

Maine Citizens' Guide
to
Invasive Aquatic Plant Management



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Written by:

Jacolyn E. Bailey, Project Director
Maine Milfoil Initiative, Saint Joseph's College

Roberta J. Hill, Invasive Species Program Director
Maine Volunteer Lake Monitoring Program

Maine Milfoil Initiative, Saint Joseph's College
278 White's Bridge Road, Standish, ME 04084

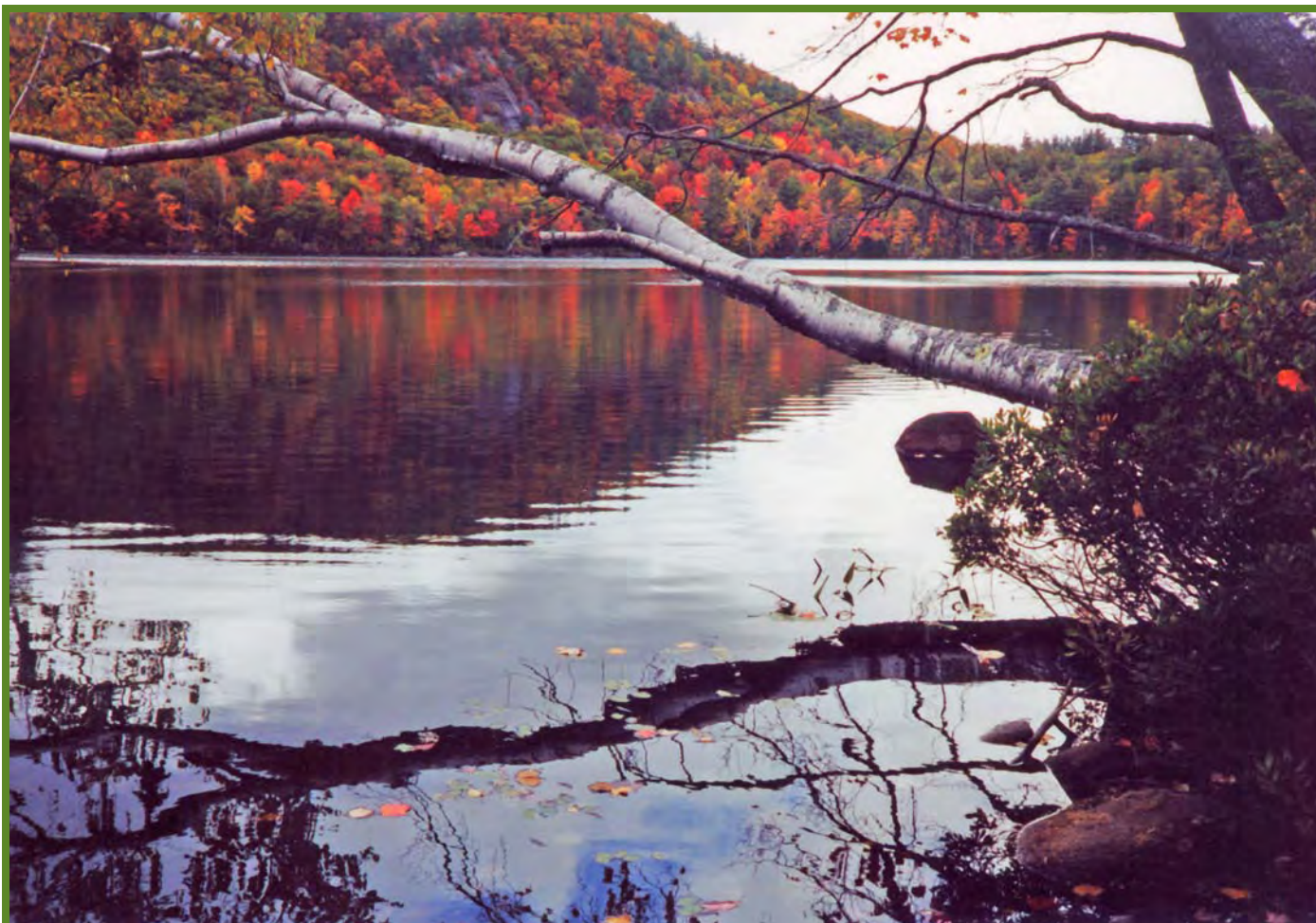
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First Edition

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For more information and updates please see: www.mainevlmp.org/citizensguide

Cover photo: Dennis Roberge.

Underwater scene of native whorled watermilfoil (*Myriophyllum verticillatum*)
and yellow perch (*Perca flavescens*) in Goose Pond, Shapleigh, Maine.



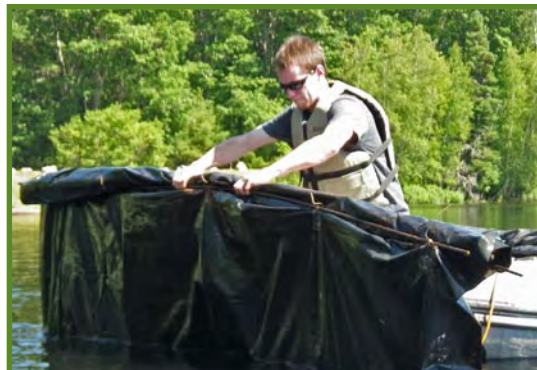
Fall on Cushman Pond, Lovell, Maine.
Photo: Mary Nelson.

Dedication

The Maine Citizens' Guide to Invasive Aquatic Plant Management is dedicated to the citizens and lake groups of Maine who have committed back-breaking labor, ingenuity, and personal financial resources to battle the spread of invasive aquatic plants on Maine's lakes. Their unflagging passion has turned the tide in the battle for the preservation of our unique and irreplaceable water resources.

and to

Liz Schran
for her commitment and extraordinary dedication to the
Maine Milfoil Initiative and all the individuals and groups involved.



Photos: Maine Volunteer Lake Monitoring Program.

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Maine Milfoil Initiative Steering Committee (L to R): Elizabeth Schran, *Saint Joseph's College*, Roberta Hill, *Maine Volunteer Lake Monitoring Program*, Peter Lowell, *Lakes Environmental Association*, Maggie Shannon, *Maine Congress of Lake Associations*, Jacolyn Bailey, *Program Director, MMI*. Absent: Carol Ann Doucette, *Little Sebago Lake*.
Photo: Saint Joseph's College.



Some of the test lake and mentoring lake participants in the *Maine Milfoil Initiative* program.
Photo: Jacolyn Bailey.

Acknowledgements

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AND LAKE GROUPS WHO MADE THIS CITIZENS' GUIDE POSSIBLE:

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The nine 'test lakes' and accompanying lake groups in the project-- Little Sebago Lake (also a steering committee member), Sebago Lake, Messalonskee Lake, Pleasant Pond, Shagg Pond/Lake Christopher, Thompson Lake, Lake Arrowhead, Hogan Pond and Collins Pond—who learned, developed and used technologies, raised funds, and shared the belief that with consistent and focused plant removal over time, aquatic plant invaders can be controlled and managed.

The reviewers that helped shape the Guide and provided valuable feedback: Christine Guerette, Debbie Hite, Leslie Latt, Peter Lowell, John McPhedran, Amy Smagula, and Ross & Bunny Wescott.

Our graphic designer, Jonnie Maloney, whose keen eye helped create a useful and attractive guide.

Preface

The intent of the *Maine Citizens' Guide to Invasive Aquatic Plant Management* is to provide the information necessary to write and implement an action plan that effectively manages invasive aquatic plant (IAP) infestations. Our objective is to make this a ready-to-use, nuts and bolts companion resource to assist lake groups in Maine and beyond.

This guide is the culmination of several years of collaborative discussion and thought. The Maine Volunteer Lake Monitoring Program (VLMP), with seed funding from the Maine Department of Environmental Protection (MEDEP), worked on the development of the initial concept. The project was not fully realized, however, until the Maine Milfoil Initiative (MMI), administered by Saint Joseph's College, launched in 2009. The MMI brought together Saint Joseph's College, three environmental organizations (Lakes Environmental Association, Maine Congress of Lake Associations, Maine VLMP), the MEDEP, and nine lake associations (Little Sebago Lake, Sebago Lake, Messalonskee Lake, Pleasant Pond, Shagg Pond/Lake Christopher, Thompson Lake, Lake Arrowhead, Hogan Pond and Collins Pond).

The program complemented the MEDEP's State Action Plan for Managing Invasive Aquatic Species and was the first to bring major federal funding (through the U.S. Fish & Wildlife Service) to the State to assist beleaguered lake groups who were battling variable watermilfoil in isolation, using scattered methods. The culmination of this program of focused education, technical assistance, training, and scientific research is this guide.

Introduction

The purpose of the *Maine Citizens' Guide to Invasive Aquatic Plant Management* is to prepare for an invasive aquatic plant infestation and effectively manage an infestation should it occur. Methods described in this guide are based upon accepted best management practices for controlling aquatic plants effectively and in a manner that protects wildlife and habitat.

Though the focus of this guide is primarily on invasive aquatic plants, much of what is discussed may be adapted to other invasive species, such as the Chinese mystery snail (*Cipangopaludina chinensis malleata*) or purple loosestrife (*Lythrum salicaria*).

Since every infestation presents a unique challenge and requires a unique approach, we have organized the guide to help you home in on the information that you will need to develop the best strategy for your unique situation.

The guide is divided into the following sections:

Section I: Case Studies – The practical information contained in the case studies provides an invaluable glimpse into possible scenarios and are therefore listed first. Each case study highlights a different challenge and illustrates the innovative solutions and lessons learned by those working on the front lines. We recommend you start here so that you may glean critical information from their experiences and insights.

Section II: Developing an Action Plan – Having well-defined goals and objectives is critical to keeping members of your group focused on what you hope to achieve. This section describes how to design an action plan that helps you stay on course and measure progress.

Section III: Organizing and Monitoring – This section covers the foundational elements that are essential to a successful project. For those looking to take a proactive role, this section will help you to prevent infestations and prepare for the possibility of future infestations. Those already dealing with an infestation will find this section helpful in addressing gaps in their existing program.

Section IV: Control Activities – This section focuses directly on the activities necessary to control invasive aquatic plant infestations.

Section V: Supplemental Information – We assume the reader has basic knowledge of the issue of IAPs, but have provided some general information in this section. You will also find resources, links for forms, and other relevant material.

We wish you well on your endeavor and welcome any feedback on the *Maine Citizens' Guide to Invasive Aquatic Plant Management*. This document will also have an online version that will be updated and amended as new information, technologies, and insights become available, and as we discover more efficient ways of preventing and managing invasive aquatic plants. We invite you to check www.mainevlmp.org/citizensguide for updates.

Section I

Case Studies



A diver emerging from a hydrilla-infested pond.
Photo: Maine Department of Environmental Protection.

CASE STUDY

Lake Arrowhead: Creative Fundraising

The Challenge

The Lake Arrowhead Conservation Council (LACC) manages the invasive aquatic plant (IAP) control efforts on Lake Arrowhead. They employ two Diver Assisted Suction Harvester (DASH) boats to target high traffic and inlet areas, with a goal of running both boats seven days a week, and also have a benthic barrier program. This aggressive strategy is effective but costly. Raising the necessary funds for one year was feasible but finding those funds for multiple years presented a challenge.

Background

Located in southern Maine, Lake Arrowhead is an 1100 acre impoundment of the Little Ossipee River. The lake has a hydro-power generating facility and borders two towns: Limerick and Waterboro. The lake is very shallow with a mean depth of six feet and maximum depth of twenty-five feet. Variable watermilfoil (*Myriophyllum heterophyllum*) has infested 60% of the lake.

LACC is led by a nine member board composed of residents of the Lake Arrowhead Community (LAC), the largest residential subdivision in southern Maine. The LACC began as an informal volunteer group focused on the invasive variable watermilfoil in Lake Arrowhead. After researching and gathering information on IAP management and education, and realizing the effort that would be needed, the LAC formed LACC, a 501c3 organization. They manage the courtesy boat inspection program, as well as the DASH and benthic barrier programs. The organization is based on memberships and generates funds through dues and other fundraising efforts.

The Approach

Recognizing that they would need significant funds to continue their control program over the long term, the LACC began finding and implementing creative ways to raise money. They pursued the usual fundraising methods with membership drives, applied to relevant foundations for grant monies, and also applied to the State of Maine's grant programs for courtesy boat inspections and aquatic plant removal efforts.

Garnering the support of the surrounding towns was undertaken by a representative of the LACC who made a PowerPoint presentation to both surrounding towns' selectboards and at the towns' budget meetings.



LACC hosts annual fundraising events including a yard sale, golf tournament, and 50/50 raffle. The local bass club sponsors a bass tournament fundraiser for LACC, which is open to the public and offers a winning prize. Their yard sale sells donated goods from area residents, baked goods, and also promotes LACC's work. These popular events are located in a high traffic areas and are publicized through print and electronic media.

The Lake Arrowhead Community has an 18-hole golf course so a tournament was a natural addition to their line-up of events. The

tournament has gained considerable interest and participation from the local golfers. Most recently, the LACC has offered a 50/50 raffle with one-half the proceeds going to the winner and one-half of the proceeds going toward plant control activities.

An on-going fundraising effort is LACC gear sales. Interested supporters may purchase t-shirts, sweatshirts, hats, and cups, all sporting the LACC logo.



The Outcome

LACC has been extremely successful with all of its fundraising endeavors and has been able to supplement funding their control activities. They are now in their sixth year of hosting their three annual events: golf, yard sale, and bass tournament. The events have not only raised the much needed funds but have also provided excellent opportunities for outreach and education.

Going Forward

LACC plans to continue its annual events and gear sales and its board members are exploring some additional fundraising ideas.

CASE STUDY

Little Sebago Lake: Engaging Lake Residents

The Challenge

Mitigation efforts are more effective when the location of aquatic invasive plant (IAP) infestations is known. When divers spend their time searching, they have less time to remove plants. Little Sebago Lake Association (LSLA) recognized that it needed to find a way to involve the boating public in finding new or reoccurring variable watermilfoil populations in order to make their removal efforts more efficient and effective.

Background

Little Sebago Lake stretches 5.5 miles in length, covers 2,009 acres and contains three distinct basins. It is surrounded by the towns of Windham and Gray and has 31 miles of shoreline. In 1999, the variable watermilfoil hybrid (*M. heterophyllum x M. laxum*) was discovered in a small western cove.

LSLA was formed in 1924 and is still leading the charge to keep Little Sebago Lake a safe, clean, stable natural resource that can be enjoyed by everyone. With the discovery of variable watermilfoil, LSLA began the task of designing an IAP management program. They were one of the first lake associations to begin such a program. They pioneered the construction of a Diver Assisted Suction Harvester (DASH) on a pontoon boat and using a sluice system. LSLA had employed the services of aquatic plant survey companies to map their infestation and recognized the value of knowing where to target their efforts.

The Approach

In order to enlist the assistance of landowners in the task of marking variable watermilfoil sightings around the lake, LSLA devised a “noodle program.” Colored pool noodles are cut into small (4-6 inch) pieces and attached to simple anchors. The markers are distributed to association members, shorefront property owners, boaters, and others. Along with their noodle markers, participants receive a flyer that explains the color-coded marking system: green noodles designate variable watermilfoil is present, yellow means that benthic barriers are deployed in the area, and red means that all the variable watermilfoil has been removed and the DASH team needs to re-check the area. After initial removal, green markers are replaced with red markers. If nothing is discovered during the re-check, the red marker is removed.



Milfoil Militia

Help us watch for milfoil in Little Sebago & keep the natural vegetation in it's place to discourage milfoil growth.

**Stop Sign “Polk-A-Dot” Campaign
Noodle Markers ~ What do they mean?**

- Milfoil Area
Do Not Enter** (Green noodle)
- Benthic Barriers
Navigational Dangers** (Yellow noodle)
- Removed Milfoil Area
Future Recheck Area** (Red noodle)

For any questions or to report milfoil sightings in your area call (LSLA) at: or email her at:



The noodle program is part of a larger campaign to raise awareness of and garner support for the LSLA's variable watermilfoil control efforts program. In addition to information about the noodle program, outreach materials (brochures, newsletter articles, website, signage, etc.) caution boaters to stay 100 feet away from DASH boat divers and provide navigational information and program updates.

The Outcome

The program has been very successful with boaters participating eagerly. Some local boaters began using high-powered lights at night to find the variable watermilfoil and put down markers. Increased fundraising resulted from the outreach. The DASH team can now concentrate on removal; patches that crop up in new areas are getting removed before they can grow and spread.

Going Forward

The LSLA continues to encourage boaters to participate in the noodle program and distributes flyers not only to residents but also to seasonal visitors and visiting boaters. As other infested lakes become interested in adopting the program, LSLA gladly shares their information.

CASE STUDY

Messalonskee Lake: Infestation Mapping

The Challenge

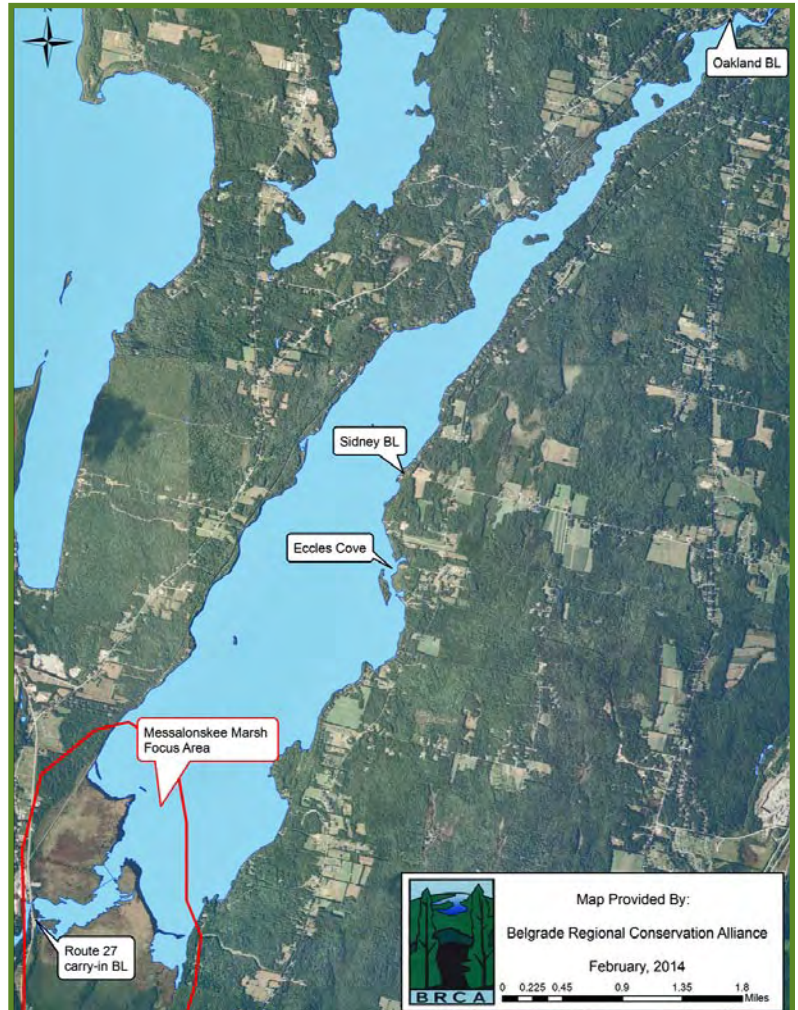
Messalonskee Lake is a significantly sized waterbody at over 3600 acres. The southern end of the lake hosts an extensive (over 1300 acres) marsh that is visited annually by many migrating birds, including several rare and uncommon species. The Belgrade Regional Lake Association (BRCA) recognized that before they could begin any mitigation effort, they needed to know where the infestations were, the type of habitat they were located in, and the recreational activity that occurred in those locations.

Background

Messalonskee Lake, also known as Snow Pond, is located in Central Maine. It is 3,691 acres, nine miles long, and surrounded by Oakland, Sidney, and Belgrade. It is one of the lakes in the Belgrade Chain. The marsh on the southern end of the lake is considered a significant wildlife habitat for waterfowl and wading birds by the Maine Department of Inland Fisheries and Wildlife. Birdwatchers come to see several uncommon species including least bitterns (*Ixobrychus exilis*), sandhill cranes (*Grus canadensis*), black terns (*Chilodonia niger*), pied-billed grebe (*Podilymbus podiceps*) and purple martin (*Progne subis*).

The Approach

In 2002, a local university instructor, and his interns, mapped the bathymetry of Messalonskee Lake and the locations of shoreline invasive variable watermilfoil infestations. They resurveyed the lake four years later, in 2006, to determine if there were any new infestation and whether the existing infestations had spread. BRCA enlisted their assistance to do an updated survey in 2010.



The Outcome

At the conclusion of the 2010 survey, the university provided BRCA with detailed maps of the location, size, and density of infested areas, as well as the lake's bathymetry. BRCA used this information to determine where to concentrate their control activities and what type of method would be appropriate for each location. BRCA was able to start efficient mitigation work based on the maps.

Going Forward

At this time there is no plan to have another full survey conducted by the professor and his students. However, surveys are underway by volunteers and control crews.

CASE STUDY

Pleasant Pond: Establishing Priorities

The Challenge

Pleasant Pond is shallow, almost completely infested, and a magnet for anglers and boaters. The Friends of Cobbossee Watershed (FOCW) realized that they needed to find a way to prioritize their approach to managing their infestation.

Background

Pleasant Pond, located in the Kennebec Valley region of central Maine in the towns of Gardiner, Litchfield, West Gardiner, and Richmond, has a 217 square mile drainage basin which is also part of the greater Cobbossee Watershed. The pond, an impounded stream channel, covers 797 acres, is approximately five miles long, and has a mean depth of seven feet. With three popular public boat launch sites and an active sport fishery, the pond is highly valued by surrounding communities and is a major contributor to the local economy. Such popularity also means the pond has substantial boat traffic. Variable watermilfoil (*Myriophyllum heterophyllum*) has become established throughout a significant portion of the pond, which is part of a larger infestation sprawling roughly 18 miles of interconnected waterway via Cobbossee Stream. Pleasant Pond consists of two basins: Upper Pleasant Pond (or Mud Pond) and Lower Pleasant Pond.



Benthic barriers have been intensively used in the area around the causeway between Upper and Lower Pleasant, where two of the pond's three public boat landings occur and where boat activity is heavily concentrated.

Photo: Friends of Cobbossee Watershed.

Incorporated in 2001, the FOCW has experienced significant growth. Its innovative approach towards outreach, program development and constituency-building has attracted local, regional and national recognition. Since 2004, FOCW has overseen invasive aquatic plant (IAP) efforts for the entire Cobbossee Watershed, including Pleasant Pond.



Bright yellow buoy markers warn boaters to use caution as they approach a heavily infested area.

Photo: Friends of Cobbossee Watershed.

The Approach

Beginning in 2005, the primary means of keeping boats out of plants was the strategic use of benthic barriers, manual removal and the placement of buoy markers. Benthic barriers have been intensively used in the area around the causeway between Upper and Lower Pleasant, where two of the pond's three public boat landings occur and where boat activity is heavily concentrated. The result has been a noticeable reduction in variable watermilfoil growth and fragmentation in the boat launch areas.

