milfoil. No plants were found during the inspection.

## 1997

- Six herbicide applications were performed in the spring to control nuisance growths of exotic aquatic plants:
  - a. Northwood Lake, Northwood
  - b. Lake Winnepesaukee, Mountain View Marina, Gilford
  - c. Lake Winnepesaukee, Meredith Bay, Meredith
  - d. Lake Massasecum, Bradford
  - e. Lake Winnepesaukee, Krainwood Shores, Moultonborough
  - f. Locke Lake, Barnstead
- Benthic barriers were placed in Heath Bog of Lake Wentworth, Wolfeboro, Lake Massabesic in Auburn, Lake Massasecum Bradford, as well as in small localized areas in other lakes.
- A new infestation of milfoil was documented at Claire’s Boat Landing on Lake Massabesic in Auburn, and Powder Mill Pond in Hancock.
- SCUBA divers inspected several small infestations of milfoil and hand-pulled plants where they were encountered in low densities.
- Several displays were presented at summer events and festivals including “Celebrate Your Lakes Day”, and “Discover Wild New Hampshire Day.”



- Informative presentations were given at a number of lake association meetings throughout the summer.
- HB 181 was passed prohibiting a number of activities associated with exotic aquatic plants.

## 1998

- RSA 487:16-a went into effect on January 1, 1998. This new law prohibits the sale, distribution, importation, purchase, propagation, transportation, or introduction of 14 listed exotic aquatic plants in New Hampshire. The new statute also allows for the designation of restricted use areas on waterbodies.
- On September 5, 1998 new rules were enacted pursuant to RSA 487:16-a.
- Benthic Barriers were placed in Lake Winnepesaukee in Meredith, Lake Wentworth in Wolfeboro, Contoocook Lake in Jaffrey, Hopkinton Lake in Hopkinton, Lake Massabesic in Auburn, and Lake Massasecum in Bradford, as well as in small places in an additional 2-3 lakes.
- Maintenance hand-pulling activities took place at a number of lakes with new and existing milfoil infestations.
- The following herbicide applications were performed during the Spring:
  - a. Forest Lake, Winchester
  - b. Captains Pond, Salem
  - c. Sunrise Lake, Middleton
  - d. Contoocook Lake, Jaffrey
  - e. Lake Winnepesaukee, Gilford
  - f. Lake Winnepesaukee, Moultonboro
  - g. Lake Winnepesaukee, Tommy Cove, Meredith
- A number of summer lake festivals were attended by the Exotic Species Coordinator, including "Celebrate Your Lakes Day," "Naturally Newfound," "Discover Wild New Hampshire Days," and Keene State College "Solarfest".
- Several presentations were given to towns and lake associations throughout the state on exotic aquatic plants.
- Exotic species signs, which are posted at boat launches throughout the state, were revised to include the changes in legislation associated with exotic plants.
- A number of milfoil control activities were conducted this summer at Lake Massasecum in Bradford. Benthic barriers were installed, a restricted use area was established in the north cove, and a net was placed across the surface of the water (vertically in water column) to trap floating fragments of milfoil.
- 500 specimens of variable milfoil (*Myriophyllum heterophyllum*) were sent to the Army Corps of Engineers, Waterways Experimental Station in Vicksburg, MS for research on control methods. Garlon 3-A, a new herbicide that is thought to be more effective and environmentally sound than 2,4-D, was used to treat the plants. More extensive research will be conducted this spring.

## 1999

- Eurasian milfoil found in Lake Mascoma in Enfield. Numerous diving operations were conducted to hand remove the milfoil.

- ‘Suspicious patches of milfoil found in Horseshoe Pond in Merrimack and in Belleau Lake, Wakefield. Plants did not flower so positive identifications were not made. Plan to investigate again in 2000.
- Nine herbicide applications were conducted this year. Most were in various portions of Lake Winnepesaukee. Other treatments were conducted at the following waterbodies:
  - Contoocook Lake, Rindge
  - Lake Monomonac, Rindge
  - Captains Pond, Salem
  - Crescent Lake, Wolfeboro
  - Lake Wentworth, Wolfeboro
- Numerous presentations were given to lake associations about exotic plants.

## 2000

- New Variable milfoil infestations documented in Little Squam Lake and Squam River, Holderness/Ashland, Danforth Pond, Ossipee, and Rocky Pond, Gilmanton.
- Re-investigations of the two suspect infestations of milfoil from summer of 1999 confirmed that the species of milfoil in Belleau Lake, Wakefield, and Horseshoe Pond, Merrimack were indeed the variable milfoil.
- Herbicide applications conducted at the following locations in 2000:
  - Lake Winnepesaukee, Meredith, Gilford, Center Harbor, Moultonborough, and Alton
  - Northwood Lake, Northwood
  - Locke Lake, Barnstead
  - Lake Monomonac, Rindge
  - Contoocook Lake, Rindge
- Innovative milfoil management activities took place on Lake Massasecum, Bradford. Lake Association, through funding from NHDES, have constructed harvester to repeatedly harvest milfoil in northern cove of lake.
- RUA installed in Little Squam Lake to contain milfoil.
- Hand-pulling conducted on milfoil in channel connecting Big and Little Squam Lakes.
- Research on milfoil impacts to property values initiated at UNH.
- RSA 487:16-b went into effect making it unlawful to knowingly, recklessly, or purposely offer for sale, distribute, sell, import, purchase, propagate, or introduce exotic aquatic weeds into New Hampshire waterbodies. The new law makes it a violation to conduct any of the above listed activities.

## 2001

- New Variable milfoil infestations documented in Lake Sunapee, Sunapee at Georges Mill, and Dublin Lake in Dublin.
- A new invasive plant was first documented in New Hampshire. *Egeria densa*, also known as Brazilian elodea, was found in Nutts Pond in Manchester.
- Herbicide applications conducted in 20 waterbodies, the most waterbodies ever treated in one summer in New Hampshire.

- Innovative milfoil management activities taking place on Lake Massasecum, Bradford. Lake Association, through funding from NHDES, have continued harvesting activities and installing bottom barriers.
- RUA installed in Little Squam Lake and Lake Sunapee to contain milfoil.
- Hand-pulling conducted on milfoil in channel connecting Big and Little Squam Lakes, Dublin Lake, and Lake Sunapee.
- Research on milfoil impacts to property values by UNH suggests a 16+%% decline in lakefront property values.