In 2010, the FOCW built a Diver Assisted Suction Harvester (DASH) unit and focused their removal efforts on: 1) a massive patch at the southern end of the pond where boats enter a channel that leads to a fourth "unofficial" boat landing; and 2) upstream portions of Cobbossee Stream (in particular the most heavily-travelled channels) where the aim is to reduce the occurrence of fragmentation in the stream and to slow the migration of variable watermilfoil fragments into Pleasant Pond.



In the effort to reduce boat/plant contact, much focus has been placed upon controlling the infestation at the public boat ramps. Here signage informs boaters that the launch site is temporarily closed, allowing the control work to proceed safely without interruption.
Photo: Friends of Cobossee Watershed.

The Outcome

After a steep learning curve with the DASH, FOCW is now making noticeable progress in Pleasant Pond. They have also developed an interactive Google Earth based map showing both the extent of the infestation and the progress that is being made in controlling it. As the result of nearly a decade of hard work, variable watermilfoil growth in Pleasant Pond has been reduced, and according to Tamara Whitmore, FOCW Executive Director, “we can now show this result to members of our community! Town officials, shorefront property owners, anglers and others can now track FOCW efforts to open channels, minimize boat/plant contact, and slow the migration of fragments from upstream infested waters. This in turn has led to more active engagement on the part of the towns and community members, and this increased involvement will help us make further progress.”

The successful strategy of minimizing boat/plant contact continues. In the future, FOCW will focus on smaller, newer, more remote infested areas. They will step up efforts to recruit more local volunteers in IAP surveys and mapping. They will also develop a Rapid Response Team to control new pioneer plants and plant patches before larger areas are infested.

CASE STUDY

Sebago Lake: Community Collaboration

The Challenge

Sebago Lake is a large waterbody with a well-established infestation of variable watermilfoil (*Myriophyllum heterophyllum*). Due to its immense size and lack of a single, overarching property owners' association on Sebago, a coordinated, collaborative effort to tackle the lakewide infestation has not occurred. Instead, a number of smaller property-owners associations and lake groups have taken on the task of controlling the infestation to the best of their abilities in their immediate areas, with mixed results.

Background

Sebago Lake is located in the Western Lakes Region of Maine and is the deepest and second largest lake in the State, with a surface area covering approximately 45 square miles (29,992 acres), a length of 12 miles, and a shoreline length of 105 miles. Sebago has shore frontage in seven towns (Casco, Naples, Raymond, Sebago, Standish, Windham and Frye Island), and is connected to nearby Brandy Pond and Long Lake by way of a popular route through the Songo River, with a historic lock system. Supporting a State Park, numerous resorts, marinas, and summer camps, Sebago Lake is one of the busiest waterbodies in Maine, visited by approximately 8000 boaters annually. It is also the primary water supply for Greater Portland, the largest metropolitan area in Maine. Variable watermilfoil populations have been found in 18 locations around the lake, including most of Sebago's major tributaries and several prominent inlet coves.

The Lakes Environmental Association (LEA) has been working in the upper Songo (north of the Songo Lock) and Brandy Pond for the last nine years. They use a Diver Assisted Suction Harvesting (DASH) boat, hand harvesting and benthic barriers in these areas and have been quite successful. Although they have not yet reached full eradication, the infestations in the upper Songo and Brandy Pond have been reduced significantly. LEA has supported their efforts through municipal, private, and state agency grants, but has fallen short of actual annual costs so their efforts are proving not to be economically sustainable. One challenge is that the Songo River below the lock still has dense variable watermilfoil populations that are not being controlled. Every time a boat comes up through the lock there is a chance of fragments being released into the newly controlled areas.



Every time a boat comes up through the lock there is a chance of fragments being released into the newly controlled areas.

The Raymond Waterways Protective Association (RWPA) was formed to preserve the water quality of all lakes in the Raymond area. On Sebago Lake, their focus has been the northeast area of the lake around Panther Run. Prior to 2009 RWPA had conducted some benthic barrier work in the Jordon River and Panther Run cove of Sebago Lake with the help of volunteers. They also hired a commercial DASH operator to come in for a few days of harvesting.

Save Sebago Cove (SSC) was formed by a concerned group of shorefront property owners in response to the variable watermilfoil infestation in Sebago Cove, a large inlet cove located along the northern shore of Sebago

Lake. Initial efforts to control the infestation included installing several benthic barriers and marking a navigation channel with variable watermilfoil caution buoys.

The Approach

In 2009, LEA, RWPA and SSC formed the Sebago-Brandy Partnership Project. Forming this alliance has allowed the group to apply jointly for grant funding, take advantage of large purchase discounts, share equipment, expertise and technology, and create a more holistic and sustainable model for controlling the lakewide infestation.

The Outcome

The Sebago-Brandy Partnership Project was awarded the MMI grant which provided funds for the purchase of equipment to build two new DASH boats, one for RWPA and one for SSC, as well as funds to run all three groups' control programs for a year.

LEA continued to work on the upper Songo River above the Songo Lock and Brandy Pond, making good headway and bringing the infestation to controllable populations. Recognizing that all their hard work would be in vain if the lower Songo River was not cleaned up, they began talks with the State and relevant stakeholders about option to keep any fragments below the lock at bay. Many ideas were discussed and considered, including the closing of the Songo Lock. Realizing that the lower Songo River needed to be controlled in order to preserve the area above the locks, LEA began looking for funding in order to undertake this additional project.

RWPA was able to purchase the needed equipment to build a DASH boat and began their DASH removal program with 40 operation days in the first season. In addition they installed 20 benthic barriers and hand removed for a few days in areas with scattered variable watermilfoil growth. However, due to the fact that the MMI grant was only for one year, the following years the RWPA was not able to run the DASH boat for as many days and has had a challenging time finding additional funding.

SSC was also able to purchase the needed equipment to build a DASH boat and almost 9 tons of plants were removed the first year. Although good progress was made, in order to continue the effort SSC needed to raise additional funds. They did so through a membership drive and a "pay-to-play" program. The "pay-to-play" program consisted of a fee that residents around the cove paid to have the DASH boat work in front of their camp. Part of the fee was also used to cover the expense of DASH in more general use areas as well. Although this system worked well to garner support and get the word out about their work, it also meant that there was less of a strategic approach to their removal efforts. SSC also realized that to sustain their efforts over the long term they needed additional funding resources.

After the successful MMI grant partnership the three groups recognized that, although individually successful, they would need to pull in the other organizations around Sebago Lake to make more progress.

Going Forward

As of this writing, the initiative is continuing its outreach efforts around the lake and coordinating mitigation efforts. To address this need, members of the Sebago Brandy Partnership Project began to focus their attention on the task of forging a broader lake-wide alliance. To kick off their newly envisioned *Sebago Lake Milfoil Initiative*, a Sebago Lake Summit was organized and widely publicized around the lake and beyond. Summit attendees were encouraged to actively participate in the establishment of management, funding, and operational goals for the initiative, and an enormous amount of interest was generated through this lively group-think process. Objectives defined and discussed by the 80 people who attended the meeting are beginning to coalesce and the prospect of more effective collaborations on Sebago Lake is promising.

CASE STUDY

Shagg Pond: Technology Innovation

The Challenge

Each lake involved in invasive aquatic plant (IAP) control has a unique set of circumstances and characteristics which drives innovation in strategy and technology. The Community Lakes Association (CLA) had limited financial resources and needed to find the most economical and efficient way to remove the variable watermilfoil (*Myriophyllum heterophyllum*) populations in Shagg Pond.

Background

Shagg Pond is located in the Western Foothills region of Maine and is relatively small. Roughly forty percent of Shagg Pond's 46 acres are littoral and just over ½ acre is infested with variable watermilfoil. The variable watermilfoil in Shagg tends to be fairly deep, in depths ranging from four to ten feet, and rooted in a substrate of compact sand. There is public access and light recreational fishing on the pond but the surface use is rarely high volume, with holidays being the possible exception.

CLA was organized in 1986 to help protect the health and beauty of a cluster of eleven lakes and ponds (including Shagg) in the towns of Woodstock and Greenwood. CLA became involved in the issue of invasive aquatic plants in 2002 when two patches of variable watermilfoil were found in Lake Christopher (also known as Bryant Pond). Surveys of all ponds in the area in 2003 revealed an additional infestation in nearby Shagg Pond, where the growth was much more extensive and infested areas ranged in size from scattered individual plants to large patches.

The Approach

CLA began by controlling the variable watermilfoil in Shagg Pond with manual harvesting and benthic barriers. Hand harvesting alone in the larger patches proved nearly futile. "You'd never get it all, and it was way too time consuming," says Jim Chandler, who runs CLA's removal program and is the primary source of variable watermilfoil control innovation for the group. Jim therefore began researching benthic barriers and how they were constructed and used in other states.

CLA purchased benthic barriers that were available through a commercial supplier and gleaned the design concepts needed to begin making their own barriers at a lower cost. The initial barriers constructed were 10' x 10' and made out of geotextile fabric. The barriers worked and were durable but they were also heavy, cumbersome and still somewhat expensive.

Determined to find an even more economical option, Jim and his crew started building new barriers out of 6-mil plastic. The material was far lighter, easier to handle, and—at about ten-cents per square-foot—roughly half the cost of the former geotextile design. Because the plastic was lightweight, the barriers could be made bigger (10' x 40') yet still were easier to construct, deploy, and manage in the water. A 10' x 40' barrier could be built from start to finish in thirty-six minutes and in a four-hour period the crew could lay twenty mats. Because the new barriers were more maneuverable, it was easier for the crew to place the barriers in a more consistent pattern and to obtain a better overlap between adjoining mats. The slippery plastic was also less likely to be colonized by algae and plants.



Jim Chandler with CLA's modified ATV winch mat-winder. This system, though somewhat finicky, was an improvement over the earlier bicycle crank-winder.
Photo: Jim Chandler.

The difficulty was removing the barriers. Hauling a 10' x 40' barrier out of the water took a lot of physical exertion and so Jim and crew developed a hand-crank system from old exercise-bike parts attached to a row boat by a wooden frame. The crank system improved efficiency, but it still took nearly one hour to remove a single barrier. The next year the exercise bike crank was

replaced with a modified ATV winch. This new system, though somewhat finicky, was an improvement, but only ten barriers could be pulled in a four-hour period.

CLA also purchased equipment to build a Diver Assisted Suction Harvester (DASH). CLA's DASH uses a single basket lined with mesh to collect the harvested plants. As CLA does not have access to a dock, nor a large machine or winch system to remove the baskets, their design uses milk crates to catch the harvested variable watermilfoil. These crates are emptied into two 32-gallon garbage cans on the boat. At the end of the day, the crew drags and lifts the cans into the back of an SUV and takes them to a nearby 4-H camp where the plants are composted. During the second year of DASH removal, a modification was made to the DASH pontoon boat that provided a more efficient way to remove their benthic barriers. The DASH was outfitted with a winchable platform made of aluminum mesh and aluminum angle bracing. This lightweight platform can be moved up and down with cables and an electric winch that is operable from the deck of the boat. The platform can be lowered as far as ten feet but usually is deployed to five feet. Using the buoyancy of water to facilitate the process, divers roll up a barrier underwater and then swim it over to the submersed platform. For barriers that are being redeployed, the platform is raised about a foot below the water surface then driven to the new location. If barriers are being removed for cleaning or repair, the platform is raised entirely out of the water into the space between the two pontoons and brought to shore for offloading. To better accommodate this new design Jim and crew have started making slightly smaller 10' x 25' barriers.



As CLA does not have access to a dock, nor a large machine or winch system to remove the baskets, their design uses milk crates to catch the harvested variable watermilfoil.

Photo: Jim Chandler.

The Outcome

The outcome of CLA's plant removal in Shagg Pond has been mixed. Although a great deal of variable watermilfoil has been removed, new patches have started appearing. While the crew was concentrating on the largest patches of dense growth, individual plants and small patches were exploding under the radar. "Think about it this way," says Jim. "A single plant takes about two years to become ten feet tall. When a plant grows to this size it becomes flaccid. At the end of the season the tall stems lie down and new roots shoot out into the sediment all along each stem. The following season, where there had formerly been a single plant, there is now a thick patch 20 feet in diameter." The infestation on Shagg Pond has grown from just over ½ acre to about 3 acres despite intense control activity.



CLA's DASH has been outfitted with a winchable platform, made of aluminum mesh and aluminum angle bracing, a lightweight platform that can be moved up and down with cables and an electric winch that is operable from the deck of the boat.

Photo: Jim Chandler.

Jim and his crew learned valuable lessons from this experience:

1. No matter how clever the tools one uses for controlling IAP, a clear strategy is needed to win the battle. Control of the individual plants and small patches is equally important to controlling more densely infested areas. If resources are limited, the objective for large infested areas may be to keep them in check rather than eradication. Then resources could be used for rapid response to new growth on individual plants and small patches.
2. A good strategy for controlling large patches with benthic barriers is to place a series of barriers in a continuous band around the outside border of the patch. After 45-60 days the barriers are moved inward to form the next "band." This cinching process is repeated as many times as is required to control the patch.
3. Deploying benthic barriers is more challenging in deeper water, but the increased water pressure helps the barriers stay down better.

CASE STUDY

Thompson Lake: Informing the Public

The Challenge

Thompson Lake has likely been infested with variable watermilfoil (*Myriophyllum heterophyllum*) for at least 20 years. But, it wasn't until 2007, with the release of the Maine Department of Environmental Protection's 'Infested Maine Public Waters' map and brochure, that the Thompson Lake Environmental Association (TLEA) recognized they needed to formally adopt a mitigation program. In order to raise awareness and generate much needed funding, TLEA knew they would have to educate the landowners, boaters, and town governments that surrounded the lake.

Background

Situated in Maine's western lakes region, Thompson Lake covers 4,426 acres and is eleven miles long, two miles wide. It is surrounded by the towns of Casco, Otisfield, Oxford, and Poland. Thompson is one of the clearest lakes in the State and is spring fed by the Poland Spring aquifer. There are 1,200 homes in the greater Thompson Lake area. Variable watermilfoil infests seven discrete areas in the lake with two of the seven populations being especially dense and extensive.

The TLEA was formed in 1971 by lake citizens concerned with maintaining the lake's exceptional quality water and environment. TLEA is an active force for lake conservation in the area, leading the way on a number of issues including: water quality monitoring, public education, identifying and solving soil erosion problems, encouraging Best Management Practices around the lake and in the watershed, preventing the spread of IAPs and, more recently, implementing IAP control activities.

The Approach

To educate local residents and also raise funds to finance their variable watermilfoil mitigation efforts, TLEA conducted door-to-door solicitation, sent out an extensive mailing, and met with town officials to gain their support. The association has created a website to highlight the organization's variable watermilfoil prevention and mitigation work, and also produces a quarterly publication that is mailed to landowners around the lake.



TLEA formed a variable watermilfoil steering committee to plan strategies for mitigation, education and outreach. The directors routinely meet with town boards of selectmen, town managers, and conservation committees to maintain good relationships and promote association concerns.

They provide speakers for school graduation and award assemblies, and host an annual meeting of the general membership to provide a forum for discussion of concerns about

the lake. They regularly provide press releases to area newspapers and have encouraged area TV broadcasters to observe and report on their programs.

TLEA's active lake monitors return annually to survey for invasive aquatic plants. They also serve as ambassadors for the variable watermilfoil program by providing general information on TLEA and updates on control activities and educational programs to interested landowners during their aquatic plant surveys.

The Outcome

TLEA has been very successful in its outreach efforts. They have been able to secure funds to run their mitigation efforts, starting first with hand removal and benthic barriers and then adding a DASH boat to the program in 2008. They have a number of projects that require volunteer surveyors and have succeeded in recruiting a large number of individuals, including some town residents that aren't TLEA members, to participate.

Going Forward

TLEA is continuing its robust public education efforts through a continued online presence, publications, events and meetings with town officials. They also continue to solicit new members into the association, currently over 500 members strong.

Section II

Developing an Action Plan



A pile of variable watermilfoil fragments collected from a camp owner's shoreline.
Photo: Maine Volunteer Lake Monitoring Program.

Section II: Developing an Action Plan

An action plan includes project goals, strategies, objectives and activities. The action plan is a working document that will require annual review to determine if tasks have been implemented, how well the program is working, and whether modifications are needed.

Topics Covered:

- Developing project goals
- Developing a list of activities and the tasks needed to accomplish them
- Keeping your action plan current
- Step-by-step guide to writing the action plan

Well-defined goals and objectives keep members of your management team focused on what you ultimately want to achieve. It is easy to get side-tracked by tasks that will not directly contribute to your program goals. A clearly defined action plan helps you avoid diluting the limited time, money and other resources you need to reasonably accomplish your program.

We recommend that an action plan be developed for a five-year time span. This is long enough to provide for the development of reasonable long-term goals, and short enough to be realistic. Annual updates are critical to keep pace with inevitable changes in local conditions and in the science of invasive aquatic plant management.

The ideal action plan includes a text description of the thought process that helped you set the goals and objectives and a description of the current situation. The plan is the core component of your overall management program and the foundation of your operational and monitoring programs.

A management team consists of all the individuals involved in a management effort (divers, boat operators, boat crew, courtesy boat inspectors, volunteers, IAP steering committee members). The IAP steering committee is a sub-set of the management team that provides guidance and keeps the team focused.

Developing project goals and expected outcomes

A goal is a formal statement that details the desired impact of the management. It should describe the desired future state of the habitat you wish to manage, should be ambitious but realistic and have these three elements:

- 1) **specific:** a clearly defined goal allows all people involved in a program to have the same understanding of what the terms in the goal mean,
- 2) **measurable:** definable in relation to numbers or percentages, and
- 3) **time-limited:** achievable within a specific time period.

A well-defined goal ensures that your management team has an explicit understanding of the program and how you want to achieve your management goals. Below are two examples of management goals:

Goal 1: Remove hydrilla from Pickerel Pond.

Goal 2: By 2020, the hydrilla infestation in Pickerel Pond will be reduced 50% or more by using Diver Assisted Suction Harvesting and Benthic Barrier techniques.

Goal 1 gives you a general understanding of what the management program is trying to do but the specifics of how to get there and how to judge your progress are absent. Goal 2 is very clear and provides a measurable outcome that can be used to determine progress in the management program. You should strive for goals that are structured like Goal 2.

How to develop goals

During the process of goal-setting it is important to give yourselves lots of time to brainstorm. However, it is also important to have an agenda for each meeting which is followed. Having a white board or easel pad to jot down brainstorming ideas is often very helpful. The following six steps can be used at an IAP steering committee meeting (or likely multiple meetings) to assist with the process of creating goals.

1. Choose one of the topics (e.g.: surveying your lake, determining manual control strategies) and think about what should be represented in a goal. It is likely that you will set multiple goals for each topic but for this exercise just choose one.

2. Write a brief description of the desired future condition of your topic. Keep in mind the three elements of a goal mentioned above but don't worry too much about fulfilling all of them right now. An example initial draft goal might read:

“Variable watermilfoil infestations will be reduced and native species restored on Shagg Pond.”

3. Review the three elements for a good goal and determine whether your goal meets them. Using the example above, the IAP steering committee would ask:

Is it specific? No, it is not clear what is meant by “restored.”

Is it measurable? No, it is not clear how you would measure “reduced.”

Is it time-limited? No, the goal statement does not specify a time period.

4. Modify your draft goal as needed to make sure it meets the three elements of an effective goal. For the example we are using, you would need to make it more specific, measurable, and time-limited. The second draft might read as follows:

“By 2023, the variable watermilfoil infestation on Shagg Pond will be reduced by 70% and native communities will have healthy populations of key species.”

This new draft goal is getting closer to meeting all three of the goal elements, as it is time limited and slightly more specific and measurable.

5. Repeat Steps 3 and 4 as needed. Although the new draft goal is closer to meeting the three elements, it could be made more specific and measurable by stating what part of the lake is of concern, how many native plants there are and what is meant by “healthy population of key species.” The third draft might read:

“By 2023, the variable watermilfoil infestation on Shagg Pond will be reduced by 70%, native plants returned to at least 30% of their original habitat, and the pond will contain healthy populations of native plant and fish species (plants: white waterlily, spatterdock; fish: brook trout, salmon, spotted sunfish and pickerel).”

It is likely that you will lack some information you need when you define your goal. Simply, indicate the information gaps in your goal and have a plan to gather the needed information.

6. Repeat Steps 1 through 5 for each of the topics in Sections III and IV, as needed.

Examples of goals

Topic: Fundraising

Example of poorly-defined goal: By 2020, Community Lakes Association will raise enough money to fund its IAP Management Program.

Example of well-defined goal: By 2020, Community Lakes Association will raise \$30,000 each year through a targeted program of grant applications to relevant foundations and organizations, host 3 annual fundraisers (a mail campaign, pot-luck dinner and milfoil days picnic), and obtain support from surrounding towns (Woodstock, Peru, Dixfield).

Topic: Building program support

Example of poorly-defined goal: Lake Arrowhead Conservation Council will work to increase awareness of the variable watermilfoil infestation in the surrounding communities.

Example of well-defined goal: By 2017, the Lake Arrowhead Conservation Council will host 4 meetings, mail out informational flyers, and meet with town officials in order to raise awareness about the variable watermilfoil infestation in at least 70% of the population of the surrounding communities (Hollis, Waterboro, Limerick, Limington).

Topic: Determining your control strategies

Example of poorly-defined goal: By 2018, Thompson Lake will have a variable watermilfoil removal team.

Example of well-defined goal: By 2018, Thompson Lake will purchase and construct a Diver Assisted Suction Harvester and hire a team of 5 divers and 3 captains to implement a 5-day-a-week variable watermilfoil removal program during the months of July – September.

How to develop activities and tasks

Implementing the action plan requires developing activities and tasks to reach the goals that were defined in the previous section. An activity is a specific action (or set of tasks) carried out by individuals on the management team to reach one or more goals. A task is a specific action in the action plan required to implement activities.

1. Select one of the goals you developed for a topic earlier and define the activities that will need to be accomplished to reach the goal. Be fairly specific, but do not focus on detailed tasks yet.

Topic: Determining your control strategies

Goal: By 2018, Thompson Lake will purchase and construct a Diver Assisted Suction Harvester and hire a team of 5 divers and 3 captains to implement a 5-day-a-week variable watermilfoil removal program during the months of July – September.

Activity 1: Construct a DASH boat April

Activity 2: Hire 5 divers and 3 captains by June

Activity 3: Determine removal schedule for season

2. Define who is responsible for implementing each activity and when each should be accomplished.

3. Define specific tasks for each of the activities you have listed for your goal. This is where you focus on the detailed to-do list.

Topic: Determining your control strategies

Goal: By 2018, Thompson Lake will purchase and construct a Diver Assisted Suction Harvester and hire a team of 5 divers and 3 captains to implement a 5-day-a-week variable watermilfoil removal program during the months of July – September.