## 2002

- New Variable milfoil infestations documented in Turtletown Pond in Concord, Balch Lake in Wakefield (plants found in 2001, but not in flower), Melendy Pond and Lake Potanipo in Brookline and in Brindle Pond in Barnstead.
- DES conducted 25 herbicide applications on various waterbodies throughout the state. This is the most number of treatments that have been conducted in any one year since the program began.
- Innovative harvesting activities continued on Lake Massasecum in Bradford.
- New Hampshire Lakes Association established a pilot Lake Host Program on several waterbodies.
- NHDES began working with Dartmouth College to sequence milfoil genetics and determine if hybridization is occurring.

## 2003

- RSA 487:25 goes into effect establishing the Milfoil and Other Exotic Aquatic Plant Prevention and Research Grant Program.
- First round of Milfoil and Other Exotic Aquatic Plant Prevention Grants awarded to three recipients. New Hampshire Lakes Association, Department of Safety, and Androscoggin River Watershed Council.
- Two new infestations of Variable milfoil documented in Jones Pond in New Durham and in Scobie Pond/Haunted Lake in Franconia.
- Eurasian milfoil found growing again in Mountain Pond in Brookfield. It was assumed that this infestation was eradicated due to a 3-year drawdown of the pond. Five foot tall plants were found growing in August.

## 2004

- Four new infestations were documented this year. Variable milfoil was found in the Merrimack River at the confluence with the Contoocook River in Penacook; in Kimball Pond in Hopkinton, and in the Pemigewasset River in Sanbornton. Fanwort was found in Otternic Pond in Hudson.
- Three Prevention Grants were given out this year. The New Hampshire Lakes Association, Ossipee Lake Alliance, and the Department of Safety, Division of Safety Services received

grants.

- One Research Grant was given in 2004. Suncook Lake Association, in participation with the University of New Hampshire, was given a grant to evaluate the effectiveness of a detailed 2,4-D treatment, and to determine if 2,4-D migrates through the substrate and into nearshore wells under normal, and rigorous, pumping regimes.

## **2005**

- One new infestation was found in 2005. Fanwort was found growing in Wilson Lake in North Salem. This infestation was most likely caused by the downstream migration of fragments out of Arlington Mill Reservoir.
- Three Prevention Grants were awarded in 2005. The New Hampshire Lakes Association, the Department of Safety, Division of Safety Services, and the Connecticut River Conservation District Coalition received funds for various projects.
- One Research Grant was awarded during this year. The Suncook Lake Association received a grant to optimize the function of a SCUBA diving device which will aid in efficient milfoil mapping.
- The DES worked closely with a Milfoil Study Committee that was established in 2004. The group met several times throughout the year, and DES was present to provide updates of the program, status of exotics, and to provide input on future directions that the legislative committee could assist with.

## **2006**

- MOA with Fish and Game signed regarding development of Long-Term Management Plans for exotic aquatic plants, for all infested waterbodies seeking to perform control activities.
- Three new infestations of exotic plants: 2 variable milfoil infestations and 1 curly-leaf pondweed infestation.

## **2007**

- Initiated rulemaking process to add new species to prohibited aquatic plant list, essentially doubling the list of species.
- Increased outreach activities with aquarium and water garden dealers in New Hampshire pursuant to newly amended exotic aquatic plant rules, including extended list of prohibited aquatic plants.
- Two new infestations of variable milfoil: Lake Pemigewasset (New Hampton) and Glen Lake (Goffstown).
- Commissioned the construction of a prototype diver-assisted suction harvester (DASH) for use by DES.
- Initiated the Weed Control Diver Program and Certification Course
- Tracked four pieces of legislation relative to increasing program funding and removing sunset from milfoil funding.
- Rock snot (*Didymo*) first identified in Connecticut River in June. Conducted field sampling and monitoring on *Didymo*.

## 2008

- Field trials and retrofitting the DASH unit.
- Two new infestations of variable milfoil documented: Long Pond (Danville) and Spaulding Pond (Milton).
- Contracted work on developing an Underwater Surveillance Vessel (USV) to enhance mapping techniques of DES biologists.
- No bills were introduced to the legislature this year for milfoil or exotic plant related topics.
- Received final written reports from federally funded milfoil study and posted to DES website.
- Initiated a project with the US Army Corps of Engineers Environmental Research and Development Center. The research focuses on the viability of milfoil seeds in lake sediments. The report from this study should be completed sometime in 2009.
- DES did a number of field demonstrations on the DASH device, including sites in Derry, Rindge, Alton, and Gilford.

## 2009

- In March, a mailing was done to all plant nurseries in New Hampshire to provide them with an updated list of prohibited exotic aquatic plants in New Hampshire.
- A total of 30 groups requested matching funds for exotic species projects in 2009. Only 13 of these groups were awarded matching funds due to inadequate funds for projects. The grants were awarded for only 30% of the total project cost, to maximize the total number of waterbodies that received funding.
- Upper Goodwin Pond was found to have growths of variable milfoil during a National Lake Assessment Survey done on the pond.
- A research project was conducted to compare single (100 lbs/acre) versus double (200 lbs/acre) doses of 2,4-D for the control of variable milfoil. A full technical report is available in electronic format through DES.
- A decontamination protocol for Didymo was developed and distributed to field staff in the various state agencies in New Hampshire.
- Legislation passed to increase boat registration fee for more funding to control and prevention grant programs.

## 2010

- A Milfoil Summit was organized and convened by the Exotic Weeds and Species Committee to share and gather information on milfoil and other invasive species from interested stakeholders.
- Post Pond, Lyme- Eurasian Milfoil infestation documented
- Willand Pond, Dover- variable milfoil infestation documented
- Nashua River- Eurasian milfoil documented
- A research project on 2,4-D formulations was conducted in Lake Winnisquam to compare the efficacy of the different formulations for controlling variable milfoil. A full technical report is available in electronic format through DES.

## **2011**

- A research project on the aquatic herbicide MaxG was conducted in Flints Pond (and also using data from SunRay Shores on Lake Winnisquam from 2010) to determine the impact to non-target species and efficacy on variable milfoil. A full technical report is available in electronic format through DES.
- Inter-agency communications increased on the topic of invasive species. Several meetings held to review each agency's perspective on invasive species threats and management efforts. As a result of these meetings: 1) a Memorandum of Agreement was drafted to outline agency roles in exotic species related activities, 2) a streamlining process was initiated for permit processes related to herbicide use, 3) agency communications were enhanced.
- Developed a fact sheet on the Asian clam in partnership with the Fish and Game Department. The Asian clam is a fast moving species within the northeast region.
- Developed a table that shows the distribution of Asian clam, zebra mussel and quagga mussel in New England (with input from other program counterparts from other states), and distributed it to various New Hampshire and regional entities for education and outreach purposes.