Activity 1: Construct a DASH boat April

Task 1: Obtain a used pontoon boat from the local marina (explore donation options)

Task 2: Purchase equipment required for DASH construction

Task 3: Arrange for DASH boat storage space during construction

Task 4: Advertise for certified SCUBA divers and experienced boat captains

Task 5: Arrange payroll processing

4. Just as you did when developing the activities, define who will be responsible for implementing each task and when it should be accomplished.

5. Repeat steps 1 - 4 for each of the other topic goals.

Keeping your action plan current

It is important to review your action plan at the end of the season to see what you accomplished, what did not get done, and to make any necessary modifications.

Work in the field is unpredictable; the weather, unexpected on-the-job interruptions, mechanical failures, personnel changes, and a host of other things can disrupt a well-laid plan. Not completing all of your intended goals for the year does not mean your management program failed, but you may need to revisit your action plan and make modifications. You may need to modify yearly goals and/or scale back or increase your annual task list. Your action plan will always be a work in progress.

Writing your action plan

An action plan template is available online www.mainevlmp.org/citizensguide that you can use as a starting point. There is a sample of a completed action plan in Section V Supplemental Information.

The following section will explain the Title Page, Introduction, and first piece of the Project Goals, Strategies, and Timeline portion of the action plan. We have tried to make the process as painless as possible by providing sample text that can be used as is, or rewritten in your own words.

The remainder of the Project Goals and Strategies section, as well as, the Project Activities and Tasks portion of the action plan will be explained in this section, however the sample text will be found at the end of each topic in Sections III and IV.

The entire process of writing an action plan may take some time to accomplish but will be well worth your efforts by increasing the likelihood of success for your Invasive Aquatic Plant management program.

Title Sheet

This section of the template simply states the subject lake of the Invasive Aquatic Plant Action Plan, the duration of the plan, who prepared it and when the plan and updates were completed. Complete your lake association information and plan duration decided by your committee. If the entire committee worked on the plan, note that.

<p style="text-align: center;">Invasive Aquatic Plant Action Plan</p> <p style="text-align: center;">FOR</p> <p style="text-align: center;">Sample Lake, Poland, Maine</p> <p style="text-align: center;">2016 - 2020</p> <p style="text-align: center;">PREPARED BY <u>Sample Lake Association IAP Committee</u></p> <p style="text-align: center;">Prepared <u>January 23, 2016</u>, Updated <u>Initial Plan</u></p>
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I. INTRODUCTION

The introduction provides background information and the current status of the waterbody. As you progress in your management program, the background information that helped you set the goals and objectives will keep your program focused and on target for success.

Site Description

This is where you describe your lake or pond in as much detail as possible. Include details such as the lake surface area (acres), number of shorefront homes, roads and their associations, appearance of the shoreline, major types of recreation, amount of boating traffic, number of boat launches (public & private). The more comprehensive you can be, the better.

Sample Text

<p>I. INTRODUCTION</p> <p>Site Description:</p> <p>Sample Lake is an 800 acre water body bordered by the towns of Poland, Otisfield, Gray and New Gloucester. There are 123 residences, of which 29 are year round. There are docks at 112 of the residences, most of which are removed for the winter. There are 3 individual road associations managing unpaved, dirt roads, all of which are maintained for access in the winter. There are 14 miles of shoreline with 0.5 miles abutting cow pastures, 4 miles of protected woodlands, and the rest residential properties with a mixture of lawn and trees. There is one public boat launch on the north end of the lake and 2 private access points at individual homes.</p>
--

Current Conditions

In this section you describe that state of the infestation on your lake. If you have completed a screening or mapping survey, include that information with the map and description of what was found. Include information on not only infested locations but also native plants (if available).

Sample Text

Current Condition:

A survey of Sample Lake was completed in 2015 by a group of 11 IPP trained volunteers using the observation characteristics developed by the Maine VLMP. They found that 60% of Sample Lake is infested with variable watermilfoil: 20% of the infestation is small dense patches (SDP), 15% is moderately infested (MIA), and the remaining 25% is large dense patches of variable watermilfoil. The 40% of the lake that is not infested breaks down to 15% being a stretch of barren, exposed area and 25% having a mixture of native plants. The dominant native plants are pickerel weed, white-water lilies, and American waterweed. The surveyors also noted spatterdock, little-floating heart, pipewort, military rush, and purple bladderwort. See the attached map for detailed information on locations of infested sites and native plant populations.

Desired Condition

This is where you describe what you would like your lake to look like once you get to the maintenance phase of your management program or if possible, the eradication phase.

Sample Text

Desired Condition:

The desired outcome of the Sample Lake management program is that our lake will be 90-95% clear of variable watermilfoil. Primary areas of boating and waterskiing will again be available for use as they will be clear of large variable watermilfoil populations and consist of no or only small clusters of plants or individual plants that can be controlled with a maintenance removal program. The 3 small, shallow coves containing significant populations of plants will be reduced by 80% and controlled with a maintenance removal program. Native plants will return to previously infested areas.

Priorities

In this section you prioritize your goals given the resources you have and your long-term desired outcome. Having a targeted set of priorities will help deliver the best success and keep your program focused for the long-term.

Sample Text

Priorities:

Year 1 priorities are to raise the necessary funds to build a DASH boat, build the DASH boat over the winter, install benthic barriers in the 3 small, shallow coves during the summer season, and begin an educational campaign targeting residents on Lake Sample.

Year 2 priorities will be to assemble a DASH crew consisting of paid staff, focus initial DASH work around the 1 public and 2 private boat launches and the areas of high boat traffic, create an annual milfoil day/picnic to be used as a fundraiser, present at Poland, Otisfield, Gray and New Gloucester's town meeting to raise awareness and request funding support, and continue the benthic barrier program in the coves.

Years 3-5 will focus on evaluating our removal progress, continuing both the DASH and benthic barrier programs, continue fundraising efforts, and public education.

II. PROJECT GOALS, STRATEGIES, AND TIMELINE

In this portion of the action plan, set specific overall and annual goals, decide the activities you need to implement to reach those goals, and plan the tasks necessary to accomplish the activities.

The initial paragraph is a reminder to review the action plan annually and recognize that invasive aquatic plant management is a challenging but necessary task. You can use this boilerplate or insert your own.

Sample Text

II. PROJECT GOALS, STRATEGIES, AND TIMELINE

The action plan described below will guide the invasive species management efforts of Lake Sample for the next five years [2016 - 2020]. This plan will be reviewed annually to assess progress made toward the goals. Given the density and abundance of invasive plant populations, eliminating all occurrences from Lake Sample is unlikely. With steady work each year, however, many patches can be reduced or eliminated, further spread can be checked, new infestations prevented, and native species allowed to thrive.

PLEASE NOTE: The next two pieces of the action plan are found throughout Sections III and IV. The appropriate action plan sample text is found at the end of the corresponding topic section and labeled ‘Action Plan Worksheet.’

Project Goals and Strategies

This is where all the hard work and thought you put into developing your topic goals belongs. If you have not yet developed your goals, refer to the ‘Developing project goals and expected outcomes’ section mentioned earlier.

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities. Start with one of the topics and identify all the activities to be accomplished, and then break down each activity by the tasks needed for completion. Once you have finished that topic, go to the next one and work your way through them all.

Section III

Organizing and Monitoring



Volunteers on Panther Pond, Raymond, Maine conducting a screening survey.

Photo: Ross Wescott.

Section III: Organizing and Monitoring

Managing a waterbody for invasive aquatic plants over the long-term requires a comprehensive management plan, even for those waterbodies not currently infested. This section covers the foundational elements that are essential to a successful project. For those looking to take a proactive role, this section will help you to prevent infestations and prepare for the possibility of future infestations. Those already dealing with an infestation will find this section helpful in addressing gaps in their existing program.

1. Forming an invasive aquatic plant (IAP) steering committee

Developing, implementing and maintaining a successful IAP management program can feel like a daunting task. The guidance and leadership of a steering committee can help make it more manageable. Your steering committee—composed of stakeholders and people with relevant expertise—will establish your program goals and objectives, make budgetary decisions, develop outreach strategies, provide for project oversight, and more.

Topics covered:

- Forming a steering committee
- Benefits of 501(c)(3) non-profit status
- Enlisting members
- Gathering information
- Writing a mission statement
- Membership roles and responsibilities

If your lake has a lake association with a Board of Directors, adding an IAP steering committee to the roster of existing Board committees is your first step. Not all members of this subcommittee need to be lake association members, so invite interested lake stakeholders and other members of the community to serve on this new committee.

If your lake does *not* have a lake association, this is the perfect opportunity to form one! Forming a lake association is one of the most effective ways to protect a lake and the interests of those who live on it and around it. Lake associations are capable of providing many key leadership functions including:



A steering committee can include any interested lake stakeholder or community member.
Photo: Maine Volunteer Lake Monitoring Program.

- Uniting lake property owners and other stakeholders in order to build the consensus, energy, and momentum needed to effectively address lake issues
- Fostering a sense of community and group responsibility
- Monitoring water quality, tracking trends, and developing strategies for maintaining lake health
- Educating lake residents and the public
- Bringing together the human and financial resources needed to ensure effective long-term stewardship of the lake
- Forming partnerships with local land trusts, communities, schools, conservation organizations, etc.
- Developing and conducting outreach programs, helping to build local stewardship capacity, and moving people to action
- Influencing and participating in local government decisions
- Increasing lakefront property owners' clout with regard to policy and regulatory matters, enforcement issues, and the ability to attract funding

Need to start a lake association?

If you'd like help starting your own association, please contact the Maine Lakes Society at 207-495-2301, or info@mainelakessociety.org. MLS can help you set objectives, plan your first meeting, and give you help with Articles of Incorporation and By-laws. Visit them on-line at: www.mainecola.org.

Benefits of a 501(c)(3)

If your lake association has not already done so, you may wish to consider formally incorporating with your state as a nonprofit legal entity and to seek recognition as a federally tax-exempt organization under section 501(c)(3) of the Internal Revenue Code.

Lake associations with 501(c)(3) status enjoy a number of benefits including:

- Tax-deductibility of donations to the organization—you can provide donors with tax-deductible receipts for all cash and non-cash donations
- Lower nonprofit postage rates for mailing over 250 identical pieces of mail
- Public service announcements on radio and TV (free but limited availability)
- Limited liability for directors and officers for operations of the organization
- Perpetual existence; the corporation continues on after the death of the founder(s)
- Government and private grants are available for tax-exempt organizations
- Employee fringe benefits not generally available to the self-employed person or business owner, e.g., group life insurance, health insurance, payments of medical expenses and approved corporate pension and retirement plans
- Some stores and businesses give a discount to nonprofit corporations and employees of nonprofits
- Some publications give an advertising discount to nonprofit organizations

WARNING !

Beware of organizations that promise 501(c)(3) status in a very short time, such as 7-30 days, or for a very low price. Some organizations can offer this by pulling you into their group exemption, which means you will not have your own 501(c)(3). In some cases such arrangements are not legitimate.

Once your organization secures tax-exempt status, it is permanent. You don't have to go back and renew it, ever.

Your IAP steering committee: where to start

Leadership is a fundamental element of management efforts. Leaders not only provide the steering mechanism for your IAP program, they act as catalysts, providing energy, passion, and inspiring motivation in others. One of the best ways to establish a strong leadership component for your management effort is to form a steering committee.

A steering committee can be a standing or special committee of your lake association. Even if your lake lacks a formal association, however, a group of citizens can – and should – still form a steering committee to start the process of developing an action plan.

Let people know that you are forming an IAP committee and seeking community involvement. You may wish to start by placing a public meeting announcement in the newspaper and posting an invitation on local bulletin boards. You are looking for individuals interested in helping to address the threat of invasive aquatic plants in local water resources and to develop an invasive aquatic plant management program.

The purpose of the first meeting should be to discuss the potential for infestation (or current infestation), associated problems and issues, and the interests and questions of attendees. Ask for volunteers to help develop and implement the monitoring program, recordkeeping, and if applicable the management plan that will guide the ongoing control effort. Among the individuals that step up, you will likely find some excellent candidates for your steering committee. Strive to get representation from a wide variety of interests, backgrounds, and perspectives. If your lake or its watershed lies within the boundaries of several towns, seek representation from each town. At this initial meeting, establish a system for future group communications and set a schedule for future meetings.

Questions to Consider in the Planning Process

- Who are your partners?
- Are there neighboring groups that are already engaged in a control effort that could provide guidance?
- How will this program benefit your community?
- Who are key individuals who could help get the program going with their time? Funds?
- What, specifically, will steering committee members be expected to do?
- How much time will steering committee members realistically be able to commit to this effort?

Information gathering

Information gathering is an important first task for the steering committee. The more you understand the ecology and socioeconomic issues connected with your lake, the more successful your IAPS management program will be. The information gathering phase is not only interesting, educational and utilitarian; it often leads to making connections with others who share a common interest in the lake and people who may be willing to lend their expertise to the management effort.

Divide the research up into discrete tasks and ask each committee member to take on one or more task(s) in accordance with his or her interest and/or area of expertise. Increase your understanding of your lake's ecology, current uses, economic importance, shoreline development patterns, state and local resource protection laws, etc. Understand the ways in which your lake is interconnected to the surrounding land and to upstream and downstream waterbodies; where the public and privately owned boat access points are located; what the extent of current aquatic plant growth and potential aquatic plant habitat is in the waterbody; how recreational uses are affected by existing infestations, and other pertinent information. Learn everything you can about the offending invasive aquatic plant and methods currently used to control it.

One of your best sources of information is going to be other groups in your area that are working to address similar infestations. Here you will find skills, expertise, experience and the benefit of hindsight. Ask questions, visit control sites, participate in networking events and meetings. Additional sources of information include local libraries, schools, municipal offices, historical societies, conservation commissions, newspaper archives, and the Internet.

For a list of helpful websites that will help with this process, check out the Resources pages in Section V.

Mission

Another important way to ensure the success of your IAP management program is to clearly articulate your committee's mission. A mission statement formed through a process of deliberation and consensus will provide cohesion and guidance for the management effort, and establish a clear standard by which all subsequent (proposed and implemented) activity may be judged. Keep your mission statement in mind as you begin to develop your management program and to formulate specific goals and objectives.

A mission statement should be clear and concise, somewhat broad in scope, provide vision, and suggest action. For example: *To protect Little Blue Pond from the threat of aquatic invaders through prevention, early detection, rapid response and management.*

If desired, broad goals for the committee (such as the following) may accompany the primary mission statement to help provide clarity and focus.

- *Become educated about IAPs and stay current about new programs, technologies and innovations so that we inform others while making informed decisions for our community*
- *Work collaboratively with members of the community, state agency officials, neighboring groups and other members of the committee to develop, implement, and maintain a successful IAP management plan*

It is assumed that most management efforts will be taking place within the construct of local and/or regional associations and that the associations have articulated mission statements. In such cases it is very important that the management goals to be developed remain consistent with and supportive of all overarching missions. If an association mission statement has not yet been articulated, this is a good time to do so.

Steering committee roles and responsibilities

It is helpful to articulate the duties and responsibilities of the IAP steering committee. Given the uniqueness of each lake, and where you are in the process, the results of this exercise will always be somewhat different. Here are some suggestions to get you started.

- Meet regularly as a committee to set goals, objectives, and tasks associated with your IAP management program; evaluate status of each, and adapt course as needed. As problems and challenges arise, seek timely solutions from within the committee, the community, and from outside resources.
- Keep the community engaged and informed
- Raise and maintain the funding and other material resources needed to achieve short and long-term goals
- Comply with State and local laws and meet all permit requirements
- Keep records
- Recruit, train, organize, and support the work of volunteers
- Hire, oversee, and meet administrative needs of employees
- Address all safety and liability issues
- Plan, build and sustain program momentum and community support



Keep your steering committee current by hosting speakers with expertise in invasive aquatic plant issues.
Photo: Maine Volunteer Lake Monitoring Program.

Consider how much time committee members will be able and willing to commit to this effort. Recognizing time limitations now will allow you to develop a plan that is realistic and sustainable.

ACTION PLAN WORKSHEET: IAP steering committee

Project Goals and Strategies

Depending on where you are in this process will determine the goals that you set. You may need to develop an IAP steering committee, get key stakeholder involved on the committee, or have regular meetings.

Sample Goals

<p>IAP steering committee</p> <p>Overall Goal: Have an IAP steering committee that includes expertise in management, control technologies, fundraising, and grant writing by 2020.</p> <p>Year 1 Goal(s): Form an IAP steering committee comprised of Sample Lake Association members and key stakeholders (marina owners, concerned residence, bass fishing organizations, town officers, teachers, etc) from the community by October 2016.</p> <p>Year 2 Goal(s): Assess expertise of committee members and assign program areas to those with relevant experience by 2017.</p> <p>Years 3-5 Goals: Continue to grow the IAP steering committee with interested individuals and those with needed expertise in fundraising and grant writing.</p>
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Project Activities and Tasks

This section of the action plant identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

1: Forming an IAP steering committee					
Activity 1: Hold initial stakeholder meeting in May, 2016					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Develop list of people to invite	high		2 hours	S. Adams	March
2. Determind date of meeting	high		2 hours		March
3. Arrange for meeting space	high	room to hold 50 ppl	2 hours		April
4. Organize presentations	high		3 hours		April
5. Order refreshments	high	plates, utensils, napkins	0.5 hours		May

2. Building program support

By now it has likely occurred to you that in order to build and sustain a successful IAP management program you are going to need substantial resources: financial resources, various kinds of material resources, and plenty of people power. Very few lake associations find they have all of the needed resources on hand to effectively address the challenge of preventing and/or managing an infestation. They must get to work immediately on engaging the community and building program support.

Topics covered:

- Defining and learning about your community
- Potential obstacles to participation
- Outreach and social marketing

The more informed and engaged the local community, the greater the likelihood the management program will be successful. It is worthwhile to take some time and care to define your community in the broadest possible terms, because it is within this community that you are going to find your most dedicated volunteers, most generous financial contributors, and individuals willing to donate expertise, equipment and/or professional in-kind services to the program.

Consider all of the individuals, businesses, groups, and institutions that have a stake in the health of your lake. Be sure to include people in neighboring towns—even more distant towns—who may be connected to your lake through its watershed. Reflect upon the types of visitors who frequent your lake as well as the seasonal residents.

As you consider this more expanded definition of your community, make an effort to include the widest possible variety of perspectives. A shorefront property owner has different concerns, needs, and ideas than does a visiting boater or a local business owner.

Even members of your community who do not wish to become engaged in supporting your efforts have something valuable to contribute! If you listen to them, they will provide you with a better understanding of existing and potential barriers that may exist in your community preventing new infestations or to managing a current infestation. Listening to people is a good way to start building a positive rapport with them.

Inclusiveness has a natural multiplier effect. If people representing a wide variety of perspectives are asked to help craft your outreach messages, your messages have a better chance of connecting in meaningful ways to the broadest possible audience.

Learning about your community



Understanding your community is essential in organizing a successful event.

Photo: Maine Volunteer Lake Monitoring Program.

EXAMPLES OF WAYS PEOPLE CAN GET INVOLVED

- Contributing to the planning processes like creating goals or defining the problem
- Donating money or helping out with a fundraising effort
- Volunteering to make phone calls, create posters or flyers, or handling correspondence
- Researching potential funders or writing grant proposals
- Presenting at public events, community hearings, or fundraising events
- Serving on committees that focus on specific problems or activities
- Assuming leadership roles in their neighborhoods or in an IAP program

Before you can reach out to the people in your community, you need to know where to find them and how best to connect with them. Every community is different. Here are a few questions to help you get better acquainted with your community:

- Where do people work, socialize, volunteer, receive services, shop, access information, and attend school or church?
- What kind of groups and organizations are people involved in locally? Consider civic groups, recreation groups, conservation organizations, neighborhood or road improvement associations.

- Who might be good contacts at your local town office? Does your community have a local Chamber of Commerce, an active Parent Teacher Association, or a retirement community?

Recognize the strengths of each potential partnering group. How does each group already organize to get things done? Do they have special skills or effective systems already in place that might be drawn upon to help support your cause? Organizing around an issue such as the threat of aquatic invaders may be unfamiliar to some groups. Understanding where they are coming from will help you find a way to relate your needs to something they know and feel comfortable with—for example, organizing a community event or school fundraiser.

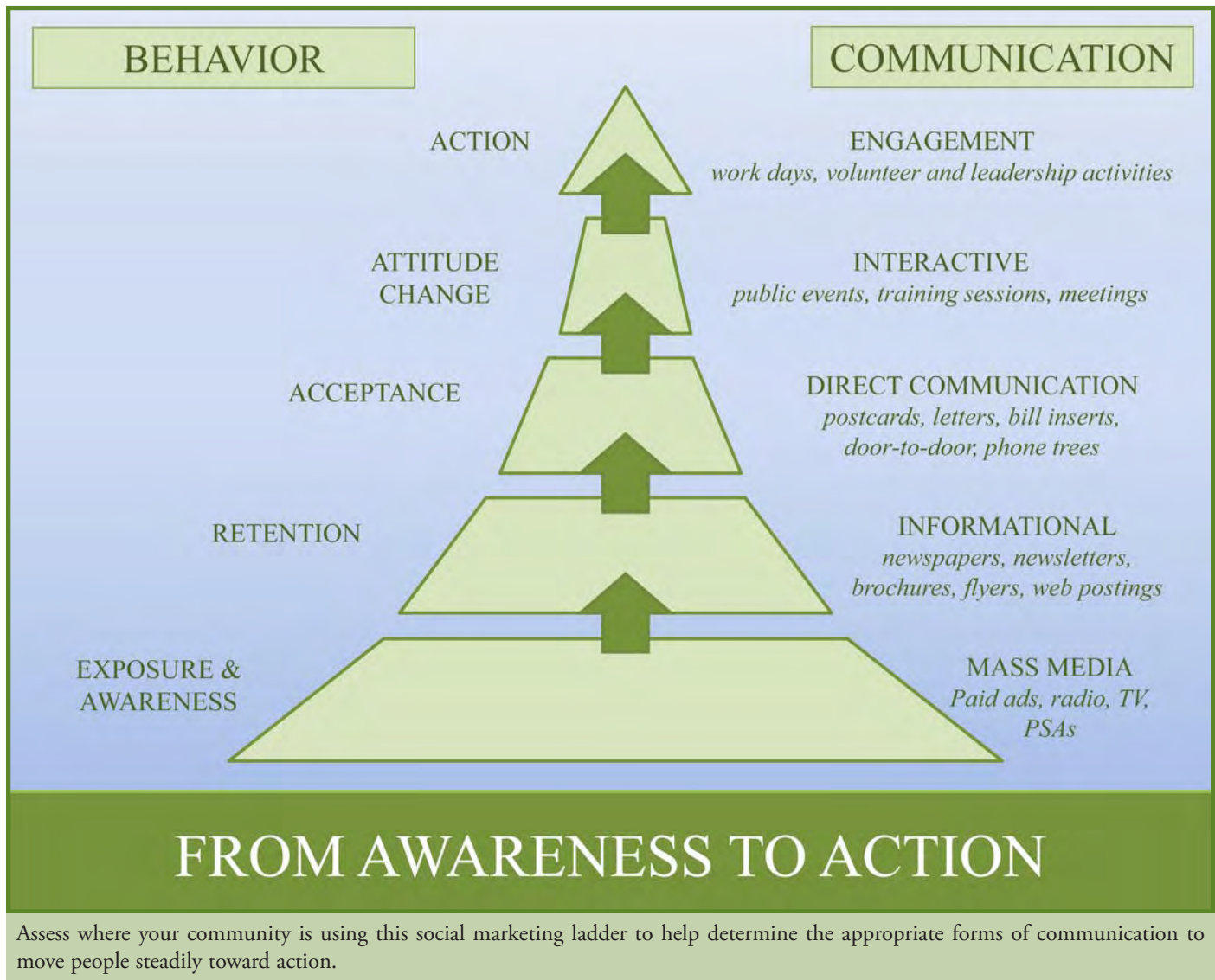
Potential obstacles to community participation

Before you launch your outreach efforts, it also helps to consider the various obstacles that could possibly inhibit community participation. The following table summarizes some common obstacles and ways to overcome them.

OBSTACLE	PROBLEM	WAYS TO OVERCOME
INADEQUATE COMMUNICATION	People are unaware of your efforts and how to become engaged	<ul style="list-style-type: none"> • Contact groups working on similar issues to find out how they get people involved • Find new ways to get the word out to the community that you're looking for people to join in your effort
LACK OF EXPERIENCE AND CONFIDENCE	<p>People are unfamiliar with the issue, what needs to be done, and what will be expected of them. They may wonder how their involvement will make a difference, or whether they will be welcome. For some people, participating in an unfamiliar activity causes anxiety.</p> <p>The complexity of the IAP issue and the scope of the task at hand may be intimidating, even overwhelming, to some.</p>	<ul style="list-style-type: none"> • Provide clear, concise information, high-quality training, and ongoing technical support • Make sure people know you are approachable, and be clear and friendly when answering their questions • Provide mentoring opportunities partnering seasoned participants with newcomers • Be very clear with people about what they can expect by getting involved and at trainings, meetings, and work days
LOGISTICAL HURDLES	People are unable to participate due to lack of time, transportation issues, or child care issues	<ul style="list-style-type: none"> • Time your events to maximize participation • Plan carefully, strive for maximum efficiency and productivity for all meetings and events • Make arrangements for transporting participants to events when needed • Hold meetings nearby and at familiar locations. Provide clear directions. • Make arrangements for childcare at the meeting site, or have parents who are involved set up a pool to take turns providing care
BURNOUT	<p>People are asked to do (or even elect to do) more than is realistic, leading eventually to a sense of being overwhelmed, and a strong inclination to give up.</p> <p>Others, observing this and wishing to avoid a similar fate, may choose not to become involved in the effort in the first place</p>	<ul style="list-style-type: none"> • Pace yourself and make realistic demands of yourself and others

Outreach and Social Marketing

When reaching out to your community, it is helpful to have some knowledge of social marketing theory. Social marketing is the systematic application of marketing techniques and other concepts to achieve specific behavioral goals for a social good. Social marketing theory describes the process by which people are moved to action in response to communicated information as a series of stages, one built upon the other. If your desire is to actively engage the public in your IAP management program (i.e. bring about a change in behavior) you will need to assess where you are in the process and determine the appropriate forms of communication for current and subsequent stages. There are a variety of communication and engagement methods that you can use including public events, letters, and articles.



Mass Media is used to raise initial awareness of an issue on a large scale. Here are some examples.

Paid ads in print (newspapers and magazines) and on radio and TV are perhaps what most of us think of when we think of mass media. The particular type of ad and the particular media outlet used will be determined at least partially by the availability of resources.

Public Service Announcements (PSAs). Radio and TV stations are required by their licenses to run a certain number of free PSAs for non-profit entities. Many stations will help you write the copy and will perform them as well.

Informational forms of communication are needed to help people retain interest in the issue. Examples include:

Posters can be very effective if placed in appropriate locations. Use eye-catching fonts and graphics and simple language. Tear-off phone numbers will allow people to easily reach out to you for more information.

Fliers and brochures may be obtained from existing sources and/or locally designed. They should be designed to catch the eye and get the message across in a clear, concise manner. Fliers and brochures may be distributed throughout the community—at town offices, fishing license and boat registration locations, marinas, real estate offices, libraries, etc. and also included in mailings or hand-delivered information packets.

A WORD OF CAUTION

Printed material can be costly. Unless the individual receiving your printed material is relatively interested in the information beforehand, the material is likely to be discarded - a waste of precious time and resources! Putting this kind of material out where only those who are genuinely interested will pick one up, and other forms of targeted distribution, are generally preferred to mass distribution.

Billboards and signs. These can be creative both in the way they're designed and in the way they're presented. People walking the neighborhood as giant zebra mussels with sandwich board "shells," for instance, might draw more attention than a simple posted sign, and they could also provide information and answer questions.

Signs and warning buoys alerting boaters to your infestation and reminding people to inspect their boats and gear (especially when courtesy boat inspectors are not on duty) are available from MEDEP. Some groups in Maine have designed their own signs to better meet the needs of their communities. Be sure to obtain permission from the proper authorities (state agencies, town officials, the lake association, or the private landowner, etc.) before erecting any sign. Ideally, signs should be positioned in such a way they cannot be missed by boaters as they prepare to launch their boats.

Organizational and community newsletters. If your lake association does not already produce a newsletter, this is the time to start one! Other local groups may also be very interested in printing information about your program in their newsletters.



Photo: Maine Volunteer Lake Monitoring Program.



The State of Maine's "Eleven Most Unwanted" poster.
 Image: Maine Volunteer Lake Monitoring Program.

Promotional materials. Items such as ball caps, T-shirts, and mugs can serve as effective channels for your message. Be creative.

Website and social media site postings. The Internet can be an excellent vehicle for reaching large numbers of people. Create a web presence for your program (ideally on your lake association website) and post information about aquatic invaders, your IAP program, events, project partners, volunteer opportunities and more. Keep the information lively and current.

Press releases, press conferences and letters to the editor. Use these to announce the kick-off or status of a campaign, provide information about your issue, provide program updates, or showcase new information about the issue that may help to change people's perceptions or behavior.

Music. Music can be an effective social marketing tool, even when the content of the music is not specific to the issue at hand. Benefit concerts, or concerts aimed explicitly at raising the profile of an issue or behavior, can draw large crowds and spread a message simply by the participation of the performers.

Direct Communication will help to move community members to the next level: a general *acceptance* of the information that is being presented and some measure of engagement.

Postcards and letters. Direct mailings can be effective, especially if the message is well-crafted, concise and compelling. Hand-written addresses and signatures are noticed.

Bill inserts. Sending out a lake association dues appeal? How about adding an IAP management check-off box for those who may wish to provide extra support for the management effort?

Door-to-door campaigns. Neighbors reaching out to neighbors, sharing concerns, and providing information (with or without supporting hand-outs) about your IAP program and upcoming events, is one of the most effective ways to communicate your messages with your community. Door-to-door campaigns provide an excellent opportunity to get to know the people whose support you need. Learn what is important to them, what they think about the IAP issue, etc. Getting to know other people who care about your lake is a key step in the process of "friend-raising."

Phone trees. Organize a phone tree and activate it at times when you feel your constituents may need a gentle reminder of the importance of their participation in an upcoming event.

Develop a Speakers Bureau

Organizations that may be able to provide speakers and/or outreach programs for your event include state environmental protection or wildlife agencies, universities, Cooperative Extension offices, educational or research institutions, conservation commissions and districts, volunteer lake monitoring programs, state and regional lake and river organizations, fishing clubs, and botanical societies. Also consider inviting speakers from groups currently engaged in an IAP control project.

Interactive events can help to shift peoples' attitudes toward an issue. Where they may have previously felt themselves as casual by-standers in respect to the threat of aquatic invaders, they may now understand how they personally may be affected, how they might be able to help, and feel the desire to become more engaged. Examples of interactive events include:

Public events such as slide presentations, public forums, info fairs, meetings, etc. are a good way to begin building the social connections that help get the community working toward common goals. Provide adequate time for attendees to chat informally during these events. For longer events, be sure to provide adequate breaks and refreshments!

Advertise creatively to reach the targeted populations, hold events at convenient times and locations, and plan events that are not too large to be effective.

Training events and mentoring opportunities. Workshops and mentoring sessions provide excellent opportunities for learning, engagement, and building new relationships.

Fun and educational community events. Even serious challenges can be creatively addressed through fun community events. Host an informal 'plant paddle' where participants can try identifying aquatic plants with a local expert on hand. Some communities have hosted Chinese Mystery Snail Roundups which involve adults and children to see who can remove the most snails.

What is a Plant Paddle?

- Short events that take place on shore and on the water
- Introduce community to the threat of IAP and the importance of early detection
- Guided learning

See the Maine VLMP website for more information on plant paddles.



Photo: Skip Bartosch

Involvement is when individuals get to the *action* stage. The primary forms of communication at this point are those that help to coordinate the task at hand, and ensure that all participants are meaningfully engaged, safe, and comfortable with his or her role. Examples of the types of activities that occur at the action stage include:



Volunteers can help out in many ways from working at a fundraiser, conducting surveys, helping with mailings and many other tasks.

Photo: Maine Volunteer Lake Monitoring Program.

Work days may include anything from making posters and washing cars for a fundraiser to cleaning benthic mats and retrofitting a DASH boat.

Volunteer activities include the above as well as longer-term projects such as conducting an annual screening and mapping survey or serving on a committee.

Leadership. Encourage leadership at all levels of your program. Once engaged, trained, and experienced, many community members will naturally begin to take on active leadership roles: experienced community members will lead meetings; your DASH boat will have a captain; your IAP monitoring team will have a team leader. Leadership is another quality that brings a significant multiplier effect to your efforts.

Free Training in Maine

A number of volunteer training opportunities are currently available, free of charge, to individuals and groups in Maine, check out the Resources in Section V for more information.

Roberta Scrugg's Top Ten PR Tips

Roberta Scruggs graduated from the Medill School of Journalism at Northwestern University and has worked as a reporter and editor at more than a dozen newspapers, from small weeklies to the Miami Herald and Washington Post.

1. Create a fact sheet about your lake and lake association: How big is the lake? How many members in your association? What are your major concerns and efforts? How many lakefront property holders are around your lake? How do they affect the local economy? Who should be contacted (give email and phone number) with questions?
2. Document your efforts and events. Take lots of photos. If someone finds a suspicious plant ask the details, gather quotes, get photos of the person, the plant, the location. Create a file of good photos (with permissions and photo credit if needed) that can be used for outreach purposes. A good photo shows engaged people (faces!) and beautiful lakes.
3. Keep the attention LOCAL: We are worried about *Example Lake*; here is why; here is how we are getting people involved.
4. Find out the newspaper/media deadlines. Ask when and to whom you should send (mail or email) or bring your press release.
5. Make sure every press release answers the basic questions: Who? What? Where? When? Why? How?
6. In your press release, tell a story – don't give a report. Imagine you are telling this story to a close friend or relative. Stories should be interesting, engaging and include quotes and anecdotes from people who care about their lake.
7. Be brief! A one-page press release is more likely to be read than a two-page one.
8. Once you send a press release, follow up by calling or visiting someone at the paper. Let him or her know why this matters to the community.
9. Create relationships with local media people (dailies, weeklies, local TV news) so they understand your issues. Try to get them directly involved – most reporters and photographers love to get out on the water.
10. Find the most articulate and engaging speakers in your group and let them talk to the media.

ACTION PLAN WORKSHEET: Building program support

Project Goals and Strategies

Here you will focus on the type of support you hope to get for your management program and how you intend to get that support. It can include outreach to neighboring towns by making presentations at town meetings, encouraging landowners around the lake to get involved and volunteer in some capacity, or having an annual “milfoil day” to raise awareness and funds.

Sample Goals

<p>Building program support</p> <p>Overall Goal: Engage the surrounding communities and business in the Sample Lake Association IAP management program through an ongoing effort of programming and educational outreach.</p> <p>Year 1 Goal(s): Gather contact information for target groups including town officials, lake residence, youth camps, etc. Create a plan for reaching out to these groups and beyond. Determine types of programs to host.</p> <p>Year 2 Goal(s): By 2017, the Sample Lake Association – IAP steering committee will host 4 meetings, mail out informational flyers, and meet with town officials in order to raise awareness of the variable watermilfoil infestation to a minimum of 70% of the population in the surrounding communities (Poland, Gray, Peru, Dixfield).</p> <p>Years 3-5 Goals: Continue on-going effort of outreach. Create a “Milfoil Days” event that will occur annually to raise awareness by bringing the community together for a barbeque and fun run (individuals participating will dress up as variable watermilfoil or “variable watermilfoil controllers”).</p>

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

2: Building program support					
Activity 1: Develop 4-H camp partnership to train adults and teens in plant identification and buoy placement					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Contact Director at 4-H camp to discuss partnership	med		1 hour	P. Cruise	March
2. Meet with staff to brainstorm best way to involve local adults & teens	med		3 hours	S. Johnson	March

3. Surveying your lake

Checking your lake for the presence of invaders is an important aspect of your management program. Knowing the resources you have to work with allows you to determine the types of personnel that will be used to conduct the screening survey project. Options include: professionals, student researchers, trained volunteers, or a combination of these.

You may choose to hire a professional company or you can use volunteers from the community. Volunteers can perform effective screening surveys with a minimum amount of training if basic procedures are followed carefully and suspicious plants are sent to professionals for identification.

Topics covered:

- Benefits of developing a volunteer team
- Preparing for a screening survey
- Conducting a screening survey

Invasive Aquatic Plant Surveys

Though many of the methods and tools used to conduct the various IAP surveys are the same, there are some distinctions among survey types that are worth noting. Invasive aquatic plant surveys generally fall into three categories: 1) IAP Screening Surveys; 2) Baseline Infestation Surveys; and 3) Infestation Monitoring Surveys. Because each survey type is suited to a specific goal or purpose, each is approached a bit differently.

The following table provides an overview of the fundamentals of conducting all three IAP surveys. This section will focus on conducting IAP Screening Surveys, and considerations specific to conducting Baseline Infestation Surveys and Infestation Monitoring Surveys are discussed in Section IV.

TYPE	GOAL / PURPOSE	APPROACH
IAP Screening Survey	Early Detection	The target waterbody is checked on a regular basis in order to detect any new introductions as early as possible. The scope and frequency of screening surveys may be adjusted in accordance with the availability of resources.
Baseline Infestation Survey	Evaluation of a newly-identified infestation	The target waterbody is thoroughly surveyed to determine the full extent of a newly-identified infestation and is mapped using characterization codes. The resulting survey map can be used in the development of a successful control strategy.
Infestation Monitoring Survey	To monitor progress of ongoing control activities, and to identify new pioneer plants and areas of concern	The target waterbody is surveyed on a regular basis to monitor the infestation and to update the infestation map. Special attention is given to evaluating the status of current and recent control sites and to identifying new infested areas.

The primary goal of your screening survey project is to 1) visually scan as much of the existing aquatic plant habitat as possible, looking for possible invaders, and 2) to record the location of any suspicious organisms (or invasive species colonies) in a way that will ensure timely and effective follow up action.

An active, well trained, fully equipped survey team benefits your lake community in many ways. The team can rule out the presence of invasive aquatic plants annually, help educate and engage the lake community (friendly face-to-face encounters, dockside, are commonplace during plant surveys), and provide a better understanding of your lake's unique native plant communities.



Volunteers use a trunk scope during a screening survey.
Photo: Maine Volunteer Lake Monitoring Program.

Screening surveys may be conducted at various levels of detail, depending on the time and resources available to devote to the task. A Level 1 survey includes public access points and areas of concentrated boat traffic (e.g., marinas), Level 2 surveys include all Level 1 plus areas where aquatic plant growth occurs, and Level 3 surveys cover the entire shoreline and littoral zone. Surveys may be conducted over a period of time, especially Level 3 surveys on large lakes, which may require several weeks or longer to complete.

Is your lake already mapped?

It is possible that the initial screening survey on your lake has already been done. Be sure to check with your state's environmental protection department or other lake organizations to determine if this is the case.

Invasive Aquatic Plant Survey Levels

Level 1

Points of public access and other areas of concentrated boat traffic (e.g., marinas and narrow navigation channels) are surveyed. Survey areas extend horizontally along the shoreline at least 100 meters (~300 feet) on either side of the high-risk zone, and outward along the entire length to the depth at which the bottom is no longer visible from the surface.



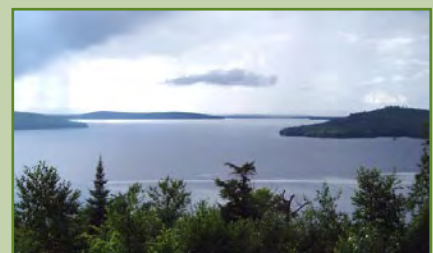
Level 2

Level 2 surveys include all Level 1 areas, plus all areas of the shoreline that are likely to provide suitable habitat for aquatic plants, such as shallow, sheltered coves. Floating leaved plants are often a good indicator of a rich plant community below the surface. In addition to supporting native plants, these areas may provide suitable habitat for an invader to take hold and (at least initially) hide.



Level 3

A Level 3 survey covers the entire shoreline area and littoral zone. (The littoral zone includes all areas in the waterbody where sunlight reaches the bottom and rooted aquatic plants may grow.) In the case of the confirmed presence of an invasive aquatic plant in a waterbody, it is recommended that a Level 3 survey be conducted in order to determine the full extent of the infestation.



Getting Ready

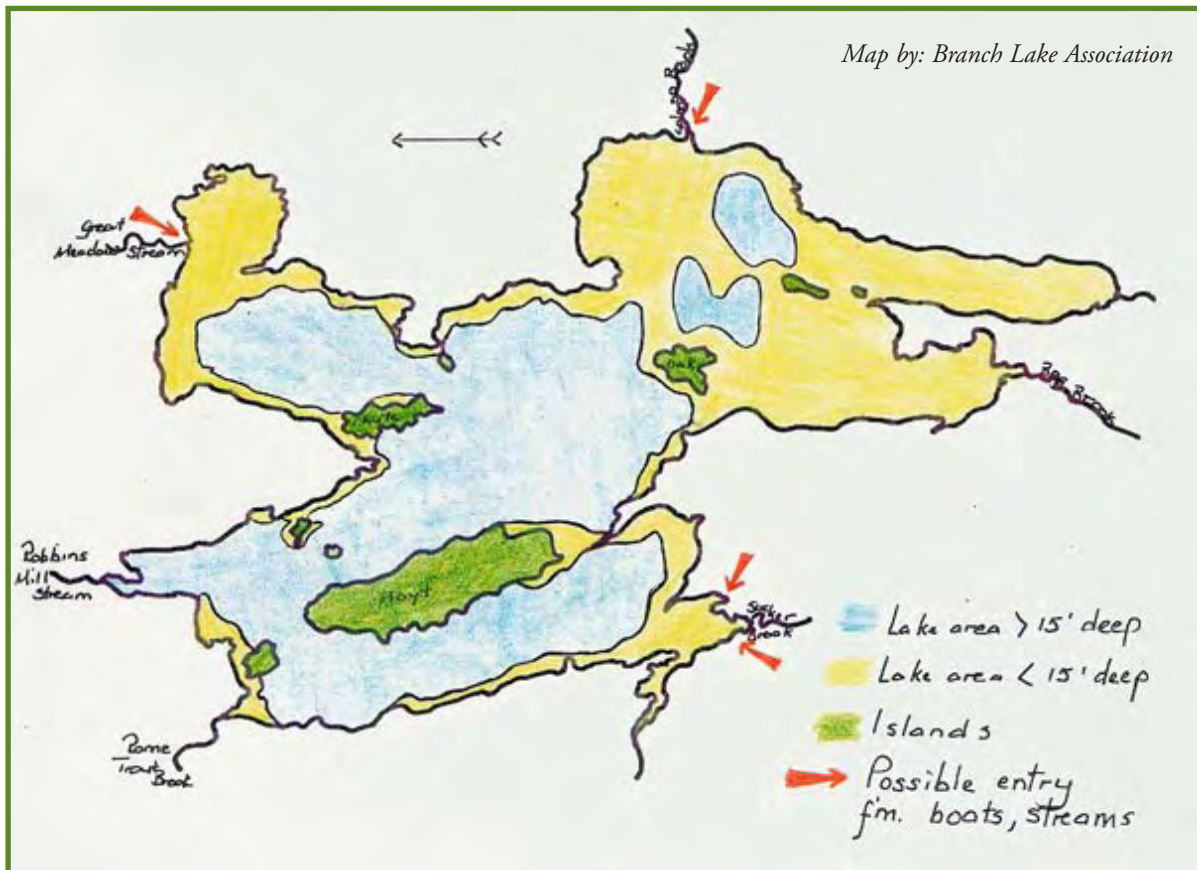
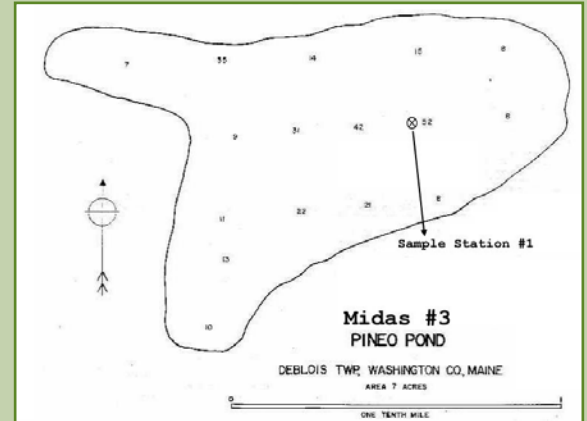
You will need to obtain or create a base map for your waterbody. Simple lake depth maps are often available through state natural resource agencies and higher quality depth maps may be available commercially. Other sources of maps showing shorelines and wetland areas are available from state geological survey offices, USGS, Google Maps, Google Earth, etc.

Using highlighters, colored pencils, marking pens, etc., color in the littoral zone. (The *littoral zone* includes all areas in the waterbody where sunlight reaches the bottom and rooted aquatic plants may grow.) It is also helpful to mark the location of protected areas that are likely to provide good plant habitat, inlets, outlets, and area with high boat traffic (such as public and private boat launches, marinas, etc.). Make copies of the base map for use by volunteers in the field.

Study invasive and native plant identification guides and keys so you will be familiar with all invasive aquatic plants of concern in your state. Most invasive plants have native look-alikes such as variable watermilfoil (*Myriophyllum heterophyllum*) which looks like the native coontail (*Ceratophyllum* sp.), water marigold (*Bidens beckii*), some bladderworts (*Utricularia* sp.), and waterweeds (*Elodea* sp.). Milfoils exhibit a wide degree of vegetative variability, often making it difficult to distinguish between native and invasive species without assistance. Learning the structural characteristics of the look-alike species before beginning the survey will save you a great deal of time.