## **2012**

- Eradication of variable milfoil growth in Rocky Pond, Hollis (first documented in 2011) confirmed. No carryover growth into 2012, no new growth in waterbody found.
- New infestation of variable milfoil reported in Otter Lake in Greenfield. Field survey confirmed widespread growth around pond, infestation likely 3 years old.
- New infestation of variable milfoil reported in Naticook Lake in Merrimack. Field survey confirmed widespread growth in half of pond, infestation likely 2-3 years old.
- Field research project on Mine Falls Pond in Nashua to evaluate a new aquatic herbicide (Clipper) to control multiple species of invasive aquatic plants in this system.
- Began working with Trout Unlimited on an education and outreach project for trout water users.

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## APPENDIX THREE: INTERAGENCY MOA ON INVASIVE AQUATIC SPECIES MANAGEMENT

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Interagency Exotic Aquatic Plant MOA - Final

February 2, 2012

### Memorandum of Agreement Among and Between

New Hampshire Department of Agriculture, Markets and Food, New Hampshire  
Department of Environmental Services, New Hampshire Fish and Game Department  
and New Hampshire Department of Resources and Economic Development  
relative to  
The Management and Control of Established Infestations of Exotic Aquatic Plants  
in New Hampshire Waters

WHEREAS, the New Hampshire Department of Agriculture, Markets and Food (DAMF), through the Pesticide Control Board acting under statutory authority established in RSA 430:31, adopted Administrative Rule Pes 601.01(b), which states that “applications for treatment of surface waters 10 acres or larger in area shall also have prior recommendations by DES and the Fish and Game Department”;

WHEREAS, the New Hampshire Department of Environmental Services (DES), through the Clean Lakes Program established pursuant to RSA 487:17, recognizes exotic aquatic plants as a threat to water quality and identifies the need for the preservation and restoration of New Hampshire lakes and ponds “to benefit the social and economic well-being of the state’s citizens”;

WHEREAS, it is the duty of the Executive Director of the New Hampshire Fish and Game Department (F&G), pursuant to RSA 206:10, to “protect, propagate and preserve the fish, game and wildlife resources of the state,” among other duties;

WHEREAS, the New Hampshire Department of Resources and Economic Development (DRED), pursuant to RSA Chapter 217-A, is charged with protecting and conserving native plants and natural communities; and

WHEREAS, the four agencies listed above (hereafter referred to collectively as “the agencies”) recognize the need to improve and streamline the process for decision-making on proposals for exotic aquatic plant control measures under RSA 487:17 such that effective control of exotic aquatic plants is obtained through the integrated use of Best Management Practices (BMPs), that are selected based on site-specific conditions and public input.

### **NOW, THEREFORE, AND INCORPORATING THE RECITATIONS ABOVE, THE UNDERSIGNED MUTUALLY AGREE AS FOLLOWS:**

- I. Actions to manage and control established infestations of exotic aquatic plants should be based on the following principles:
  - A. The most effective approach to manage exotic aquatic plants is through the use of integrated control techniques that are tailored to site specific conditions;
  - B. The development and implementation of Long-term Exotic Aquatic Plant Management Plans (LTMPs) for waterbodies that have exotic aquatic plant infestations is the primary tool for ensuring comprehensive and integrated control solutions;

- C. Coordination of data collection and analysis among the State agencies is key to improving long-term management of established infestations of exotic aquatic plants; and
- D. Timely and appropriate decisions on permit applications are required to ensure no undue delays in the implementation of appropriate exotic aquatic control techniques and mitigation measures.

II. The agencies will apply these principles to exotic aquatic plant management projects in an integrated fashion as follows:

A. By January 15, 2012, the agencies will fully implement the permit streamlining changes agreed to in the LEAN in Government Implementation Plan for *The Permitting of Herbicide Application in the Waters of the State*, dated August 23, 2011 (copy attached as Appendix I), including:

- 1. Reviewing, in a timely fashion, permit applications for control of exotic aquatic plants relative to applicable statutes and regulations, and providing comments and concerns to the other agencies;
- 2. Working cooperatively with the Pesticide Control Board to draft or amend regulations for the permitting process as appropriate; and
- 3. Meeting again in one year to discuss the effectiveness of the permit process changes.

B. By February 28, 2012, the agencies will develop and agree to a template for Long-term Exotic Aquatic Plant Management Plans (LTMPs) for water bodies that have infestations of exotic aquatic plants, and shall subsequently use this template to develop draft LTMPs for each affected waterbody which will be effective for calendar year 2013 onward. This process shall include:

- 1. LTMP template development based on information shared during inter-agency meetings and communications; and
- 2. Contribution of data and information from the agencies relative to the content of the individual LTMPs.

C. By February of each year, complete preparation or updates of draft LTMPs for projects taking place in that year's growing season, using the template developed pursuant to II.B. above, for all waterbodies that have infestations of exotic aquatic plants.

D. The agencies will review completed draft LTMPs as they are finalized and provide comments to DES within 15 calendar days of receipt of each draft so that the drafts can be finalized and sent to contractors for inclusion with permit applications.

E. LTMPs will be revised when necessary to reflect changes in site specific conditions, and/or the effectiveness of the integrated control techniques employed. The agencies will review and comment on all the proposed LTMP modifications.

F. By November 15 of each year, the agencies will review the annual list of potential exotic aquatic plant control projects (recognizing that this may not be a complete list at this date), to determine if there are any species, habitat, water supply or other concerns relative to the types of control practices, and then share that information with the other agencies. At least two weeks prior to this date, DES will submit an official Database check request to the Natural Heritage



Bureau (NHB) for information on known locations of protected species and exemplary natural communities in the vicinity of proposed exotic plant control project locations. If any concerns exist, the agency with data and experience with the topic of concern will make recommendations about suitable modifications or alternatives relative to the proposed control actions and LTMP recommendations for that waterbody and infestation (e.g., timeframes, approaches, setbacks).

G. In December of each year, agency program staff will meet and/or correspond to review project-specific areas of concern and to finalize suitable alternatives. Upon concurrence, suitable alternatives will be included in a revision of the LTMP for that waterbody and included, when appropriate, as conditions in any permit that may be issued for exotic aquatic plant management activities.

H. By April 2012, improve the process for monitoring and data sharing on water bodies undergoing exotic aquatic plant control techniques, which include the following:

1. Accessing data from the NHB plant and animal tracking database housed at the Natural Heritage Bureau Inventory.
2. Developing strategies or Standard Operating Procedures (SOPs) for mapping, surveying and monitoring of habitats, species and other natural resources related to control practices in infested waterbodies.
3. Agency coordination to complete field work and site inspections to address data needs required for addressing concerns relating to specific species or habitats. To use this information to inform the choice of appropriate methods and timeframes for management and control activities.