Need a lake map?

Depth maps for many Maine lakes are available on the VLMP Lakes of Maine website: lakesofmaine.org



Conducting the Survey

During the screening survey you are trying to visually scan as much of the littoral area as possible, looking for suspicious organisms, and recording their location. Primarily you are looking for any possible invaders, but since you are going through the process of conducting a comprehensive survey of the waterbody, you may wish to expand the scope of your screening survey to include identifying native species. Some lake groups inventory just the dominant native plant species, while others create a comprehensive list of all native species growing in the waterbody. Consideration of the time and number of people you have available for this project should help you to determine an appropriate scope for your survey before you set out.



Surveying by snorkeling provides an excellent view of submersed plants.

Photo: Maine Volunteer Lake Monitoring Program.

Surveys should be conducted when there is adequate light, and when conditions are relatively calm. Early morning conditions are often ideal because the water is calm and reflection on the water surface is minimal. It will be difficult to conduct an effective survey during windy conditions and weekends may be problematic because of heavy powerboat activity.

As far as season timing, July through September is generally the best time of year to conduct screening surveys. Prior to July, many aquatic plants are not fully developed. Emergent flowering structures are sometimes needed for plant identification and for many species flowers do not typically start to develop until July. Curly-leaf pondweed (*Potamogeton crispus*) is an exception to this rule, usually reaching maturity by late spring to early summer.

The area to be surveyed extends from the shoreline to the point at which it is no longer possible to see the lake bottom with a viewing scope. The depth of the littoral zone may actually go out further, depending on water clarity. Very clear lakes may support rooted plants at depths of 15-20 feet. Hydrilla (*Hydrilla verticillata*), one of the most notorious invasive aquatic plants, can grow in extremely low light to depths of 30 feet or more. Using SCUBA divers, an underwater video camera, or a weed weasel enables surveying to these greater depths.

VOLUNTEER SURVEYORS

It is recommended that all novice surveyors participate in some form of formal training prior to direct involvement in survey activity; that an experienced surveyor provides oversight to ensure that standard procedures and protocols are followed; and that a system is established whereby all suspicious organisms may be sent to professionals for identification.

In Maine

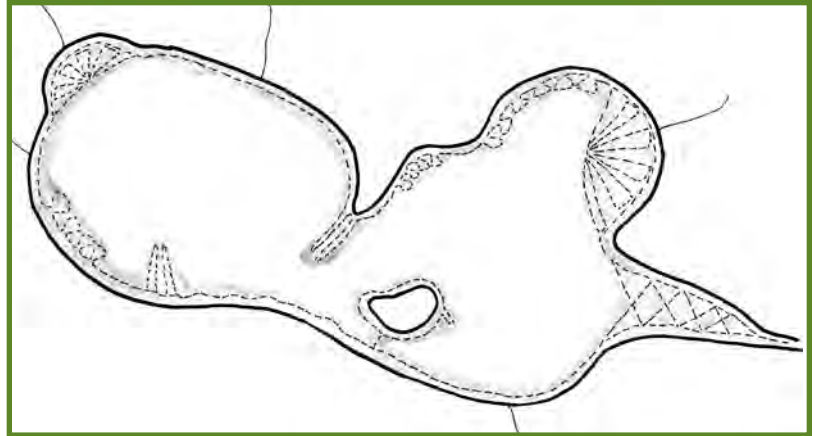
Invasive Plant Patrol training and technical support is offered free to volunteers through the Maine Volunteer Lake Monitoring Program (mainevlmp.org).

The course surveyors' travel will vary in accordance with the natural variability of the littoral zone and, to a lesser extent, occasional human-placed obstacles. In areas where the lake bottom drops relatively steeply from the shore, plotting a straight course roughly parallel to the shore generally allows adequate screening of the area from both sides of the boat. Working in groups of two or more, one surveyor scans the area from the boat toward the shore, the other from the boat toward the outward extent of the littoral zone. Scanning will involve looking through the glass-like surface of the water, when weather and light conditions are optimum; or through the view scope, when they are not. In addition for scanning the area for aquatic invaders, the surveyor is generally watching for submersed hazards such as rocks, logs, and mooring lines, while the surveyor in the stern is steering the boat.

The relatively straight line of travel along the shore may wiggle and contort from time to time to conform to, and accommodate, shoreline features, docks, moored boats, floats, and the like. The

assumed width of the littoral zone should be verified from time to time by spiking out (heading out perpendicular to shore) and visually checking the depth.

In areas where the littoral zone is wider, in shallow coves, inlets and outlets, and where the plant community is dense and complex, other course patterns including point-to-point transects should be employed. Shallow ponds may support rooted plants from shore to shore. The overall goal in selecting a proper course pattern is to optimize direct observation of the plant communities. Highlighter pens or colored pencils are used to track the progress of the survey on the field map.



The gray area represents the lake littoral zone. The dotted line represents the various patterns of travel used to optimize direct observation of the areas.

Surveyors obtain specimens when a closer look is needed to distinguish friend from foe. Collect a representative sample or specimen and float it in clean water in a white tray or container. Use a hand lens to view minute features and consult your identification guides and keys. If you are noting dominant native plants observed in your survey, be sure to record these as you go.

If you have determined that an invader has been found, mark the location using a weighted buoy and mark it on the field map. Be sure to indicate local landmarks (shoreline cottages, unusual rocks or trees, etc.) to help others re-locate the site. If you have a GPS, mark the waypoint or record the longitude/latitude coordinates. But remember, unless you have a high-end GPS unit, the accuracy may be off by 15 feet or more. Use a consistent marking code on the survey form, the plant specimen bag, the map, and the marking buoy.



A volunteer taking a closer look at a plant while conducting a screening survey.
Photo: Maine Volunteer Lake Monitoring Program.

If larger infested areas are encountered, places where plants and plant clusters are sparsely distributed and too numerous to mark individually, the entire infested area should be shaded in on the map. Mark the perimeter of the infested areas with a series of buoys and/or GPS waypoints.

Many aquatic plants (native and invasive) can spread through fragmentation so avoid disturbing plants unless a specimen is required. Specimens should be obtained by a clean cut, if possible. Scoop up any and all fragments with the leaf rake or a net.

When the survey is complete, organize your findings and consider how you are going to use the survey results. Data may be organized simply by copying and collating the documentation forms and field maps. However, to share your findings with the public, you will want to present the information in more user-friendly formats, such as, a narrative report, a poster sized map indicating dominant plant locations, a PowerPoint presentation, etc.

MAINE SURVEYORS

Be sure to submit copies of all survey and mapping data to MEDEP and VLMP to ensure that this important information will be included in Maine's statewide database.

Survey Equipment

With the exception of the boat(s), the equipment needed to conduct a screening survey is fairly simple, inexpensive, and easy fabricate. Surveys are accomplished most easily, and are safer, with at least two persons in the boat: one to paddle and steer; one to watch for obstacles, scan for the target organism(s), make observations, and record findings.

Here is what you will need:

- Small shallow-draft boat, canoe or kayak (**Large boats & motors not recommended as they make the process more difficult and destroy sensitive aquatic vegetation.**)
- Personal flotation device
- Documentation forms, pencil, and clipboard
- Base map of the survey area
- Pocket knife or snips
- Viewing scope - available commercially or easily constructed (*see Section V- Resources*)
- Depth finder or weighted measuring tape
- Zip-seal plastic bags (various sizes) and cooler; for storing specimens
- Species identification guides and keys
- Buoys to mark suspicious plant location
- Permanent marker pens - to mark specimen containers
- Magnifying glass or hand lens - for examining plant specimen structure. 10X to 20X strength are recommended.
- Small white tray or shallow plastic container (e.g., margarine tub) - for floating and observing specimens in the field
- Polarized sun glasses - greatly improve visibility under most conditions

The following items are not essential, but may be very helpful:

- Colored pencils or highlighter pens - for tracking survey progress on the map
- Long-handled net - used for catching stray plant fragments; a leaf rake can perform this task sufficiently
- Long-handled cultivator - for collecting bottom specimens out of reach
- Weed weasel - a tined tool on a rope, used in deeper water to obtain plant samples not visible from the boat. (*Construction plans are in Section V - Resources.*)
- Underwater video camera - used in deeper water to see plants that are not visible from the boat
- Small gas-powered or electric motor - facilitates travel to survey locations and through plant-free sections of the littoral zone (**Motors should not be used in areas where there is significant plant growth.**)

View Scopes

View scopes are an essential tool for conducting screening surveys. Ripples and surface reflection may obstruct a surveyor's view of plants below and a scope penetrates through these surface disturbances allowing surveyors to see more effectively. Though scope designs vary, the best scopes are easy and comfortable to use, provide a relatively wide angle of view, and are constructed of opaque materials to shield out as much side and back light as possible. (Being relatively cheap and easy to construct is another plus!) Here are examples of some of the scopes constructed and used by lake volunteers. The bucket scope cover, view canoe, and trunk scopes are original volunteer designs. Directions for constructing your own scopes are available online at www.mainevlmp.org.



diver's mask



kayak scope



6" tube scope



trunk scope



bucket scope



view canoe

ACTION PLAN WORKSHEET: Surveying your lake

Project Goals and Strategies

These goals reflect where you are in surveying your lake for invasive aquatic plants and when you intend to re-evaluate.

Sample Goals

<p>Surveying your lake Overall Goal: Establish an annual screening survey program by 2020.</p> <p>Year 1 Goal(s): Identify a project coordinator for the plant survey program. Recruit and train volunteers by 2017.</p> <p>Year 2 Goal(s): Include native plant identification during the IAP plant surveys and create a map of dominant native species.</p> <p>Years 3-5 Goals: Continue screening survey efforts and expand number of volunteers trained and participating in the program.</p>
--

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

3: Surveying your lake					
Activity 1: Enlist volunteers to assist with screening survey program					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Host information meeting	high		3 hours	S. Monson	May
2. Host screening survey training	high		6 hours	S. Murray	June
3. Assign sectors / provide base maps	high		2 hours	N. Murray & J. Kingston	July
4. Conduct first-year screening survey	high		many hours	N. Murray & J. Kingston	August

4. Fundraising

Trying to raise funds to start and maintain an IAP management program can be challenging. The good news is there are lots of resources available that can guide you through the process. In particular, the Internet is an invaluable resource for discovering the basic how-to, the tips and tricks of pros, and much more. Fundraising is a large topic that could be a separate guide by itself. In this section we will briefly describe some of the main areas you should consider.

Topics Covered:

- Where to start the fundraising process
- Different types of fundraising
- Leveraging personal connections
- Fundraising resources

There is no one right way to approach the task of fundraising; every lake group needs to assess their possible options and pick what fits best for them. The first step is to figure out who can do this for you. Is there someone in your lake association that has experience writing proposals and fundraising and would be willing to volunteer some time to help? If that isn't an option, should you hire a professional grant writer or send someone for training? Start early! Getting donations and financial support for your program will take time. Don't wait until the last minute.

Determining your funding needs begins with the specifics of your management program. It will be necessary to identify all the materials, operations and services you will need for your IAP program. Consider not just the immediate costs but also long-term needs (5-8 years out). Although the long-term cost estimates may change once you get there, it is a good idea to have some notion of just how much you will need to fundraise to keep your program running over the long haul. With that said, trying to decide just how much money is needed can be a tricky task; it is better to err on the side of items and services being more expensive rather than less. You don't want to get caught not having enough funds to get you through the year.

When considering the available funding sources, think about creating a layered, diverse approach to funding. Start with a grassroots local reach (association members and community businesses), then grow out to county or region-wide resources, followed by state level, and then consider other sources such as corporate or civic organizations and foundations.

Local networking and donations

Think locally! Set aside time for a brainstorming session to list potential supporters in your community: members who have supported your organization in the past, business owners with an interest in healthy lakes, and influential friends. Don't overlook the value of the personal connections of your members. A strong base of local support is a powerful argument to other potential funding sources, so even a small amount given locally can leverage other donations.



Presentations to potential donors can be formal or informal and even get them out on the water.

Photo: Ken Stabinski.

Find ways to link up with local civic clubs and groups that have regular meetings and invite community members to speak (Elk's Clubs, Kiwanis, Rotaries, Granges, Masons). Consider creating a special presentation and talking about the economic losses that are potentially at stake if an IAP gets into your lake. Have a funding target and a clear description of how the money will be used. You may not get a donation right away, but it is a good way to start the conversation, and it may lead you to other connections within your community.

Donations don't just need to be cash; reach out to businesses with services or materials that can assist your management program or provide food or prizes for one of your events. Put together a one-page information sheet about the work you are doing and how their donation can benefit them and you. Use photos in your material and provide answers and information relevant to the business you are asking.



The wife-carry race is a popular component of the annual *Shoe and String Festival* in Norway, Maine.

Photo: Brenda Melhus, courtesy of Western Foothills Land Trust.

And don't forget the residents on your lake! Make sure folks know the hard work you are doing to preserve the very lake they live on. Little Sebago Lake in Windham, Maine provides a flyer to each of the homes in the area that they worked that day. After finishing up for the day and before heading back to dock, the crew makes sure each home or camp in that area receives the flyer with information on their control efforts, how many bags of variable watermilfoil they removed that day, and how the residents can help out financially or by volunteering time. The same idea could be applied to a screening

survey being conducted, with homes getting information on how much area was surveyed, what types of native plants were found, and whether invaders were discovered, in addition to the information on how to support your program.

IN-KIND SUPPORT

In-kind donations can be given in the form of goods and services rather than cash. They may be resources you would otherwise pay for, or they may be things that money simply cannot buy. When someone volunteers to give you a service, supplies, or free help, you are receiving in-kind support. Do you hold meetings at a Board member's house? Does the local Town Office let you use the photocopier? Will a local marina donate a pontoon boat? Can someone with mechanical skills retrofit your pontoon boat to be used as a DASH unit? Are you baking cookies for a fundraising event? These are all examples of in-kind support.

Seeking in-kind support should be an integral part of your funding activities. Many donors – people, groups, or businesses – find they are more able to donate something other than cash. In-kind support should not be seen as a second-best to direct monetary donations, but as an equally important part of the resource pool available to help support your IAP program.

Here are more examples . . .

- Printing and mailing
- Website development and hosting
- Office equipment and supplies
- Transportation
- Fundraising and grant-writing assistance
- Legal, accounting, or clerical assistance
- Space for events
- Use of private launch sites
- Use of property or facility for construction projects
- Food for meetings, work-days, fundraising events, etc.
- Use of boats, tools, monitoring equipment
- Time donated by skilled, creative and industrious volunteers



Here a volunteer donates his time to help enter data.

Photo: Maine Volunteer Lake Monitoring Program.

Fundraising events

Special events are another method of raising funds for your program. The added bonus is that they also increase visibility and support. Events can include barbecues, raffles, walkathons, outings, entertainment. Get creative! Clearwater Lake in Industry, Maine held a 'Chinese Mystery Snail Roundup' at which participants competed to collect the most snails. A free lunch was provided to the participants and prizes awarded for most snails collected by weight as well as largest snail collected. The event was a great success, raising awareness of the problem, removing over 500 pounds of snails from Clearwater Lake, and raising funds for their management program.

Sometimes local businesses (like a pizza parlor or other restaurant) are willing to host a night a week where they agree to donate 10% of their proceeds towards the Hydrilla Battle in their community. Often a business will pick a slow day of the week and donate a percent as a way to support a good local cause and promote business at the same time. This provides another publicity opportunity for your program – an added advantage.



Putting on a family contra-dance is a fun and healthy way to raise money for your cause.

Photo: Brenda Melhus, courtesy of Western Foothills Land Trust.

Grants

Finding grant opportunities and information about possible funders can seem like an overwhelming task, but there are many resources available to assist with the process. That being said, grants require a considerable amount of thought, effort, and time. If you have someone who is experienced in grant writing, great! You are already one step ahead. If you are starting from scratch, going to workshops, researching on the Internet, and talking to grant assistance groups are useful ways of learning about grantseeking. Once you are comfortable with the grant process, the next step is to find potential funders for your program.

For a list of grant writing and research websites, check out the Resources pages in Section V.

Develop a list of criteria so that you can find funders that will fit your program. Then, identify funders interested in your particular location and/or program focus; developing an expansive list that will be winnowed down to those that best fit your needs.

Using the information you have gathered, write a targeted proposal for each potential funder. Follow their current proposal guidelines and be sure to check with your steering committee and management team to see if anyone has a personal connection to prospective funders. Create a prospect spreadsheet to keep track of those funders you have targeted with proposal deadlines, grants you have applied to, the amount requested, award date and follow up status.

Business sponsorship

Local businesses have a vested interest in maintaining the economic welfare of the communities in which they do business: this means the lakes at the foundation of many rural economies is of interest to them. Make a list of all the businesses with which members of the management team have personal connections, and then expand it to include every local business that might be related to your cause. Gather the contact information for whoever makes

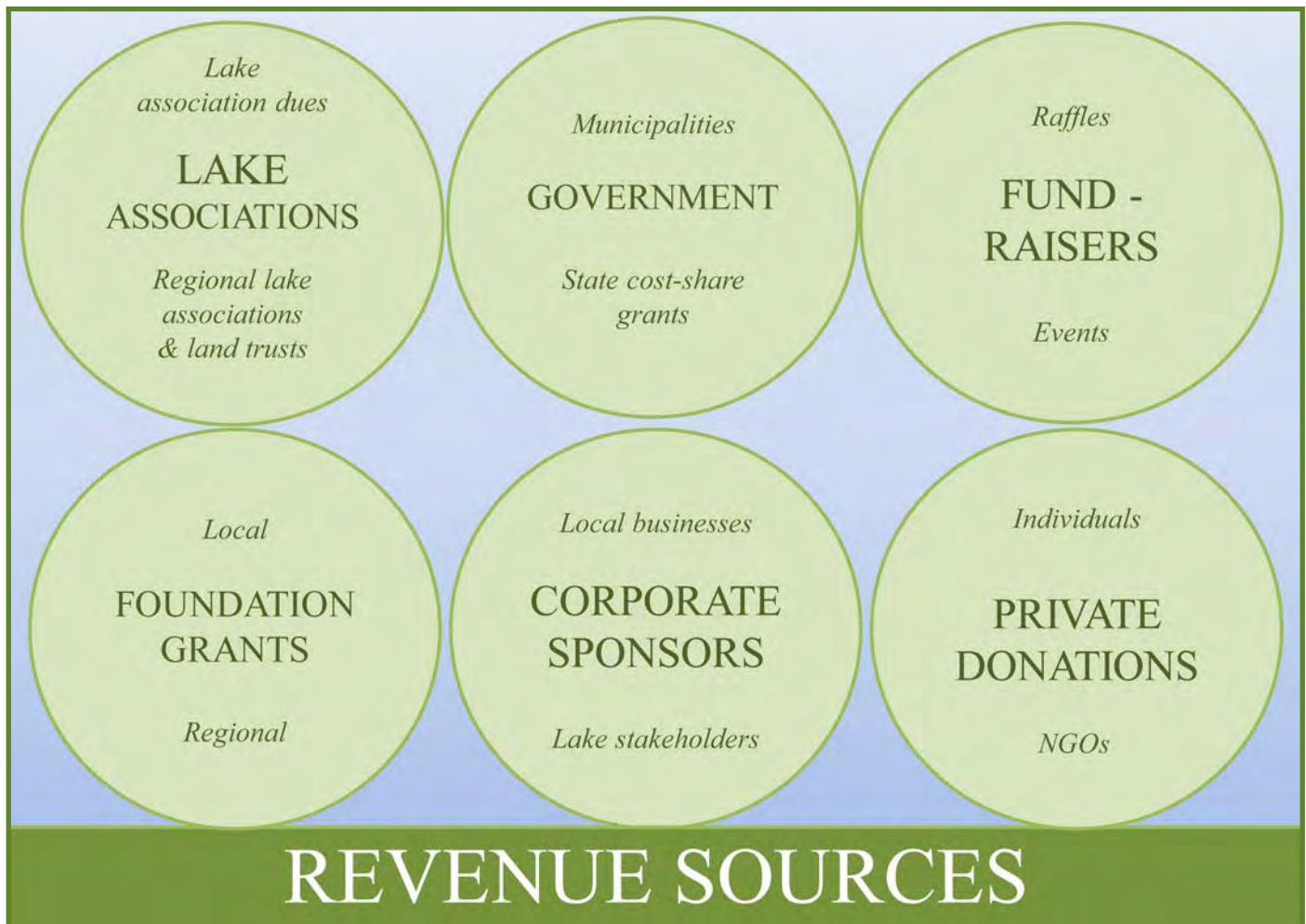
the sponsorship decisions and decide exactly how much you want to ask for. Compose a customized case statement for each business that tells them about your program and how it can benefit their business to provide a sponsorship.

For those businesses with whom someone on your team has a personnel connection, ask them to hand-deliver the letter and provide information on the program. When contacting businesses that are not personally connected, make sure to tell them about you, the program and ask permission to send an email with further information. Writing a script before making the call can help ensure that you cover all the information.

Call to follow up during the day within a week of making contact. Don't get discouraged! You will encounter many more nos than yeses. The secret to successful fundraising is asking a lot of people.



Signage showing business sponsor of a lake's Diver Assisted Suction Harvester.
 Photo: Lake Arrowhead Conservation Council (adapted by Maine Volunteer Lake Monitoring Program).



ACTION PLAN WORKSHEET: Fundraising

Project Goals and Strategies

These goals focus on how you will raise funds, how much you need, who you will be targeting to seek funding, whether or not you will be writing grants, and who will be responsible for that task.

Sample Goals

<p>Fundraising</p> <p>Overall Goal: Establish an ongoing program of grant submissions and funding sources to continue the IAP management program efforts.</p> <p>Year 1 Goal(s): Enlist a trained grant writer to lead the effort and gather information on targeted funders: state agencies, foundations, lake residents, surrounding municipalities by 2016.</p> <p>Year 2 Goal(s): Begin an annual fundraising campaign targeting lake residents and submit a minimum of 5 grant proposals to appropriate grantors by 2017.</p> <p>Years 3-5 Goals: By 2020, Sample Lake Association will raise \$30,000 each year through a targeted program of grant applications to relevant foundations and organizations, 3 annual fundraisers (a mail campaign, pot-luck dinner and milfoil days picnic) and support from surrounding towns (Poland, Gray, Peru, Dixfield).</p> <p>Strategy: The Sample Lake Association will initially start its fundraising efforts by reaching out to lake residents and municipalities. We will then solicit foundations and other grantors in addition to local resources.</p>
--

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

4: Fundraising					
Activity 1: Determine key foundations for submitting proposals for our work					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Review list of foundations and determine fit for Sample Lake	high		7 hours	B. Newton	March
2. Create calendar of due dates	high		2 hours	B. Newton	March

5. Sustaining the Effort

Sustaining your effort is critical. IAP management programs are a time consuming process and are never really finished. The steering committee must continually nurture and expand community involvement and partnerships. Recruit new and diverse stakeholders who can help maintain the human, social, and material resources needed to achieve your long-term goals.