I. By May 2012, develop a working set of best management practices for the integrated control of exotic aquatic plants using the following:

1. Peer reviewed literature on aquatic plant management, with a specific focus on impacts to habitats, species and drinking water supplies, or other relevant issues.
2. Habitat and species data that are collected and shared by each of the agencies.
3. New and evolving management techniques for controlling exotic aquatic plants.

### **III. FURTHER, THAT THE DEPARTMENT OF AGRICULTURE, MARKETS AND FOOD WILL:**

- Streamline the permit review process by working with the Pesticide Control Board to draft or amend regulations as appropriate.
- Perform reviews of permit applications for control of exotic aquatic plants relative to applicable statutes and regulations, and issue permits that reasonably address the concerns of other state agencies in an integrated fashion.
- When deviations from agency recommendations or draft LTMPs occur, provide information (via e-mail and within two weeks of permit issuance) to agencies explaining why the deviation occurred.
- Review completed draft LTMPs and provide comments to DES.

**IV. FURTHER, THAT THE DEPARTMENT OF ENVIRONMENTAL SERVICES WILL:**

- Review requests for exotic aquatic plant control actions to determine consistency with agency lake management policies, including waterbody-specific Long-Term Management Plans and water supply protection.
- By September 30 of each year DES will, via email, provide a list of potential projects for the next growing season to the agencies. This list will be based on requests received by DES by that date for funding assistance for control practices.
- In collaboration with the other agencies and interested parties, prepare or update (as appropriate) long-term Exotic Aquatic Plant Management Plans (LTMPs) for all waterbodies that have established infestations. DES will modify the plans on an ongoing basis to reflect changes in actual field conditions and guide future control efforts, with an emphasis on waterbodies that are slated for management action in that growing season.
- Coordinate and conduct field work to provide input and feedback for alternative methods or timeframes for control actions to limit impacts to species or habitats of concern and for use in LTMPs and permitting processes.
- Measure and report the results of control activities.

**V. FURTHER, THAT THE DEPARTMENT OF FISH & GAME WILL:**

- Review requests for exotic aquatic plant control actions to determine consistency with agency wildlife protection and management policies.
- Assist in the development of LTMPs by identifying important fish and wildlife habitat, designated conservation zones and boat access sites, and by providing information on any wildlife species listed as rare, threatened or endangered species and/or species of greatest conservation need.
- Coordinate and provide input for alternative methods or timeframes for proposed control techniques to minimize impacts to species or habitats of concern and for use in LTMPs and permitting process.
- Review completed LTMPs and provide comments to DES.

**VI. FURTHER, THAT THE DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT WILL:**

- Review requests for exotic aquatic plant control actions to determine consistency with agency efforts to protect and conserve native plants and natural communities.
- Assist in the development of LTMPs by identifying the presence of any rare, threatened or endangered species or sensitive habitats in or near proposed control activities.
- Coordinate and conduct field work to provide input and feedback for alternative methods or timeframes for control actions to limit impacts to species or habitats of concern and for use in LTMPs and permitting process.
- Review completed draft LTMPs and provide comments to DES.

IN WITNESS WHEREOF, the respective parties have hereunto set their hands on the dates indicated.

 Lorraine Merrill, Commissioner Department of Agriculture	<u>2-21-2012</u> Date
 Thomas S. Burack, Commissioner Department of Environmental Services	<u>2/16/2012</u> Date
 Glenn Normandeau, Executive Director Department of Fish and Game.	<u>3/2/12</u> Date
 George Bald, Commissioner Department of Resources and Economic Development	<u>2/27/12</u> Date

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## APPENDIX FOUR: FACT SHEETS AND EDUCATIONAL MATERIALS

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Item	Link to Item on DES Website
<i>Pamphlets</i>	
Attention Boater Pamphlet	<a href="http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/boater.pdf">http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/boater.pdf</a>
Aquarium and Water Garden Enthusiast Pamphlet	<a href="http://des.nh.gov/organization/divisions/water/wmb/exoticspecies/documents/aquarium_water_garden.pdf">http://des.nh.gov/organization/divisions/water/wmb/exoticspecies/documents/aquarium_water_garden.pdf</a>
Frightful Fourteen Pamphlet	<a href="http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/frightful_fourteen.pdf">http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/frightful_fourteen.pdf</a>
<i>Newsletter</i>	
Weed Watchin' Newsletter	<a href="http://des.nh.gov/organization/commissioner/pip/newsletters/weed_watchin/index.htm">http://des.nh.gov/organization/commissioner/pip/newsletters/weed_watchin/index.htm</a>
<i>Fact Sheets</i>	
Weed Watcher Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-4.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-4.pdf</a>
Zebra Mussel Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-4.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-4.pdf</a>
Variable Milfoil Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-23.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-23.pdf</a>
Eurasian Water Milfoil Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-24.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-24.pdf</a>
Fanwort Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-25.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-25.pdf</a>
Law Prohibits Aquatic Plants Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-40.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-40.pdf</a>
Water Chestnut Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-43.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-43.pdf</a>
Purple Loosestrife Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-45.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-45.pdf</a>
Didymo (Rock Snot) Fact Sheet	<a href="http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-61.pdf">http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-61.pdf</a>
<i>Books</i>	
Aquatic Plants and Algae of New Hampshire's Lakes and Ponds	<a href="http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-05-30.pdf">http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-05-30.pdf</a>

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## APPENDIX FIVE- EXOTIC PLANT SIGNAGE

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Sign for Infested Waterbodies