Evaluation of your efforts must also be an ongoing process. Shifting resources and unanticipated changes may require that you update your goals and action plan. Evaluation allows everyone involved to be up-to-date on the program's progress, results, and challenges.

Topics covered:

- Maintaining community interest and engagement
- Ongoing monitoring, review and assessment

Maintaining community interest and engagement

People remain involved in projects if they feel they are achieving their personal goals. Recognize that individuals (and groups) have different reasons for becoming and remaining involved and do what you can to ensure the needs of each participant are being met. Common motivators for people who become and stay involved in community projects include:

- learning something new or developing new skills
- meeting, working with, and making friends with like-minded people
- feeling their contribution is genuinely useful and helpful to the community
- having the opportunity to influence the outcome of an issue of personal concern
- being recognized for their efforts

When new people arrive for their first meeting or activity, be sure to welcome them, thank them for coming, and solicit their opinions and suggestions. Create an environment that makes them part of the discussion, get them involved in projects that spark their interest, and most important, listen to what they have to say.

Active listening will prevent alienating people and helps you to empathize with and understand different perspectives and opinions. Active listening skills include clarifying things that don't make sense, summarizing what is presented, and allowing the participants to finish without interruptions.

One of the best ways to ensure continued engagement is to provide numerous opportunities for people to learn, grow, challenge themselves, and share what they have learned with others by taking on meaningful leadership roles. Dispersing leadership liberally throughout your organization has the added bonus of preventing burn-out among those who are already actively engaged in leadership roles.

Define and clarify the plans, goals, and purposes of the group early on. People need to have a sense of direction with something to look forward to in order to get and stay involved. Working towards common goals gives people a special bond, enabling them to work together as a team and making them care more deeply about the work they are doing. Come up with clear plans and realistic goals and make sure that they follow a practical, achievable timeline. If people see nothing happening--or if they feel too rushed--they will lose interest. Know how to pace your projects. Creating a timeline allows you to see what is complete and what still needs work, in addition to giving everyone a clear idea of a realistic pace. Periodically remind group members of the goals and timeline in order to keep them focused and inspired.



Working in teams is not only more efficient and effective, it is more fun!
Photo: Maine Volunteer Lake Monitoring Program.

Establish good communication and be organized. When people walk into a disorganized or unclear situation they generally walk away. Keeping people informed will help them work to meet common needs and avoid duplicating work.

People value their time. Any time people get involved in an issue, they are committing personal time, but sometimes they also sacrifice work time or time spent with family and friends to become involved. When people show up for a meeting, they rightfully expect to have their time used wisely. If a meeting drags on or accomplishes

little, they may not attend other meetings or events because they feel as if it is a waste of their valuable time. Know how to run effective and efficient meetings, and keep them as short as possible.

Provide significant recognition of all contributions to the effort. Most people appreciate being thanked for their contributions to a cause. Sincere, informal signs of appreciation: a smile, a word of thanks, a handshake, a hug, given when appropriate, will not go unnoticed. But it is equally important to provide regular (perhaps annual) demonstrations of formal appreciation for everyone who contributes in any way to your cause. Listings of supporters in newsletters and on websites, award ceremonies, plaques, tee-shirts, pins, are all ways in which you can show an individual or group, and the greater community, how much you appreciate each and every contribution.

Ongoing monitoring, review and assessment

In order to sustain the effectiveness of your efforts over time, components of your IAP program are going to require ongoing monitoring and regular review. This periodic examination will allow your steering committee to respond to environmental changes, assess the efficiency of technological components, anticipate the need for any modifications or program redevelopment, and identify changes to recordkeeping requirements.

It is important that you have a well-crafted action plan in place to give strategic direction. However, even the best plans cannot predict every internal and external change that may occur. The collection and recording of real time data (e.g., assessments of existing resources, updated screening surveys, information regarding the status of a new infestation) will allow your program to respond quickly to actual events.

Areas to monitor and review may include, but are not limited to the following:

- lake 'infested' status
- screening survey protocols
- volunteer needs
- funding goals met or not
- changes to permit rules
- new control technologies
- efficiency of current control methods
- status of infestation / current map
- assessment of annual goals

An annual or bi-annual assessment of your program can keep things running smoothly for the long term. Some questions to reflect upon during your assessment may include:

- How do you monitor progress and gauge results?
- Have you widely shared the information gathered?
- How do you promote the results of your efforts?
- How do you continually improve your efforts?
- How do you effectively apply the "lessons learned"?
- Are you satisfied with your progress toward interim and long-term goals?
- Are you building system-wide capacity to ensure long-term effect and sustainability?
- Do you have the funds to sustain your efforts?
- Are you building capacity within your organization?
- Have you considered alternative courses of action that may prove more promising?

ACTION PLAN WORKSHEET: Sustaining the effort

Project Goals and Strategies

This section will focus on your ongoing efforts including volunteer needs, plant surveys, control activities, and other areas. This is where you will plan for any program reviews and adjustments.

Sample Goals

<p>Sustaining the effort</p> <p>Overall Goal: The Sample Lake management program will monitor its efforts through a combination of plant surveys, evaluating volunteer programs, and assessing how effective we are at accomplishing goals.</p> <p>Year 1 Goal(s): By 2016, Lake Sample Association will have enough volunteers to complete a screening survey and will begin reaching out to the lake community for funding and educational purposes.</p> <p>Year 2 Goal(s): By 2017, Lake Sample Association will host a volunteer recruitment day, implement a speaker's bureau of local talent, and conduct our first goals assessment of the IAP management program.</p> <p>Years 3-5 Goals: Continue annual volunteer recruitment and goal assessment.</p>
--

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

5: Sustaining the effort					
Activity 1: Host volunteer award and thank-you event in late September					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Find venue for event that holds 30 people	high		2 hours	J. Jay	July
2. Order awards	high		2 hours	J. Jay	July
3. Hire caterer	high		1 hour	J. Jay	August

Section IV

Control Activities



Controlling invasive aquatic plants is often hard and messy work. The Friends of Cobbossee Watershed benthic barrier crew shows what it takes to get the job done.

Photo: Friends of Cobbossee Watershed.

Section IV: Control Activities

In order to successfully manage invasive aquatic plants over the long-term, waterbodies need to have a management program based on a comprehensive action plan. A plan will help provide the rationale for your management, and the process will help to identify what information you have and what is still needed. This section focuses directly on the activities necessary to control invasive aquatic plants.

6. Evaluating the infestation

Before you can develop and implement your IAP action plan you will need to know precisely what it is that you are dealing with. How extensive is the infestation in the lake? Where are the hot-spots, where is the infestation most well-established? How large are these areas? How dense are the populations? Are their native species mixed in? Where are invasive plants most likely to come into contact with boating activity? To answer these questions you will need to do an IAP infestation survey.

Topics covered:

- Preparing for an IAP infestation survey
- Observation codes and mapping
- Determining the extent of the infestation



A dense stand of variable watermilfoil, (*Myriophyllum heterophyllum*).

Photo: Lou Wetzel.

Knowing the current status of your infestation at any point in time is essential to developing and implementing an effective control strategy. Since even minor infestations may persist for at least several years, and most infestations persist for significantly longer, you should plan accordingly. Conducting an initial Baseline Infestation Survey and developing, activating and supporting a sustainable Monitoring Infestation Survey program should be a critical part of your IAP action plan.

Two distinct types of surveys are required for effective IAP management: the Baseline Infestation Survey and the Infestation Monitoring Survey. Each has a specific purpose and emphasis, and the strategies for accomplishing each survey type may vary.

- The purpose of the Baseline Infestation Survey is to determine the extent of the infestation and gain a clear understanding of the unique characteristics of each infested area and use that information to develop the optimum control strategy. With a Baseline Infestation Survey the emphasis is on thoroughness. The best way to achieve this is to conduct a comprehensive Level-3 survey and to clearly record and map all survey findings. A group that does not yet have an existing volunteer-based survey team may opt to hire professionals or trained student interns to conduct this initial baseline survey, or develop and activate a trained volunteer IAP survey and mapping team.
- The purpose of the Infestation Monitoring Survey is to regularly monitor (annually or more frequently) the infested waterbody to assess control activity effectiveness and detect new pioneer colonies as early as possible, in order to inform ongoing adjustments to the management strategy. With an Infestation Monitoring Survey, the emphasis is on vigilance. Possible strategies for this ongoing monitoring effort include: the development of the volunteer team; engaging the control crew in the monitoring and assessment of the control sites; engaging boaters and shoreline property owners in a buoy-marking campaign as discussed in the Little Sebago Lake Case Study; or a combination of the above.



A team plots their course before embarking on an infestation mapping survey.

Photo: Steve Underwood.

Much of the process involved in both types of infestation surveying is similar to conducting a screening survey. The difference being that for the infestation surveys you know there is an invader in your waterbody and that invader is the primary target of your survey activity.

Primarily you are looking for the “confirmed” invader. But since you are going through the process of conducting a comprehensive survey of the waterbody, you may wish to expand the scope of your survey to include being on the lookout for the other invasive plants that are listed IAPs in Maine.

Figure A - Buoy illustration.

Figure: Maine Volunteer Lake Monitoring Program.



Figure B - Marker buoys in amongst floating plants.

Photo: Jacolyn Bailey.



The perimeter of larger infested areas may be marked with a series of weighted buoys.

Conducting an infestation survey

When there is a confirmed presence of an invasive aquatic plant in a waterbody, it is recommended that a Baseline Infestation Survey is conducted and the entire littoral zone is surveyed. The earlier the detection of all invasive plant populations in the waterbody, the better the chances for successful control and the greater the potential to prevent spread of the invader to other, non-infested regions of the water body.

It is important to note that some invasive aquatic plants may be found at depths beyond those typical for a littoral zone. Hydrilla can grow in water depths of 50 feet. Whatever the target plant, it is always advisable that you research its growth habits and adjust your survey strategy accordingly. Spend time getting familiar with the appearance and growth habit of the target invader. Visit a known infested area to observe the plants as they appear from the boat, and carefully collect a sample for closer inspection.

As with the screening survey, obtain a base map for your waterbody and, using colored pencils or highlighters, shade in the areas to be surveyed. Provide copies of the base map for each of your infestation survey teams with assigned sections. When an IAP population is found indicate where on the map and note local landmarks (shoreline cottages, unusual rocks or trees) to help others re-locate the site. Mark the GPS waypoint or record longitude/latitude coordinates if you are using this technology. To keep the map readable, you can simply number the observation on the map and then record the location, landmarks, and/or waypoints on a separate form.

Characterize all of your IAP observations on the map and/or separate form. The chart on the next page is an example of a simple code system that can be used for characterizing each IAP observation. Record each characterization code under the observation number on the form. In some cases it may be appropriate to use more than one code, for example IA/MXN would indicate an infested area where invasive plants are sparsely scattered among a dense colony of native plants.

Once a Baseline Infestation Survey has been completed, it can be used to determine management priorities and methodologies. It is crucial to continue a surveying program over the long-term in order to assess control

activities and help guide management priorities going forward. This is when an Infestation Monitoring Survey should be conducted. Mapping and infestation characterization still occurs as in Baseline Infestation Surveys however the survey area consists of the known locations of infestations. Surveyors can assist control crews by marking the location of an invasive plant with weighted buoys. If it is a larger infested area where plants and plant clusters are sparsely distributed and too numerous to mark individually, they can mark along the perimeter of the site with a series of buoys.

In addition to your infestation survey teams, engage lake residents to look for invasive populations. Shorefront property owners, for example, can be issued marker buoys and use them to indicate any new IAP sightings they may happen upon while they are out on the lake.

CODE	OBSERVATION CHARACTERIZATION
IN	Individual IAP
SDP	Small Dense Patch of IAP; primarily single species stands, covering an area less than 100 square feet
MDP	Medium-sized Dense Patch of IAP; primarily single species stands, covering an area 100 to 500 square feet
LDP	Large Dense Patch of IAP; primarily single species stands, covering an area over 500 square feet (Provide an estimate of the area coverage for LDP if possible.)
SIA	Sparsely Infested Area; plants and plant clusters sparsely distributed over a wide area, too numerous to mark individually (Shade SIA on the map &/or mark outer boundaries with series of GPS way points)
MIA	Moderately Infested Area; Plants and plant clusters moderately distributed over a wide area, too numerous to mark individually (Shade MIA on map &/or mark outer boundaries with a series of GPS waypoints)
HIA	Heavily Infested Area; Plants and plant clusters are heavily distributed over a wide area, too numerous to mark individually (Shade HIA on map &/or mark outer boundaries with a series of GPS waypoints)
MXN	IAP mixed in with a significant colony of native plants (Use to modify any of the above codes.)

When the survey is complete, organize your findings and consider how you are going to use the infestation data. Data may be organized simply by copying and collating the documentation forms and field maps or by creating a report or poster that can be used to determine your control strategy and share your findings with the public.

ACTION PLAN WORKSHEET: Evaluating the infestation

Project Goals and Strategies

These goals reflect where you are in evaluating your infestation as well as how often you intend to re-evaluate.

Sample Goals

<p>Evaluating the infestation</p> <p>Overall Goal: Establish an annual infestation survey program that documents (ideally using GIS) the ongoing efforts of the management program by 2020.</p> <p>Year 1 Goal(s): Establish a project coordinator and enlist and train volunteers to begin an infestation survey program by 2017.</p> <p>Year 2 Goal(s): Incorporate the use of GIS mapping into evaluation efforts. Either have a volunteer do map production or hire a professional company.</p> <p>Years 3-5 Goals: Continue infestation survey efforts and expand number of volunteers trained and participating in the program.</p>

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

6: Evaluating the infestation					
Activity 1: Host volunteer award and thank-you event in late September					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Host informational meeting	high		3 hours	N. Murray	July
2. Host mapping training	high		6 hours	N. Murray	July
3. Mapping practice day/assign sectors	high		4 hours	N. Murray & J. Kingston	August
4. Conduct first-year survey	med		many	N. Murray & J. Kingston	end of September

7. Setting site-specific control objectives

Before you can determine which control technologies you are going to use to manage the IAP populations in your lake, you need to use the information gathered from your infestation mapping to determine site-specific (whole lake and areas within lake) strategies.

Topics covered:

- Finding the best action plan for your lake
- Site characterization
- Creating a timeline
- Evaluating your progress

There is no magic bullet that exists that can 1) completely eradicate an invasive species infestation, 2) be inexpensive, 3) take almost no time and 4) have no effect on the local ecology. The choice of control strategies should be a **balance** of all these concerns based on what is best for the water body under consideration.

Developing a cost-effective and environmentally sound IAP management program can be a challenge. Every waterbody has unique characteristics (aquatic plant community, substrate type, etc.) and ways in which they are used (recreational, drinking water, etc.). For example, one lake could be a water source for a local city and allow no swimming, only limited boating and have a high diversity of aquatic plants; another lake may be highly used for an assortment of recreational uses (fishing, swimming, water-skiing, kayaking) and have 2 to 3 dominant aquatic plant species. The control method chosen for these lakes should be based on site-specific factors including the ecology, human uses, financial resources available, extent of the infestation, and IAP species present. It is important to proceed in a systematic manner.

Site characterization

Control of invasive aquatic plants in a waterbody will likely have diverse objectives for the different areas (coves, boat launch, fishing area) under consideration. They may be eradication within an area, population suppression, limiting spread, or reducing impacts.

The completed infestation map of your waterbody will indicate where the invader populations are, how large an area they encompass, and how dense those areas are. Additional information gathered should include locations of boat launches (private and public) and marinas, recreational uses of areas (fishing, water skiing, swimming, boating, etc.), use intensity, water flow characteristics, and water depth.

Once the areas within the lake have been characterized, you need to determine the removal priority, level of removal (eradication, suppression, impact reduction), and type of removal method. For example, boat launches and water skiing courses are considered high-use areas and should have a high priority. Difficult to access wetland coves with low use would be regarded as a low priority, as would a wooded shoreline with no homes and limited boat traffic.

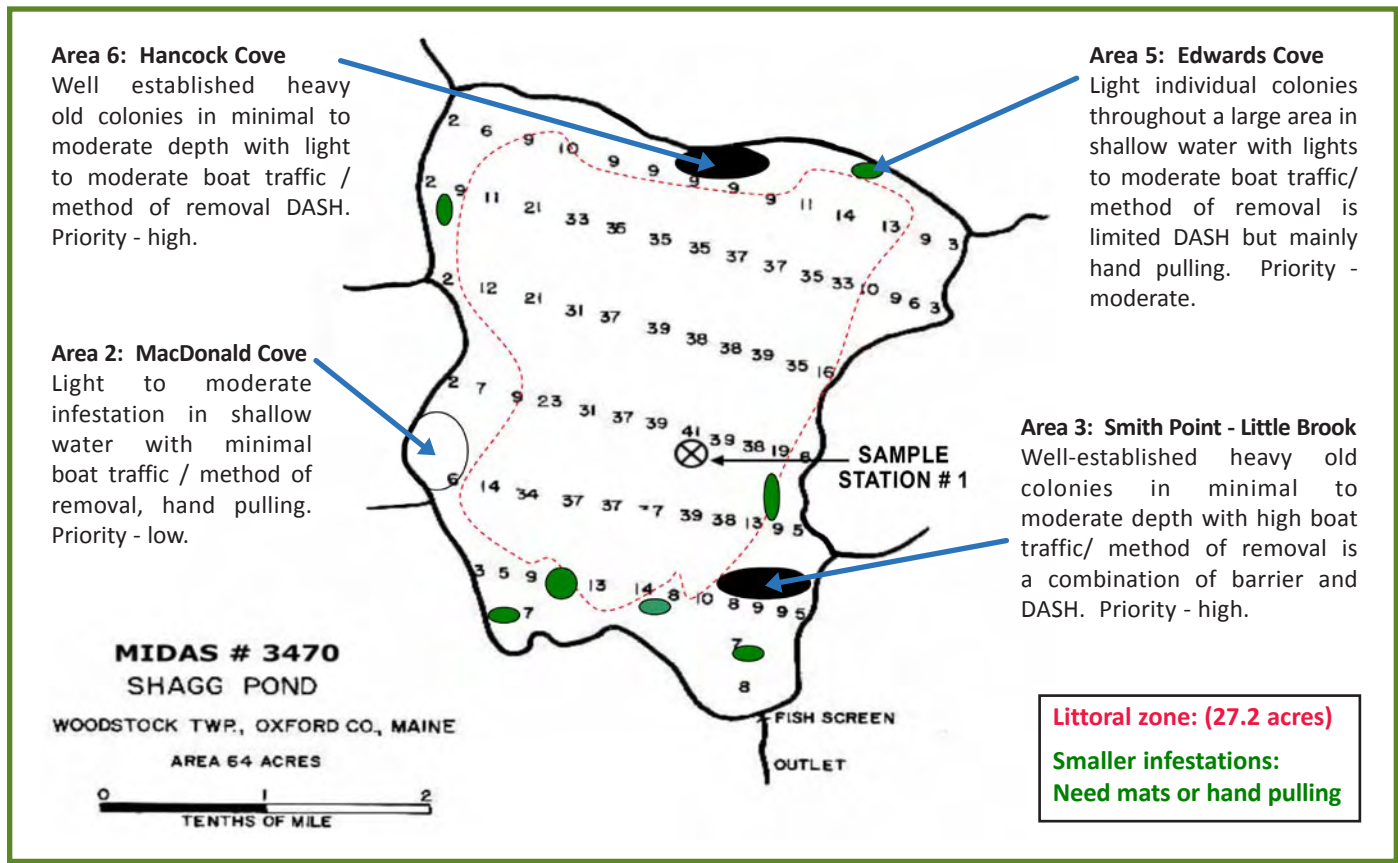


Shoreline characteristics and surface uses may vary dramatically throughout a lake. Noting the unique characteristics of each area will help determine which type of control method to use in each situation, how best to prioritize control activities, and the scope and intensity of each control action.

Photos: Jacolyn Bailey.

Areas with higher concentrations of plants may initially receive more resources than areas with fewer plants, however, do not neglect the low density areas as they can eventually become larger and/or create fragments that reestablish in areas you have already worked.

When deciding the removal level, it is important to be realistic about the size and density of the infestation. An area with eight acres of almost 100% invasive plant that is well established may never be eradicated. However, reducing the population size and keeping the plant biomass suppressed will improve the areas for recreation and reduce fragmentation and potential establishment of new populations. In areas where there are only a handful of invasive plants among many natives, it may make sense to eradicate the invader before it becomes a larger population.



Sample of a site characterization map.

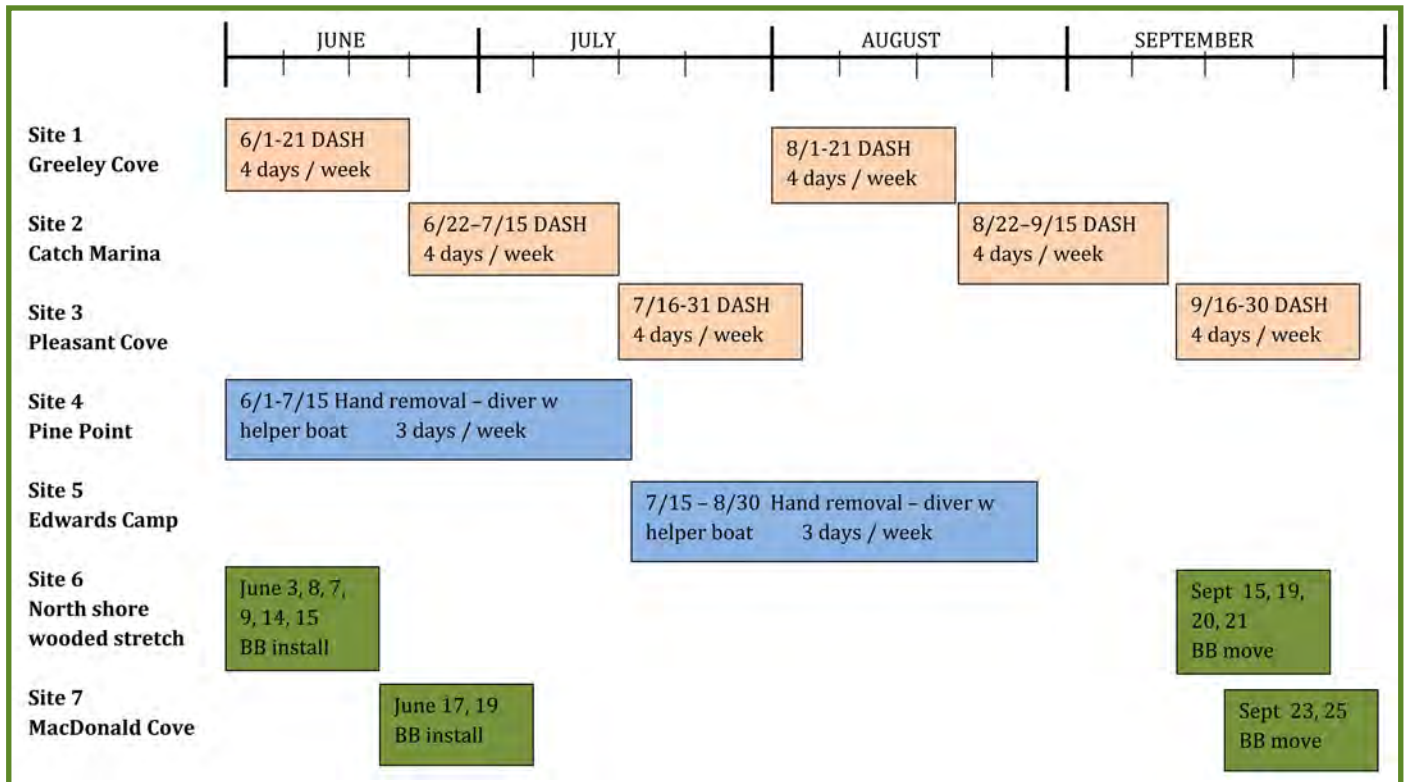
Once priorities and removal levels are selected, you need to determine which control technique to use. Areas with high intensity use, at medium depth, and comprised mostly of the IAP, would be candidates for a diver assisted suction harvesting (DASH) unit. A shallow cove with medium-sized scattered plants, that is difficult to access with a DASH boat, may be perfect for benthic barrier deployment or having divers hand remove the plants using bags. Depending on available funding, the difficult to access wetland cove may remain untreated, at least for the time being. Study the various control techniques, noting where they are best suited, under what circumstances, associated costs, the labor required, and match that to your area characterizations.