Sign for Uninfested Waterbodies

## APPENDIX SIX: EXOTIC AQUATIC PLANT CONTROL TECHNIQUES

Method	Effectiveness	Specificity to Target	Advantages	Disadvantages	Cost*
<b>Hand Pulling (Physical)</b>	Effective in removing a few individual plants at a time.	Very specific	Good for localized areas/few plants.  Plants physically removed from water body.	Labor-intensive  Good for small infestations only.  Not practical when plant growth is dense.	\$25-\$150+/diver/hour
<b>Diver Assisted Suction Harvesting (DASH)</b>	Effective in controlling exotic plants distributed in low to moderate density over a large area, or larger more dense patches in a small area	Very specific	Plants and roots physically removed from system, speeds up hand removal (but is only as good as diver)	Moderately expensive, hard to do in cobble/rocky bottom area.	\$900-\$2,000 for a team of two divers and one or two topside support staff (includes equipment use and disposal)
<b>Mechanical Harvesting (Physical)</b>	Effective in removing large amounts of vegetation at a time.	Not specific	Rapidly removes vegetation from area.  Plants physically removed from water body.	Fragments plants which could cause regrowth.  Removes native vegetation.  Could increase turbidity, ultimately affecting other aquatic life.  Does not remove rooting system.	Ranges widely depending on plant density, location, disposal, etc. Generally \$350-\$1500 per acre.
<b>Hydro-Raking (Physical)</b>	Effective in removing large amounts of vegetation at a time.	Not specific	Rapidly removes vegetation.  Removes rooting systems to prevent rapid regrowth.  Plants removed from water body.	Fragments plants which could cause regrowth.  Removes native vegetation.  Could increase turbidity.	Ranges widely depending on plant density, location, disposal, etc. Generally \$350-\$2500 per acre.
<b>Benthic Barrier: Permeable or Non-Permeable (Physical)</b>	Effective for very small areas.	Specific to areas where barrier is located  Impacts all plants under barrier	Compresses plants to sediments and prevents likelihood of fragmentation by wind, wave, or anthropogenic means.	Labor intensive.  Must be frequently cleaned/re-staked.  Plants not physically removed from water body.  May cause sediment/water anoxia.  May impact non-target species such as fish, invertebrates, and others.	\$0.60-\$1.22 per sq. foot (\$25,000-\$50,000 per acre).
<b>Chemical Treatment</b>	Systemic herbicides more effective than contact herbicides.	Most chemicals have target species for which they are most effective  Varying application rates can increase target specificity	Chemical has potential to eliminate exotic plant infestation if done at correct time and correct concentration is used.  Relatively rapid effect.  Longer time span of control than other types of control techniques.	Addition of chemical to water body.  May impact non-target species if not applied according to label restrictions.  Could be environmentally damaging if not applied to label restrictions.	Varies with chemical and size of treatment area. Could range from \$200-\$1300 per acre.
<b>Drawdown (Habitat manipulation)</b>	Somewhat effective if repeated frequently.  More effective if drawdown maintained for a long time period.	Not specific	Could control density of vegetation due to plant die-off from desiccation or freezing.  Winter drawdowns favorable.	Impacts non-target species (plants, fish, amphibians, etc.).  Devastating to entire water body ecology.	Low cost if dam or other means of drawing down water is available.
<b>Dredging (Habitat manipulation)</b>	Effective in removing plants from a localized area where dredge takes place.	Not specific	Completely removes plant material.  Removes nutrient laden sediments.  Removes seed bank.	Devastating to entire system; impacts non-target plants and animals.  Could cause excessive turbidity.  Must wait for water body to be filled again.	\$16,000-\$32,000 per acre. Previously used and successful in Milville Lake, New Hampshire.
<b>Biological Controls</b>	Effective against target plants.	Specific	Insects, bacteria, or viruses used in this method are typically specific to target plant. Their life cycles revolve around particular plant species.  Does not affect non-target species.	May cause decline in oxygen as plant material decays.  Many biological controls are themselves exotic.  Still experimental.	Cost of insects. High monitoring cost.

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## APPENDIX SEVEN: CRITERIA FOR CONTROL TECHNIQUE SELECTION

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### Preliminary Investigations

#### I. Field Site Inspection

- Verify genus and species of the plant.
- Determine if the plant is a native or exotic species per RSA 487:16, II.
- Map extent of the exotic aquatic plant infestation (area, water depth, height of the plant, density of the population).
- Document any native plant abundances and community structure around and dispersed within the exotic/nuisance plant population.

#### II. Office/Laboratory Research of Waterbody Characteristics

- Contact the appropriate agencies to determine the presence of rare or endangered species in the waterbody or its prime wetlands.
- Determine the basic relevant limnological characteristics of the waterbody (size, bathymetry, flushing rate, nutrient levels, trophic status, and type and extent of adjacent wetlands).
- Determine the potential threat to downstream waterbodies from the exotic aquatic plant based on limnological characteristics (water chemistry, quantity, quality as they relate to movement or support of exotic plant growth).

### Overall Control Options

For any given waterbody that has an infestation of exotic plants, one of four options will be selected, based on the status of the infestation, the available management options, and the technical knowledge of the DES Limnologists and other key resource managers who have conducted the field work and who are preparing or contributing to this plan. The options are as follows:

- 1) **Eradication:** The goal is to completely remove the exotic plant infestation over time. In some situations this may be a rapid response that results in an eradication event in a single season (such as for a new infestation), in other situations a longer-term approach may be warranted given the age and distribution of the infestation. Eradication is more feasible in smaller systems without extensive expanded growth (for example, Lake Winnepesaukee is unlikely to achieve eradication of its variable milfoil), or without upstream sources of infestation in other connected systems that continually feed the lake.
- 2) **Maintenance:** Waterbodies where maintenance is specified as a goal are generally those with expansive infestations, that are larger systems, that have complications of extensive wetland complexes on their periphery, or that have upstream sources of the invasive plant precluding the possibility for eradication. For waterbodies where maintenance is the goal, control activities will be performed on the waterbody to keep an infestation below a desirable threshold. For maintenance

projects, thresholds of percent cover or other measurable classification will be indicated, and action will occur when exotic plant growth exceeds the threshold.

- 3) Containment: The aim of this approach is to limit the size and extent of the existing infestation within an infested waterbody if it is localized in one portion of that waterbody (such as in a cove or embayment), or if a whole lake is infested action may be taken to prevent the downstream migration of fragments or propagules. This could be achieved through the use of fragment barriers and/or Restricted Use Areas or other such physical means of containment. Other control activities may also be used to reduce the infestation within the containment area.
- 4) No action. If the infestation is too large, spreading too quickly, and past management strategies have proven ineffective at controlling the target exotic aquatic plant, DES, in consultation with others, may elect to recommend 'no action' at a particular site. Feasibility of control or control options may be revisited if new information, technologies, etc., develop.

If eradication, maintenance or containment is the recommended option to pursue, the following series of control techniques may be employed. The most appropriate technique(s) based on the determinations of the preliminary investigation will be selected.

Guidelines and requirements of each control practice are suggested and detailed below each alternative, but note that site specific conditions will be factored into the evaluation and recommendation of use on each individual waterbody with an infestation.

#### **A. Hand-Pulling and Diver-Assisted Suction Harvesting**

- Hand-pulling can be used if infestation is in a small localized area (sparsely populated patch of up to 5' X 5', single stems, or dense small patch up to 2' X 2'). For larger areas Diver-Assisted Suction Harvesting (DASH) may be more appropriate.
- Can be used if plant density is low, or if target plant is scattered and not dense.
- Can be used if the plant could effectively be managed or eradicated by hand-pulling or DASH
- Use must be in compliance with the Wetlands Bureau rules.

#### **B. Mechanically Harvest or Hydro-Rake**

- Can not be used on plants which reproduce vegetatively by fragmentation (e.g., milfoil, fanwort, etc.) unless containment can be ensured.
- Can be used only if the waterbody is accessible to machinery.
- Can be used if there is a disposal location available for harvested plant materials.
- Can be used if plant depth is conducive to harvesting capabilities (~ < 7 ft. for mower, ~ < 12 ft. for hydro-rake).
- If a waterbody is fully infested and no other control options are effective, mechanical harvesting can be used to open navigation channel(s) through dense plant growth.



### **C. Herbicide Treatment**

- Can be used if application of herbicide is conducted in areas where alternative control techniques are not optimum due to depth, current, use, or density and type of plant.
- Can be used for treatment of exotic plants where fragmentation is a high concern.
- Can be used where species specific treatment is necessary due to the need to manage other plants
- Can be used if other methods used as first choices in the past have not been effective.
- A licensed applicator should be contacted to inspect the site and make recommendations about the effectiveness of herbicide treatment as compared with other treatments.

### **D. Restricted Use Areas (per RSA 487:17, II (d))**

- Can be established in an area that effectively restricts use to a small cove, bay, or other such area where navigation, fishing, and other transient activities may cause fragmentation to occur.
- Can not be used when there are several “patches” of an infestation of exotic aquatic plants throughout a waterbody.
- Can be used as a temporary means of control.

### **E. Bottom Barrier**

- Can be used in small areas, preferably less than 10,000 sq. ft.
- Can be used in an area where the current is not likely to cause the displacement of the barrier.
- Can be used early in the season before the plant reaches the surface of the water.
- Can be used in an area to compress plants to allow for clear passage of boat traffic.
- Can be used in an area to compress plants to allow for a clear swimming area.
- Use must be in compliance with the Wetlands Bureau rules.

### **F. Drawdown**

- Can be used if the target plant(s) are susceptible to drawdown control.
- Can be used in an area where bathymetry of the waterbody would be conducive to an adequate level of drawdown to control plant growth, but where extensive deep habits exist for the maintenance of aquatic life such as fish and amphibians.
- Can be used where plants are growing exclusively in shallow waters where a drawdown would leave this area “in the dry” for a suitable period of time (over winter months) to control plant growth.
- Can be used in winter months to avoid encroachment of terrestrial plants into the aquatic system.
- Can be used if it will not significantly impact adjacent or downstream wetland habitats.
- Can be used if spring recharge is sufficient to refill the lake in the spring.
- Can be used in an area where shallow wells would not be significantly impacted.
- Reference RSA 211:11 with regards to drawdown statutes.

## **G. Dredge**

- Can be used in conjunction with a scheduled drawdown.
- Can be used if a drawdown is not scheduled, though a hydraulic pumping dredge should be used.
- Can only be used as a last alternative due to the detrimental impacts to environmental and aesthetic values of the waterbody.

## **H. Biological Control**

- Grass carp cannot be used as they are illegal in New Hampshire.
- Exotic controls, such as insects, cannot be introduced to control a nuisance plant unless approved by Department of Agriculture.
- Research should be conducted on a potential biological control prior to use to determine the extent of target specificity.

## APPENDIX EIGHT: SFY 2009-2012 BUDGET SUMMARY

<b>Summary of SFY 2009 revenues and expenditures for 1430 by Class and Program</b>				
July 1, 2008 through June 30, 2009				
	<b>Clean Lakes</b>	<b>Exotics Control</b>	<b>Exotics Prevention</b>	<b>Totals</b>
	<b>(L)</b>	<b>(M)</b>	<b>(P)</b>	
<i>Revenue from boat registrations</i>				
fee (\$/boat)	\$0.50	\$1.50	\$3.00	\$5.00
Income	\$48,990.10	\$145,709.25	\$289,643.00	\$484,342.35
<b>EXPENSES</b>				
<b>1. Personnel &amp; related costs</b>				
10-full-time salary	\$25,799.25	\$25,384.66	\$56,490.75	\$107,674.66
18-overtime	\$904.05	\$9,129.36	\$2,626.44	\$12,659.85
22-rental prop	\$4,900.00	\$5,225.00	\$0.00	\$10,125.00
26-membership fees	\$110.00	\$257.00	\$0.00	\$367.00
27-transfers to OIT	\$5,530.22	\$5,031.98	\$0.00	\$10,562.20
28-rent	\$6,805.85	\$3,384.90	\$0.00	\$10,190.75
40-indirect costs	\$1,230.57	\$1,908.94	\$1,742.49	\$4,882.00
42-Add'l Fringe	\$1,455.30	\$2,250.73	\$2,919.97	\$6,626.00
49-DAS, Sec, EAP	\$6,028.29	\$1,500.00	\$0.00	\$7,528.29
50-intern salary	\$4,236.23	\$5,827.57	\$0.00	\$10,063.80
60-staff/intern benefits	\$16,367.17	\$16,203.90	\$32,431.67	\$65,002.74
70-in-state travel	\$5,211.41	\$2,866.53	\$0.00	\$8,077.94
80-out-of-state travel	\$2,854.53	\$763.27	\$0.00	\$3,617.80
<b>Total</b>	<b>\$81,432.87</b>	<b>\$79,733.84</b>	<b>\$96,211.32</b>	<b>\$257,378.03</b>
<b>2. Lab/field/outreach materials</b>				
20-supplies	\$9,651.76	\$7,790.56	\$0.00	\$17,442.32
30-equipment	\$299.00	\$5,098.14	\$0.00	\$5,397.14
<b>Total</b>	<b>\$9,950.76</b>	<b>\$12,888.70</b>	<b>\$0.00</b>	<b>\$22,839.46</b>
<b>3. Pass through by contracts</b>				
73-contracts	\$0.00	\$68,616.00	\$216,938.54	\$285,554.54
<b>Total Expenses</b>	<b>\$91,383.63</b>	<b>\$161,238.54</b>	<b>\$313,149.86</b>	<b>\$565,772.03</b>
<b>Ratios program category:total expenses (%)</b>				
Personnel	89%	49%	31%	45%
Lab/field/outreach	11%	8%	0%	4%