Creating a timeline

Once your removal map is completed, you can create a timeline that can effectively help you plan your upcoming field season. Ultimately the number of days you are able to work will be determined by the resources you have available. Start by estimating the cost of your chosen control technique; sometimes determining a daily rate for

each control technique makes the process easier. How many benthic barriers will need to be created? How much time will be required to make them? Can volunteers do this work to save funds? How much time to install the barriers? Can you afford to run a DASH unit all season (June – September) or are you limited to a number of weeks? Can you have your crew working five days a week? How big of a crew do you need? Starting with the priority areas, estimate the number of days you plan to work on each area and how much it will cost. If you have funds remaining, move to the intermediate priority areas, then the low priority areas. You may not work the low priority areas every year.

Once you have determined the number of days for each area, create a timeline for when the work will be done. Keep in mind environmental (thunderstorms, high winds), human (sickness, broken gear, holidays) and mechanical (engine issues, lost parts) factors that may require modifications to the timeline.



Sample of a control timeline.

KEY: BB = benthic barrier DASH = diver assisted suction harvester

Evaluating your progress

It is important that records are kept for all control activities, including dates, times, people involved, hours spent, amount of plant material harvested, etc. This information is not only helpful to you monitor your progress, but can also be used for funding requests and project support.

Over time, you may find the control techniques selected will change based on the progress of the program. During your control plan evaluation you may decide that the control technique you originally selected for an area is no longer a good match. Likewise, you may decide that an infested area that had high priority has been knocked back enough that it only needs regular maintenance and moves to an intermediate priority. Adjust your plan and the associated activities as needed and create an updated plan annually.

ACTION PLAN WORKSHEET: Setting site-specific control objectives

Project Goals and Strategies

The goals in this section should indicate priorities, control intensity, and method(s) used for each site within your lake.

Sample Goals

<p>Setting site-specific control objectives</p> <p>Overall Goal: Determine the appropriate control actions for each infestation site within Sample Lake. Perform an annual assessment and make necessary changes before the control season begins.</p> <p>Year 1 Goal(s): Assess initial infestation map and determine control technology and intensity by May 2016.</p> <p>Year 2 Goal(s): Create removal map, indicating priority areas, and timeline for field season by June 2016.</p> <p>Years 3-5 Goals: Review progress and update status of infested areas annually. Make changes to following years site-specific control activities as needed.</p>
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Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

7: Setting site-specific control objectives					
Activity 1: Create map with all infested areas identified, characterized, and prioritized					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Create base map from mapping survey info	high		10 hours	M. Murphy	May
2. Meet with IAP steering committee; discuss control methods to use	high		4 hours	M. Murphy	May

8. Determining control strategies

Investing time in choosing the best control strategy for your waterbody is essential to the success of a management program. It is well worth the effort to review the case studies and recommendations in this guide, explore the newest control techniques and research available, and connect with lake groups already dealing with aquatic species infestations.

Topics Covered:

- Determining which control technique to use
- Manual harvesting
- Diver assisted suction harvesting
- Benthic barriers
- Chemical control
- Biological control
- Disposal options
- Quality control and training

There are a number of different approaches used across the country to combat aquatic invasive species. This section will provide an overview of the most commonly used control techniques in use with a focus on those used in Maine.

Determining the best technique for your waterbody will require you to become familiar with the advantages and disadvantages of each technique and evaluate whether it is the best solution for your situation.

Manual Harvesting

One of the most low-tech ways to remove invasive aquatic plants is by manual harvesting. This technique involves removing the plant above-ground biomass, as well as its root systems. Once collected, all plant material is placed in a mesh bag, and brought to the water surface for further disposal away from the waterbody. The means by which the plants are approached, handled, and disposed of may vary, but the basic concept remains the same.



In shallow areas, hand removal can be accomplished by wading in to remove the plants.

Photo: Maine Volunteer Lake Monitoring Program.

The depth at which the invasive plants occur determines the approach (or combination of approaches). For **shallow water** populations with solid substrate, it may be possible to approach the task by simply wading from plant to plant. The challenge with this approach occurs when the lake sediments are soft and wading causes turbidity. This release of brown clouds of fine sediments into the water column can obscure visibility which will decrease removal efficiency.

One way to reduce disturbance and turbidity is to approach the plants using a shallow draft boat such as a canoe. These lightweight craft are somewhat unstable for this type of work but, by working in two-person teams, it is possible. One person (the harvester) bends over the gunnels to work the plant from the muck, and one person (the plant collector, fragment scout, and counterbalance) carefully shifts their weight in the boat to keep things stable.

Another way to minimize disturbance when harvesting in shallow areas is to use a snorkel, mask and fins. Floating on the surface reduces the disturbance to the bottom of the lake. Wearing fins helps keep the feet buoyant at the surface; however, care must be taken not to let your fins come in contact with the bottom in the area where you are working, as they will cause large plumes of substrate to obscure visibility. As with the method above, it is helpful (and safer) to work in teams: one or two snorkelers in the water pulling plants, and one or two spotters in a boat(s), keeping an eye on the snorkelers, handling plants as they are removed, and retrieving stray fragments.

Regardless of the method you employ, some substrate disturbance is unavoidable as the plants are being removed by their roots and some sediment will be released during that process.

What is a hookah diving system?

A hookah system uses a personal compressor that is located above the water to deliver air to the diver rather than a tank of compressed air that is strapped to the diver's back. It is a convenient system for commercial divers and others who are immersed in limited areas and depths.

The approach for IAP populations in **deep water** (greater than 3 or 4 feet) is to use SCUBA or a hookah system. Again teamwork is key-- a diver works with a spotter in a boat or teams of two or three divers attended by spotters in boats at the surface who skim fragments and handle plants pulled up by the divers.

Regardless of the depth of the water, the technique for extracting the invasive plants remains the same. The diver, wearing gloves or bare-handed, finds the base of the plant, reaches down into the substrate carefully loosens the roots, then lifts the plant, roots intact, from the sediments. It is VERY IMPORTANT to remember that any small stem or root fragment left behind is capable of sprouting a new plant. Great care must be taken to avoid fragmentation.

As mentioned earlier, removing plants causes turbidity. Much of the hand-removal work is done in conditions of poor visibility, compelling divers to learn to recognize the target invaders as much by feel as by sight. The visibility problem can be mitigated somewhat by working methodically in one direction, and striving to keep ahead of the leading edge of the sediment plume. In areas where there is a flow, starting at the downstream end of the infestation and working upstream can minimize the effect of removal-generated turbidity on visibility. Another solution is to work a defined area until the turbidity becomes unmanageable, then to leave that area to settle (perhaps shifting to a second area away from the plume), then return to the initial area to clean up the plants that were missed earlier.



Careful removal of the entire plant, including roots, prevents re-growth.
Photo: Lakes Environmental Association.

Divers use various techniques and equipment to transport plants to the surface. If you are working in very shallow water (or, in deeper water, removing only one or two isolated plants), getting plants to the surface is not much of an issue. If you are removing dozens of plants in deeper water, the way in which the plants are transported to the surface can impact the efficiency of the project.



Divers are better suited to perform control activities in deep water.
Photo: Maine Volunteer Lake Monitoring Program.

For small-scale deepwater projects, divers generally use dive bags to collect plants. Dive bags (the type used by urchin divers) are made of lightweight nylon mesh with a wide, aluminium-frame mouth that opens and snaps shut like a clam shell. Bag size can vary depending on the number of plants that one is attempting to remove during the dive and the personal preferences of those who will be handling the bags. Some divers find that cutting down standard dive bags $\frac{1}{2}$ to $\frac{3}{4}$ size makes them more manageable; others prefer larger bags.

Getting the octopus-like invasive plant into the bags can be a challenge. The upper parts of plants may be coaxed into the bag prior to removing roots, to keep the plant under control and to minimize fragmentation. Larger plants are sometimes wrapped around the diver's hand like a forkful of spaghetti prior to bagging. It may be necessary to remove some plants in sections: removing the upper part first, and then the lower part and roots.

Once bags are full, divers may swim them up to individuals in boats at the surface. Alternatively, bags may be transported to boats by more mechanical means. One fairly simple and inexpensive mechanical technique is to rig up a pulley system. Clips are attached at intervals along a loop of rope, long enough to extend from the surface to the bottom, then back again. The

loop-line is threaded through a smaller loop anchored to the bottom and another smaller loop secured to the boat. Divers clip loaded dive bags to the line, yank on the line to signal helpers in the boat, who pull up the bag, empty the weeds into the hold of the boat, reattach the bag, signal the diver, and run the bag back to the bottom.

In shallow areas, a similar cable system can be employed. A lake group in Maine uses a system of cables and ropes rigged up across an infested stream to transport 5-gallon buckets full of plants to trucks waiting on shore.

Advantages:

Manual harvesting is a useful technique for removing scattered individual plants (especially those interspersed among native plants), and controlling small populations of invasive plants (usually less than a 3' x 3' area) in depths of less than 2 feet.

Disadvantages:

Like virtually all known methods of controlling invasive aquatic plants, manual harvesting has its drawbacks and limitations. It is a slow process, and weather and light conditions can impact the efficacy of the project. Low light makes finding the target invader more difficult.

Equipment & Materials:

Shallow draft boats (canoes, kayaks, etc.), paddles, PFDs, net dive bags, SCUBA flags, cellphone or radio for emergency communication, first aid kit, snorkeler's equipment (fins, mask, snorkel) or diver's equipment (BC, regulator, gauges, fins, mask, wetsuit). The diver's equipment is typically provided by the certified SCUBA diver.

Diver Assisted Suction Harvesting



DASH units are constructed on floating platforms, such as a pontoon boat.

Photo: Joseph Howe.

This technique is used by divers and involves the hand-removal process, but instead of placing the plant material into a bag, the diver uses a suction hose. It is essentially accelerated hand-removal.

A DASH unit is constructed on a floating platform, such as a pontoon boat, barge, or even a swim platform mounted on pontoons. The deck of the platform is modified by either completely replacing the floor with a steel mesh, or by cutting rectangles in the floor and replacing it with the steel mesh. Mounted on the deck is a venturi pump that draws water through a hose. The hose is a special low-density, large-diameter

hose connected to the pump that extends into the water from the vessel, floating on the water surface except for the last 8-10 feet which is sinking hose. The end of the hose is held by a diver who feeds plant material into the opening. The plants, water and a small amount of sediment are discharged into a collection area. The plants are collected and the water flows back out into the lake.

A number of options have been employed for plant material collection. On some DASH units plant material moves down a sluiceway and is deposited in mesh bags attached to the underside of the sluice. A deckhand, or the boat captain, exchanges full bags for empty ones. They also watch that the bags do not become clogged by sediment or algae and keep watch on the diver. At the end of day the bags are stockpiled or brought directly to the disposal location.

Using another collection method, the hose dumps directly into a large basket made of steel mesh. The mesh is small enough to keep any plants from escaping but large enough for water to drain. Often there are two of these baskets on the platform so that when one is filled the other can be used. It is typically necessary for a worker to pitchfork the plants from the basket in which they are deposited into another basket. If plants are allowed to accumulate in the basket that the hose is dumping them into, the basket will have trouble draining. In the event that the dry basket fills up, plant accumulation in the wet basket should be piled to the side, trying to leave as much of the basket floor uncovered as possible, particularly in the spot where the hose stream makes contact with the basket bottom. The boat captain keeps an eye both on the basket and the divers. Overnight the IAP that has been collected can continue to drain and takes up less room. The challenge for this collection method is emptying the basket. Some groups use large machinery to remove the basket from the boat and dump it into a waiting truck, others have modified the basket so that one side will open and they can use a pitchfork to empty the basket into the back of a truck.



A venturi pump mounted on the deck of a DASH unit.
Photo: Joe Howe.



A molded fiberglass sluiceway is one option for a DASH unit.
Photo: Little Sebago Lake Association.



The sluice empties into mesh bags like these onion bags.
Photo: Little Sebago Lake Association.

Advantages:

The DASH method is best suited for plant removal in deeper water (4+ feet) with medium to large sized infestations. It speeds up the hand-removal process significantly and can be deployed easily.

Disadvantages:

The negative aspects of the method include a high amount of residual plant fragmentation (which can be alleviated by having an individual charged with fragment clean up), the relatively high start-up and maintenance costs, and the possibility of unintended by catch of non-targeted organisms.

Equipment & Materials:

Pontoon boat or platform for venturi system and hoses (see side box for detailed information on DASH unit construction), PFDs, mesh bags (if using sluiceway system), SCUBA flags, cellphone or radio for emergency communication, first aid kit, diver's equipment (BC, regulator, gauges, fins, mask, wetsuit). The diver's equipment is typically provided by the certified SCUBA diver.

Diver Assisted Suction Harvester (DASH) Specifications

This control method has encouraged an enormous amount of innovation in the development of the technology and techniques. Lake groups have fine-tuned the process to fit their specific needs based on the experiences of those groups already using the technology.

Boat & Venturi System:

- Pontoon boat or floating platform
- 50' I-helix hose 4" diameter (main suction hose – floating design)
- 23hp Vanguard® water pump model P350S (creates suction for main hose via power jet)
- 30' pressure hose 3" diameter (pump outlet hose)
- 10' suction hose – 5" diameter (final outlet to collection bin)
- Foot valve – 4" diameter (inlet and filter to pump)
- 4" power jet (creates suction to main hose)
- 4"-5" bell coupler (expands outlet of power jet to 5")
- 4" swivel hose nozzle
- swivel tip "T" handle
- foot valve cap
- 5" hose coupler with clamp
- 4" suction hose couplers (3)
- 3" hose clamp (6)
- 3" quick coupler male (2)
- 3" quick coupler female (2)

Sluiceway Collection System:

- molded sluiceway
- Plexiglas® (cut for doors to sluice openings)
- 1'x2" plastic handles for sluice doors
- heavy-duty Velcro® belt to secure onion bags

Metal Bin Collection System:

- custom metal bin to dimensions needed (typical 4'L x 3'W x 3'H)
- metal pipes attached to corner of bin to hold outlet hose
- finer mesh screening to line inside of bin to prevent fragment flow-through
- backhoe or other machinery to remove bin from boat and empty into truck for transport off-site

Benthic Barriers

The use of benthic barriers (also called bottom mats or bottom barriers) is a method that is especially effective in controlling pure (single species) stands of invasive aquatic plants. The basic concept is simple. Tarp-like material is placed over the invasive plants, on the lake floor, to prevent light penetration, disrupt photosynthesis and smother the plants. Over time, the plants beneath, including the roots, are killed.

The most common materials used in the construction of benthic barriers include fiberglass screening, geotextile or other heavy-duty landscape fabric, impervious pond liner, burlap, and plastic. Some of the materials (e.g., fiberglass screening) are porous, allowing for gases to escape from under the barrier. Other barrier materials (geotextile, plastic tarps, etc.) are less permeable and have a tendency to trap gasses.

Benthic barrier material costs vary depending on the type, quality and performance rating of the material. A 2006 Massachusetts Department of Natural Resource Conservation study estimates the cost to be from \$0.22 to \$1.25 per square foot, and an estimated cost per acre of \$20,000 to \$50,000. This estimate did not include weights, marking devices or any installation costs.

Due to the high cost of some materials, there has been experimentation using novel, less expensive materials. The Lakes Environmental Association Songo River control team in Naples, Maine started out using a blue tarp material that is inexpensive and easily acquired. Because they are using their mats on a flowing river, the material stays down well with a few strategically placed sand bags. They have since moved on to boat shrink wrap with inlaid coated rebar which is an even lower cost alternative. Another group, Community Lakes Association in Woodstock, Maine has found a 6-millimeter polyethylene material produces much lighter and more cost effective mats. A 10' x 40' polyethylene barrier is of comparable weight to a 10' X 12.5" mat constructed from geotextile. Plus, the cost of the polyethylene barrier is about 10 cents per square foot for the sheeting and rebars (about \$4000 per acre not including installation costs). Eliminating the side bars further lowers materials costs and reduces installation time.



Benthic mats are constructed from materials such as black plastic, tarp, or geotextile.
Photo: Jim Chandler.



Benthic barrier construction can be easily learned by members of the community.
Photo: Maine Volunteer Lake Monitoring Program.

Gas accumulation under the barriers can lead to billowing and displacement. To keep these mats in place, perforations must be made at regular intervals prior to installation. Two-inch-long slits may be cut with a sharp knife or box cutter, or holes may be burned into the material with a wood burning tool. Care must be taken to perforate the mat only as much as needed to prevent billowing without diminishing the light-blocking integrity of the mat.

Many of the materials used to construct benthic barriers will float and must therefore be anchored in place. Sandbags, bricks, cinderblocks, and rocks are all useful anchoring materials. The weights are simply lowered onto the mats in whatever pattern and frequency needed to make the material lie relatively flat on the lake bottom.

Community Lakes Association - low-cost polyethylene mats

The 10' X 40' mats are constructed of 6-millimeter polyethylene black-plastic sheeting with 3/8" rebar attached across the width every six or seven feet. Electrical ties are used to attach the rebar to the sheeting and clear duct tape is used to reinforce the holes for the ties. At both ends of the mat, the sheeting is wrapped around the rebar several times, reinforced with clear duct tape and tied with five electrical ties. Rope handles are attached to both ends to make the mats easier to manoeuvre into place. A box cutter is used to make a line of five evenly spaced 2-inch slits midway between each set of rebar. No side bars are used in this application, and each mat is overlapped about one-foot with the previous mat. The slippery nature of the polyethylene sheeting enhances gas escape along the sides of the mats.

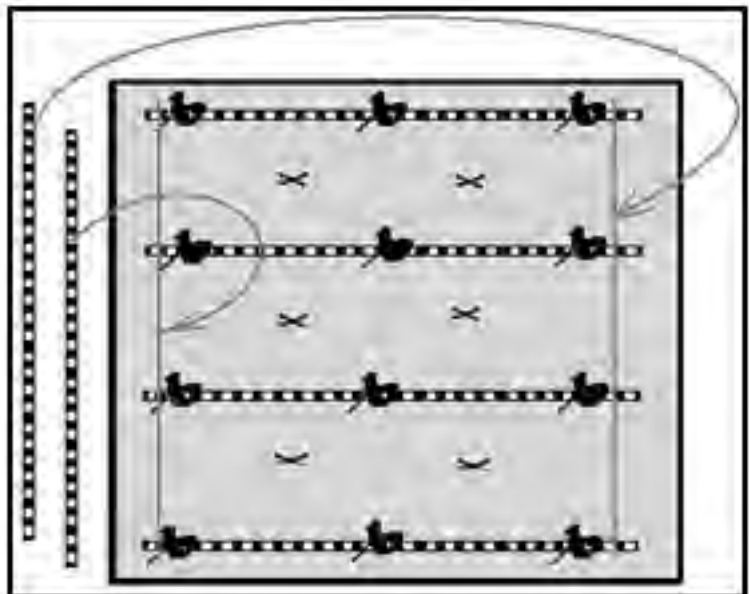
Rebar rods are also used as weights. They are directly attached to the barrier material with electrical ties to ensure that they maintain their position on the mats. The mat is then rolled up and ready for deployment. An additional option is to slide two additional rebar along the sides of the mat, perpendicular to the attached rebar, to add an extra rigidity to the barrier. However, this is not necessary; the mats can be effectively used with just the attached rebar.

The amount of weight needed to hold the mat in place will vary depending on the water depth at the deployment site and other localized conditions such as water currents, surface use activity, amount of plant material being covered. In general, mats tend to be more stable in deeper, calmer water.

Despite the best installation and weighting, boat anchors, propellers, swimmers or other types of activity may disturb, damage, or dislocate benthic barriers. Frequent (at least twice a month) visual inspection and maintenance are essential to ensuring that the mats stay in place and maintain their effectiveness. Maintenance chores include repair work, silt removal, and release of gas build-up to correct billowing problems. To help minimize disturbance problems, clearly mark the treatment areas and ask the public to temporarily avoid activity near the sites.

Benthic barrier size is determined by a variety of factors such as the size and configuration of the target infested area, the number of individuals that can install and remove the mats, and the size of the boat used to deploy the mats (for offshore areas).

Generally, the larger the mat size the more cumbersome it will be to move and manipulate, with sizes ranging (for Maine projects) from 5' X 5' to 40' X 60'. In addition to the rolled style mat, there is also a "clamshell" version that works well for small, densely infested patches. For these mats, rebar is placed along the edges of the mat and folded in half to form a triangle. A floating rope with a buoy is connected to one corner so that the mat can be relocated. The smaller 5' x 5' mats use 10' rebar that are bent at right angles, whereas the 10' x 10' clamshells use full size rebar and are folded twice.



Jim Chandler Benthic Mat /clamshell design figure.
Designs & Figures by: Jim Chandler.

Transporting and deploying benthic mats requires advanced planning and preparation. It is important to gather all of the necessary equipment including anchored buoys, floats, and underwater marking devices (such as fiberglass rods or PVC pipe). Additionally, a map indicating the targeted area for deployment, or GPS coordinates can guide the control team to the target location. GPS devices are also handy to mark the perimeters or corners of the barriers once they are in place in order to relocate the mats for maintenance or moving to a new location.

Sites close to shore can be accessed without the use of a boat. Individuals on shore can pass the mats out to divers who will then place them over the target infestation.

For offshore sites, barriers should be constructed to be efficiently transported from shore to the target area. Mats that have been previously constructed and packed (folded or rolled) for deployment are loaded into boats and transported out to the pre-determined treatment area. Working as a team, one person in the boat feeds and guides the mats to a SCUBA diver (or divers) in the water who then swims the mats to the lake floor. The mat is then rolled out over the infested area and weighted.