Summary of SFY 10 Revenues and Expenditures for 1430 by Class and Program  
 July 1, 2019 through June 30, 2010

	(L)	(M)	(P)	
<i>Revenue from boat registrations</i>				
fee (\$/boat)	\$0.50	\$3.00	\$4.00	\$7.50
Income	\$457,492.91	\$96,408.94	\$128,194.49	\$682,096.34
<b>EXPENSES</b>				
<b>1. Personnel &amp; related costs</b>				
10-full-time salary	\$46,977.00	\$20,437.50	\$45,411.75	\$112,826.25
18-overtime	\$859.54	\$11,858.93	\$430.80	\$13,149.27
22-rental prop	\$8,566.69	\$8,166.67	\$0.00	\$16,733.36
24-Maint other then bldgs	\$0.00	\$150.00		
26-membership fees	\$110.00	\$105.00	\$0.00	\$215.00
27-transfers to OIT	\$2,201.40	\$9,304.38	\$1,716.03	\$13,221.81
28-rent	\$1,127.64	\$5,169.92	\$0.00	\$6,297.56
40-indirect costs	\$2,345.34	\$2,299.88	\$1,351.91	\$5,997.13
42-Add'l Fringe	\$3,000.28	\$4,273.35	\$1,778.85	\$9,052.48
49-DAS, Sec, EAP	\$3,080.18	\$3,995.60	\$67.22	\$7,143.00
50-intern salary	\$3,800.66	\$7,077.67	\$0.00	\$10,878.33
59-Full time temp	\$586.05	\$1,387.03	\$273.50	\$2,246.58
60-staff/intern benefits	\$23,061.36	\$14,335.83	\$37,031.95	\$74,429.14
66-Employee Training	\$395.00	\$0.00	\$35.00	\$430.00
70-in-state travel	\$226.24	\$434.88	\$0.00	\$661.12
80-out-of-state travel	\$617.72	\$1,962.26	\$0.00	\$2,579.98
<b>Total</b>	<b>\$96,955.10</b>	<b>\$90,958.90</b>	<b>\$88,097.01</b>	<b>\$276,011.01</b>
<b>2. Lab/field/outreach materials</b>				
20-supplies	\$6,722.18	\$17,133.82	\$62.06	\$23,918.06
30-equipment	\$0.00	\$1,115.31	\$0.00	\$1,115.31
<b>Total</b>	<b>\$6,722.18</b>	<b>\$18,249.13</b>	<b>\$62.06</b>	<b>\$25,033.37</b>
<b>3. Pass through by contracts</b>				
73-contracts	\$0.00	\$41,238.01	\$164,377.75	\$205,615.76
<b>Total Expenses</b>	<b>\$103,677.28</b>	<b>\$150,446.04</b>	<b>\$252,536.82</b>	<b>\$506,660.14</b>
<b>Ratios program category:total expenses (%)</b>				
Personnel	94%	60%	35%	54%
Lab/field/outreach	6%	12%	0%	5%

# Summary of SFY 2011 revenues and expenditures for 1430 by Class and Program

July 1, 2010 through June 30, 2011

	Clean Lakes	Exotics Control	Exotics Prevention	Totals
	(L)	(M)	(P)	
<i>Revenue from boat registrations</i>				
fee (\$/boat)	\$0.50	\$3.00	\$4.00	\$7.50
Income	\$45,590.36	\$272,654.93	\$362,687.03	\$680,932.32
<b>EXPENSES</b>				
<b>1. Personnel &amp; related costs</b>				
10-full-time salary	\$114,304.50	\$0.00	-\$0.50	\$114,304.00
18-overtime	\$0.00	\$12,725.03	\$0.00	\$12,725.03
22-rental prop	\$0.00	\$14,000.04	\$0.00	\$14,000.04
24-maintenance-other	\$0.00	\$150.00	\$0.00	
26-membership fees	\$0.00	\$220.00	\$0.00	\$220.00
27-transfers to OIT	\$0.00	\$13,576.07	\$0.00	\$13,576.07
28-rent	\$0.00	\$6,326.82	\$0.00	\$6,326.82
40-indirect costs	\$444.97	\$2,542.70	\$3,369.07	\$6,356.74
42-additional fringe benefits	\$850.71	\$4,861.20	\$6,441.09	\$12,153.00
49-DAS, Sec, EAP	\$1,284.87	\$3,293.85	\$2,959.28	\$7,538.00
50-intern salary	\$2,608.08	\$8,633.14	\$0.00	\$11,241.22
60-staff/intern benefits	\$35,937.25	\$1,192.86	\$38,221.05	\$75,351.16
66-Employee Training	\$70.00	\$530.00	\$0.00	\$600.00
70-in-state travel	\$0.00	\$652.72	\$0.00	\$652.72
80-out-of-state travel	\$0.00	\$4,084.70	\$0.00	\$4,084.70
<b>Total</b>	<b>\$155,500.38</b>	<b>\$72,789.13</b>	<b>\$50,989.99</b>	<b>\$279,279.50</b>
<b>2. Lab/field/outreach materials</b>				
20-supplies	\$1,151.64	\$18,480.82	\$3,634.94	\$23,267.40
30-equipment	\$0.00	\$149.88	\$0.00	\$149.88
<b>Total</b>	<b>\$1,151.64</b>	<b>\$18,630.70</b>	<b>\$3,634.94</b>	<b>\$23,417.28</b>
<b>3. Pass through by contracts</b>				
73-contracts	\$0.00	\$103,773.80	\$141,667.00	\$245,440.80
<b>Total Expenses</b>	<b>\$156,652.02</b>	<b>\$195,193.63</b>	<b>\$196,291.93</b>	<b>\$548,137.58</b>
<b>Ratios program category:total expenses (%)</b>				
Personnel	99%	37%	26%	51%
Lab/field/outreach	1%	10%	2%	4%

**Summary of SFY 2012 Revenues and Expenditures for 1430 by Class and Program**  
**July 1, 2011 through June 30, 2012**

	Clean Lakes (L)	Exotics Control (M)	Exotics Prevention (P)	Totals
<b>Revenue from Boat Registrations</b>				
<b>Fee (\$/boat)</b>	\$0.50	\$3.00	\$4.00	\$7.50
<b>Income</b>	\$47,569.64	\$284,001.47	\$378,432.56	\$710,003.67

**EXPENSES**

**1. Personnel & Related Costs**

<b>10 - Full-time salary</b>	\$55,781.25	\$0.00	\$63,196.50	\$118,977.75
<b>18 - Overtime</b>		\$3,312.50	\$5,047.25	\$8,359.75
<b>22 - Rental Property</b>		\$14,000.04	\$0.00	\$14,000.04
<b>24 - Maintenance, Other</b>		\$300.00	\$0.00	\$300.00
<b>26 - Membership Fees</b>		\$265.00	\$0.00	\$265.00
<b>27 - Transfers to OIT</b>		\$7,184.26	\$0.00	\$7,184.26
<b>28 - Rent</b>		\$5,917.75	\$0.00	\$5,917.75
<b>40 - Indirect Costs</b>	\$647.12	\$15,028.08	\$4,899.66	\$20,574.86
<b>42 - Additional Fringe Benefits</b>	\$669.30	\$3,824.59	\$5,067.57	\$9,561.46
<b>49 - Transfers to other Agencies</b>		\$56.00	\$0.00	\$56.00
<b>50 - Intern Salary</b>	\$7,137.24	\$8,166.48	\$0.00	\$15,303.72
<b>60 - Staff/Intern Benefits</b>	\$33,382.02	\$1,578.12	\$35,440.70	\$70,400.84
<b>66 - Employee Training</b>		\$1,450.00	\$0.00	\$1,450.00
<b>70 - In-State Travel</b>		\$734.18	\$0.00	\$734.18
<b>80 - Out-of-State Travel</b>		\$1,770.41	\$0.00	\$1,770.41
<b>Total</b>	\$97,616.93	\$63,587.41	\$113,651.68	\$274,856.02

**2. Lab/Field/Outreach Materials**

<b>20 - Supplies</b>	\$810.10	\$38,156.40	\$70.79	\$39,037.29
<b>30 - Equipment</b>		\$9,971.39	\$0.00	\$9,971.39
<b>Total</b>	\$810.10	\$48,127.79	\$70.79	\$49,008.68

**3. Pass through by Contracts**

<b>73 - Contracts</b>	\$0.00	\$174,743.50	\$180,700.00	\$355,443.50
<b>Total</b>	\$0.00	\$174,743.50	\$180,700.00	\$355,443.50

<b>Total Expenses</b>	\$98,427.03	\$286,458.70	\$294,422.47	\$679,308.20
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Ratios Program Category:Total Expenses (%)

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## APPENDIX NINE: GRANT RATING SUMMARY

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Pursuant to Env-Wq 1306.03, “the department shall review the grant applications, rank them using the prioritization criteria specified in Env-Wq 1306.04, and assign funding amounts based on available funds.”

Pursuant to RSA 487:18, project priority shall be determined by totaling the points assigned under each of the following categories:

- (a) Based on the type of infestation in the surface water, points shall be assigned as follows:
  - (1) A surface water having one or more widespread and well-established infestations shall receive one point;
  - (2) A surface water having one or more established infestations that are showing signs of spreading to uninfested portions of the waterbody shall receive 2 points;
  - (3) A surface water having one or more infestations that have remained small or localized shall receive 3 points; and
  - (4) The score for this category shall be multiplied by a weighting factor of 4;
  - (5) The score for this category shall be multiplied by a weighting factor of 4;
- (b) Based on the type of proposed treatment, points shall be assigned as follows:
  - (1) Projects where only herbicides will be used shall receive 0 points;
  - (2) Projects where herbicide treatment will be followed by non-chemical management efforts, such as hand removal or bottom barriers, shall receive one point;
  - (3) Projects where only non-herbicide controls will be used shall receive 2 points;
  - (4) Projects where a new or innovative approach will be tried shall receive 3 points; and
  - (5) The score for this category shall be multiplied by a weighting factor of 3;
- (c) Based on the type and availability of public access sites and public boat access sites, points shall be assigned as follows:
  - (1) Private ponds shall receive 0 points;
  - (2) Public bodies of water with no known access point shall receive one point;
  - (3) Public bodies of water where public access exists only as open land or beach and there is no public boat access area shall receive 2 points;

- (4) Public bodies of water where a public boat access area exists shall receive 3 points; and
  - (5) The score for this category shall be multiplied by a weighting factor of 2;
- (d) Based on the predominant use(s) of the surface water, points shall be assigned as follows:
- (1) Surface waters where less than 30% of the shorefront is developed shall receive 0 points;
  - (2) Surface waters where the surrounding land use is mostly residential and boating is predominantly small boats and canoes shall receive one point;
  - (3) Surface waters where the surrounding land use is both residential and transient and boating is a mix of large and small boats, including unmotorized boats, shall receive 2 points;
  - (4) Surface waters designated as public water supplies shall receive 3 points; and
  - (5) The score for this category shall be multiplied by a weighting factor of 2;
- (e) Based on the impact of the infestation to recreational and economic values of the surface water, points shall be assigned as follows:
- (1) Infestations in mostly-undeveloped areas of a surface water where there is little cultural impact shall receive 0 points;
  - (2) Infestations with mostly residential impacts shall receive one point;
  - (3) Infestations with impacts to residential boat access or beaches as well as to residents shall receive 2 points; and
  - (4) Infestations with impacts to commercial operations, such as marinas, public beaches, motels, restaurants, and public docks, shall receive 3 points;
- (f) Based on the impact of the infestation to ecological values of the surface water, points shall be assigned as follows:
- (1) Infestations that are physically contained and do not threaten the life cycle of native aquatic plant or animal communities shall receive 0 points;
  - (2) Infestations that are rapidly spreading and threaten the life cycle of native plant and animal communities shall receive 2 points; and
  - (3) Infestations that pose a risk to rare, threatened, or endangered plant or animal species within a surface water shall receive 4 points;
- (g) Based on the treatment history of the surface water, points shall be assigned as follows:
- (1) Projects funded within the last 2 years shall receive 0 points;



- (2) Projects not funded within the last 2 years where there was no request for funding in those 2 years shall receive one point;
  - (3) Projects not funded within the last 2 years where funding was requested and denied shall receive 2 points; and
  - (4) Projects not previously funded shall receive 3 points; and
- (h) Based on the amount of local match, points shall be assigned as follows:
- (1) Projects where the applicant proposes to provide not more than 50% match for the project shall receive 0 points;
  - (2) Projects where the applicant proposes to provide at least 50% but less than 65% match for the project shall receive one point;
  - (3) Projects where the applicant proposes to provide at least 65% but less than 80% match for the project shall receive 2 points; and
  - (4) Projects where the applicant proposes to provide 80% or more match for the project shall receive 3 points.

Source. (See Revision Note at chapter heading for Env-Wq 1300) #8703-A, eff 9-5-06; amd by #9488, eff 6-23-09