In areas with large infestations, benthic barriers are often installed in the high-use areas only, such as boat channels, beaches, and dock areas to establish plant-free zones that minimize opportunities for plant fragmentation and spread. However, in areas where boating occurs, barriers are recommended only in water deeper than five feet, to avoid entanglement with propellers. Control of entire large infested areas (over 500 square feet) with benthic barriers is possible, though not generally recommended, due to the cost of installation and maintenance.

Most barriers are designed to be removed after the treatment period (typically 40 to 60 days), cleaned, repaired, and either stored for later use or redeployed. In some cases barriers are removed from the water to be placed in a new location; in other cases they are simply shifted underwater. Barriers should not be left down for extended periods of time. They can become covered in silt and growing plants which makes removing and relocating them incredibly difficult. Properly maintained reusable barriers may last for up to ten years, possibly longer, depending on the material's composition, usage and maintenance.



Trevor Tidd, designer of the “clam-shell” benthic barrier, demonstrates the simplicity of his design.
Photo: Lew Wetzel.

IN MAINE

- ! Removable barriers installed during the growing season should be removed within 90 days of installation. The only exception to this are barriers installed in late fall when the time frame extends into the winter. Mats left over winter must be removed from the lake or moved to a different site at the beginning of the following growing season.
- ☾

Advantages:

Placing benthic mats requires less time than to manually harvest the same size area, and the mats produce a “cleaner” more effective) result. Typically, mats are best used in medium to large infested areas, with the invader comprising at least 70% of plant population; however, an exception to this is in a mixed vegetation stands where

sparsely distributed invasive plants persist despite repeated manual removal. In these cases small mats may be placed strategically in order to 'spot kill' the offending invaders, while allowing the natives growing around them to continue to thrive.

Disadvantages:

A drawback with the benthic barrier method is that it is not selective. Benthic barriers will damage or kill all plants underneath, invasive and native, and can also negatively impact fish and bottom dwelling invertebrates. Negative impacts on non-target animal populations are minimized, but not eliminated entirely, by avoiding benthic barrier placement during fish spawning season (from April 1 through June 30) and by limiting the amount of area covered at any one time.



Divers rolling out a benthic barrier.
Photo: UC Davis Tahoe Environmental Research Center.

The general rule is that no more than 10% of the littoral zone of the waterbody (or distinct portion of the waterbody, such as a cove) should be covered at any one time. Larger infestations are managed by covering a limited portion of the infested area, and then moving each mat to the next adjacent infested area, and repeating this process as necessary, every sixty days.

Another challenge is keeping the material in place and minimizing possible entanglement with boats.

Equipment & Materials:

Previously constructed benthic barriers (rebar, fabric/plastic, zipties, clear duct tape), PFDs, net dive bags (for fragments), SCUBA flags, cellphone or radio for emergency communication, first aid kit, diver's equipment (BC, regulator, gauges, fins, mask, wetsuit). The diver's equipment is typically provided by the certified SCUBA diver.

For shoreline work: a platform to stack mats or stack them on shore and have individuals handing them to the divers.

For middle-of-lake work: a pontoon boat works well to carry the mats, or use some sort of platform.

Chemical Control

Herbicides are chemicals used to control invasive vegetation by causing its death or significantly suppressing growth. Herbicide use and review has changed significantly in the last couple of decades as their effects on safety, health, and the environment have become more of a concern. Currently no herbicide can be used for aquatic application if it has more than a one in a million chance of causing significant harmful effects to human health, wildlife, or the environment. Due to these more stringent standards, fewer compounds are now available for aquatic use.

Aquatic herbicides kill plants by direct contact or systemically. Contact herbicides act immediately by causing cellular damage at the area of uptake. Though it acts quickly this type of herbicide has limited effect as it does not penetrate to the roots or rhizomes. Systemic herbicides take longer to act but kill the entire plant. Some herbicides are selective based on the plant's morphology or biology. For example, some herbicides are effective for controlling broadleaf plants but not narrow-leaved plants or grasses.

Herbicides must be used with caution. The U.S. Environmental Protection Agency (EPA) registers these products for use only as specified on the approved label. The applicator is required to have extensive knowledge of the system being treated (e.g., the exchange rate of the lake) and of the target plant (e.g., the appropriate herbicide concentration and exposure time for each species). Additionally, many states require further permitting or regulatory requirements and limit application to only trained and licensed applicators.

Any herbicide treatment in Maine requires a permit from the Maine Department of Environmental Protection and must be conducted by a licensed herbicide applicator.

All herbicides legally used in the United States for controlling aquatic plants must be “registered for use” by the EPA. According to the EPA’s own definition, pesticide registration is the “process through which EPA examines the ingredients of a pesticide; the site or crop on which it is to be used; the amount, frequency and timing of its use; and storage and disposal practices. EPA evaluates the pesticide to ensure that it will not have unreasonable adverse effects on humans, the environment and non-target species.”

It should be noted that the EPA definition does not say there will be “no adverse effects;” it says that any possible adverse effects will not be “unreasonable.” Although pesticide registration is scientifically rigorous, it does not guarantee that a product is completely safe. There are a limited number of long-term studies of the effects of herbicide use on ecosystems. Repeated use of herbicides for long-term management of aquatic vegetation can fundamentally shift how the system operates, and how the rest of the plant and animal community that depend on aquatic vegetation responds over time. Herbicides may not kill organisms such as invertebrates or fish directly, but little is known about what will happen to these organisms and their habitat over a period of time.

Studies are often primarily concerned with “acute toxicity,” the study of how much of the product in question it takes to kill an organism. There is very little known about the “sub-lethal effects,” especially on creatures other than mammals.

Little is known about the interactions of different compounds in the environment. The EPA estimates 87,000 “chemicals of commerce” are currently present in the United States. To assess all possible interactions of aquatic herbicides with toxic materials released into the watershed from forestry, agriculture, and lawn and garden activities is very complex.



Herbicide application on Damariscotta Lake, Jefferson, Maine.
Photo: Maine Department of Environmental Protection.

Research, supported by numerous case studies, indicates aquatic herbicides are an effective tool for controlling IAP infestations. However, eradication of IAPs, even by use of herbicides, is difficult. Herbicide resistance occurs as a plant loses sensitivity to a particular herbicide over time through genetic selection. In Florida, hydrilla (*Hydrilla verticillata*) infests more waterbodies every year, despite an aggressive management plan. Hydrilla seeds, tubers, and turions are not affected by commonly used herbicides; repeated applications are required to control regrowth.



Herbicide application on Salmon Lake, Belgrade, Maine.
 Photo: Maine Department of Environmental Protection.

An article published in *Aquatics*, the journal of the Florida Aquatic Plant Management Society, in 2006 reported some hydrilla populations have developed resistance to herbicide, fluridone, thus limiting the effectiveness of this herbicide as a control method.

Advantages:

Herbicide use can be less expensive than other control methods as it requires minimal manpower and little maintenance. Herbicide application, followed by other control methods, such as hand pulling, is often an effective control strategy. Herbicides are easily applied around docks and underwater obstructions.

Disadvantages:

To be effective, herbicides may require multiple applications over many years, possibly leading to herbicide resistance in target species. Long-term effects on organisms and interactions with other chemicals present in the environment are not well known. Some herbicides have swimming, drinking, fishing and water use restrictions; some non-target species may be adversely affected.

Equipment & Materials:

Most states require that only certified applicators conduct any herbicide treatments, and then only under special permits. Check your state’s laws. The applicator will have all the necessary equipment to conduct the application.

Maine requires that all herbicide treatments in lakes, ponds, and rivers are conducted by a licensed herbicide application according to a permit from the Maine DEP.

Biological Control (Biocontrol)

This method involves the deliberate use of one organism to regulate the population size of a pest organism. There are three types of biological control that can be implemented: classical, conservation and augmentation. Classical biological control brings the specialized natural enemies of the pest from its native range (which makes the biocontrol agent an exotic organism), with the aim of establishing a sustained population of natural enemies. Conservation biological control manipulates the environment to favor already established natural native enemies of the pest. Augmentation biological control involves supplemental release of natural enemies to boost the populations.



This tiny weevil (*Eubrychiopsis lecontei*), which feeds selectively on Eurasian watermilfoil, is a promising bio-control agent for this particular invasive plant.
 Photo: RI Johnson, CU, Bugwood.org.

An introduction of a small number of biocontrol individuals is an inoculation and the introduction of a large number of individuals is an inundation. Inundation is typically used for biological control agents that cannot survive an entire year or cannot achieve densities high enough to regulate the pest population.

Current research and development of biological controls focuses on introduced insects and naturalized pathogens and insects. Typically, insect biocontrols are investigated overseas in the native habitats of the target invader. Development of insect biocontrol agents that target hydrilla and Eurasian watermilfoil (*Myriophyllum spicatum*) are currently underway. Researchers in Vermont found that the milfoil weevil (*Euhrychiopsis lecontei*) negatively impacts Eurasian watermilfoil by suppressing the plant's growth and reducing its buoyancy. Although the research is promising, it is too early to predict large-scale success. Pathogens are another possibility, however, ongoing searches have been fruitless and so there are currently no foreign pathogen agents under development.



Grass carp (*Ctenopharyngodon idella*) are voracious plant eaters and not selective; native plants are beaten back along with the invaders.

Photo: Eric Engbretson, USFWS, Bugwood.org.

Advantages:

Biological controls provide a fairly permanent regulation of devastating pests that may be difficult or impossible to manage by more traditional chemical and manual methods. They decrease the invasive plants' competitive advantages over native plants by increasing leaf mortality, decreasing plant size, reducing flower and seed production, and/or limiting population expansion. The aim is not necessarily eradication but, rather, controlling the plant so it behaves like a native.

Disadvantages:

Historically, biocontrol introductions were not regulated as they are today. Some unfortunate mistakes led to catastrophic outcomes (e.g., brown tree snakes in Guam and cane toads in Australia). Even relatively specialized herbivorous insects released for the biological control of invasive weeds can pose risks to related native plants. Biological control is both full of potential and risk. While the complexities of environmental interactions are difficult to predict, with caution and study, safe effective biological control should be possible.

Equipment & Materials:

Uses of biological control agents are regulated and each type will require different application procedures. Be sure to follow the application instructions or hire a professional firm to apply the biocontrols.

Other Control Techniques

The following are less commonly used techniques for controlling IAPs. Rotovating is a method used in the Pacific Northwest that uses a barge-mounted rototilling machine on a submersible arm to till up the bottom sediments and destroy the root crowns of the invasive plant. It is a rapid control method, however, it spreads an extraordinary number of fragments, resuspends sediments, disrupts benthic communities, causes high levels of turbidity, and is nonselective.

Drawdown is a control technique in which the water level of a waterbody is lowered until it is below the entire depth range of the target species. The drawdown remains in place for at least one month during the winter to ensure the sediments have frozen. It has been shown to knock back populations of hydrilla and Eurasian watermilfoil for a year or two. This is an inexpensive method; however, it has significant environmental effects and can interfere with the use of the waterbody during the drawdown period.

Mechanical harvesters are large machines that cut and collect aquatic plant material, which is then removed from the water by a conveyor belt, stored on the harvester temporarily, and then removed to a nearby barge. This method provides immediate open areas of water and can target specific locations. It is, however, a temporary fix as the plants in the harvested area grow back and the plant density is not reduced. There is a large amount of bycatch of fish, amphibians, and invertebrates, and harvesters are expensive to purchase and maintain.

Importance of training and quality control

Well-trained staff and volunteers are key to proper control technique implementation and invasive species removal. Most control methods are aimed at a specific invader or group of invaders, thus identification of the correct target plant is critical. Removing the wrong plant can negatively affect native communities and is a waste of time and resources. By requiring training you will ensure your crew properly implements IAP control methods. Your staff will be more efficient, productive, and consistent and you will know that your resources are being used effectively.

Free Control Training in Maine

A number of volunteer training opportunities are currently available, free of charge, to individuals and groups in Maine, check out the Resources in Section V for more information.

A Control Method Manual for your divers, boat captains, benthic barrier installers and other key personnel will provide a reference after the training has concluded. Helpful information includes step-by-step instruction on how to implement your methods, information on general operations, contact information for key individuals, safety expectations and other relevant information. A manual of this type will help make clear your expectations for the job and your staff.



Variable watermilfoil makes excellent compost. Here a truckload of harvested variable watermilfoil is delivered to a local farm.

Photo: John Ewing, Portland Press Herald.

Disposal of collected material

Control of IAPs generates large amounts of plant material requiring appropriate disposal. It is the material is disposed of far from any waterbody. Plant material can be dewatered and dried on mesh racks or bins and then bagged and brought to a transfer station. Composting is another option as aquatic plants are full of nutrients. A lake group in Maine has started a composting program and is selling their properly degraded material as mulch.

Decontamination of equipment

In some cases, management equipment is used on multiple waterbodies. If this occurs, it is of utmost importance that all the equipment is properly decontaminated to prevent any cross-contamination. A written procedure for equipment decontamination will help ensure that the correct steps are taken.

At a minimum, before and after the equipment is used in a waterbody, all visible plants, plant fragments, and animals should be removed; all water from bilges and other water holds should be drained and the equipment rinsed with water at a temperature above 140°F for a minimum of one minute and/or washed with a disinfectant.

Additionally, all absorbent items that have come into contact with water should be soaked in an appropriate disinfectant for a minimum of thirty minutes. An alternative to rinsing and washing may be to thoroughly dry the equipment and keep it dry for at least five days before and after it is used in a waterbody.

These simple steps can help prevent the spread of invasive aquatic plants to other waterbodies.



Boat wash stations allow boaters to clean their boats before entering a waterbody, however, there is no substitute for a careful visual inspection.

Photo: Friends of Cobbossee Watershed.

EXAMPLE: Captain and Crew Checklist for DASH Boat

Before leaving dock:

- Uncover motor, compressor and captains seat, place covers in compartment
- Go over boat components and check:
 - Motor oil – check to make sure it is filled properly.
 - Gas – make sure tank is secured, fill tanks at end of each day and that bilge is pumped.
 - Fittings – on air lines, regulator, expansion tank, compressor, etc. are properly attached.
 - Check for loose screws and nuts on motor and compressor, connections at boat motor, parts of trough, suction and pressure hoses
- Tools are on the boat
- Make sure you have enough mesh bags for the day / report when inventory low
- Make sure you have all daily reporting forms needed / report when inventory low

Before moving the boat:

- Put up ladder before moving
- Check the suction hoses to make sure you don't back over them (They're expensive to replace!)

General Operations

- Set anchors properly to prevent drift, make sure they are securely tied
- Attach intake pipe to side of boat, prime pipe, tighten and fill completely with water before starting suction motor. (Starting without water ruins seals and bearings)
- Assist diver with water entry
- Make sure ladder is in place for diver when they are ready to return to the boat
- Watch the diver, it is the captain's responsibility for their safety
- Make sure you have hand & sound signals confirmed with your diver before they enter the water
- Watch generator motor and do not touch – it gets very hot!
- Set generator motor at level wanted by diver
- While working, keep gear stowed so it isn't in the way and a safety hazard

At the end of the shift:

- At the end of your shift, wash down the boat BEFORE coming back to dock
- Coil hose on deck. Do not place on trough or rest on handles
- Release pressure from pressure tank and then retighten when reaching dock
- Make note of any repairs needed or low inventory items
- Cover seat, podium, and motor (if cool enough)
- Securely tie up boat.
- Remove full bags and place in holding area.

ACTION PLAN WORKSHEET: Determining control strategies

Project Goals and Strategies

Describe your invasive aquatic plant control techniques and what you hope to accomplish annually by reducing the infestation.

Sample Goals

<p>Determining control strategies</p> <p>Overall Goal: Establish an ongoing DASH and benthic barrier program to eradicate variable watermilfoil.</p> <p>Year 1 Goal(s): By 2016, Sample Lake Association will purchase and construct a Diver Assisted Suction Harvester and hire a team of 5 divers and 3 captains to implement a 5-day-a-week variable watermilfoil removal program during the months of July – September.</p> <p>Year 2 Goal(s): By 2017, the Sample Lake Association will have a control program in place with all necessary staff and equipment and will conduct a minimum of 30 control days.</p> <p>Years 3-5 Goals: By 2020, the variable watermilfoil infestation on Sample Lake will be reduced by 60% and native plants returned to at least 30% of their original habitat and will contain healthy populations of key plant and fish species (plants: white waterlily, spatterdock; fish: brook trout, salmon, spotted sunfish and pickerel).</p> <p>Strategy: Sample Lake Association will implement a program using a combination of Diver Assisted Suction Harvesting followed by benthic barrier deployment in areas of deeper water (> 4 feet). In shallow areas, manual removal and benthic barriers will be implemented as indicated on the attached map.</p>
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Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

8: Determining control strategies					
Activity 1: Create 100 benthic barriers & install in Beaver Cove and Mumford Cove					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Purchase materials for 100 benthic barriers	high	mat material, rebar, zip-ties, clear duct tape	3 hours	H. McMann	April
2. Gather volunteers to build mats	med	at least 5 people	4 hours	T. Smith	April
3. Build mats	high		10 hours	H. McMann	May

9. Staffing considerations

To implement any kind of management program, it is important to consider the various roles and responsibilities that need to be satisfied. Some positions can be filled with volunteers; others will likely require paid staff. Determining your needs and available resources will help you choose the right person for the job. This section will provide information to help you put together your staffing plan.

Topics Covered:

- Building and maintaining a team
- Working with volunteers
- Hiring employees

A staff is required to execute work tasks and activities in your management plan. Before you start staffing, define specific roles and skill sets needed by your organization. Determine if paid or volunteer staff best fits that function.

A staffing plan specifies what positions, jobs and/or roles will be needed by the organization over the next year, who these employees will report to and how they will work together. Taking the time to draft a staffing plan will help ensure that your organization has the right number of people with the right skills to contribute to the successful implementation of your action plan.

Develop a detailed and useful description of the positions you need to fill. These specifications could include:

- Position
- Responsibilities
- Skills required
- Number of staff needed
- Estimated start date
- Estimated end date
- Rate of pay for position
- Estimated # hours per week
- Training needed
- Volunteer or paid staff



DASH units are generally staffed by a captain, divers, and one or more crew members.

Photo: Little Sebago Lake Association.

Just having the required number of staff members for your program will not help you to successfully execute the management plan tasks and activities. Your staff should have the necessary motivation, availability, and skills to execute the project responsibilities. Your staffing plan should be very clear about the staff responsibilities and the consequences of not fulfilling those responsibilities.

Working with volunteers

Incorporating volunteers into your program can help build organizational strength and extend your resources. Volunteers provide extra hands that enable you to do tasks and activities that may otherwise never get done. It is important to remember that volunteers do not replace staff members, they add value and support. Legally, volunteers are different from paid staff and are not covered by the same employment legislation.

Many people volunteer because they are interested in the work or cause and want to make a meaningful contribution, not because they want a steady unpaid job.

Before beginning the process of recruiting volunteers, you need to identify the tasks that are appropriate and inappropriate for volunteers; volunteers should complement, not cover, the work of any paid staff. Although it may be tempting to identify easy tasks that involve very little training for volunteers (e.g., stuffing envelopes or filing documents), the danger in doing this is that they may quickly become bored with the work. Conversely, giving volunteers tasks which they find too challenging may also discourage them from staying involved. People will differ in what they find too routine or over-challenging. It is important to match the job to the volunteer. Be flexible and identify a range of tasks that volunteers can undertake. Consider having tasks that would appeal to a

range of motivations, time availability and commitment. It is important to develop detailed job descriptions for each volunteer position and clearly define the expectations, exact duties, time frame for service, training that will be provided and to whom the volunteer will report.

Effective recruitment entails using multiple position options to entice individuals to volunteer for the opportunities available. Spread the word about the opportunities you have using your association newsletter and website. Feature active volunteers in these resources that include instructions on how to volunteer. Reach out to your current volunteers to recruit friends and family. Advertise in local newspapers and community bulletin boards.

If you find that you are not attracting the volunteers you would like, think about your recruitment process: what works well and what is not so effective? Might your current volunteer recruitment process be putting up barriers which discourage people from getting involved?



Benthic barrier installation may require divers depending on the depth of the area being managed.
Photo: Peter Lowell, Lakes Environmental Association.

Once you have some individuals who are interested in volunteering, it is always a good idea to meet with them. You can meet with them for an informal chat or you may want a more formal structure for their interview process. Either way, think about what you need to know from the possible volunteer and what they need to know about your organization and project. Using your position descriptions, you can focus on the skills you are looking for and determine which position best fits each potential volunteer.

It is a good idea to provide new volunteers with a good introduction to the program and ensure that they are supported in their roles. Introduce them to important individuals within your program and let them know who their contact person will be to answer any questions. If there is any training required for the volunteer, make sure they are aware of the training and are committed to attending.

WANTED: VOLUNTEERS!!

When skills and interests are matched to the appropriate task, volunteers can perform virtually all program tasks from leadership to control operations, website development, outreach, office assistance, fundraising and grant-writing, legal, accounting, or clerical services, equipment fabrication, food preparation and more.

A 1990 Gallup Poll showed the main reason people don't volunteer is because nobody ever asked them! So, get the word out that you are actively looking for people to join your cause. The process of recruiting volunteers should be ongoing, as the average volunteer remains active no more than three years. Here are ideas to help you with your recruitment efforts:

- Make invitations to join personally. When people interact on a personal level, especially between friends or neighbors, the prospect of becoming involved seems less intimidating and distant.
- If face-to-face initial contact is not possible, personal phone calls or letters are more effective than general advertisements.
- Actively recruit volunteers at all public meetings and events. Set up a sign-up booth. Show pictures of other volunteers in action to give people an idea of the kinds of things they may be asked to do.
- Plan and hold special recruitment events: lakeside wine and cheese gatherings; fun, informal events such as plant paddles; and presentations to local civic groups.

Hiring employees

Hiring paid staff will often be necessary for an IAP management program. There are many businesses that can help with this process or it can be done by your lake association. Regardless of which avenue you choose, you need to ensure that you are compliant with federal and state regulations.

The Nuts and Bolts

Before hiring an employee you must do the following:

- Obtain a Federal Employer Identification Number (FEIN)
- Register with your State Labor or Employer Division
- Obtain Worker's Compensation Insurance
- Post an "Employee Poster" as required by Federal and most State Governments

The FEIN number is necessary for reporting taxes and other documents to the IRS and reporting employee information to state agencies. You can find more information and apply for an FEIN online at the IRS website (www.irs.gov).

All businesses with employees are required to carry workers' compensation insurance coverage through a commercial carrier, on a self-insured basis, or through their state's Workers' Compensation Insurance Program. Check your state's website for more details information.

After hiring employees

The following forms must be filed for every new employee:

- Federal W-4 Form
- Federal I-9 Form (verifies the legal status of the employee)
- State New Hire Reporting Form



Once removed, benthic barriers may be cleaned and stored for future use or immediately re-deployed to the next control site.

Photo: Friends of Cobbossee Watershed.

The IRS requires that you keep records of employment taxes for at least four years. These forms and any other employee paperwork must be kept by the employer in an employee file. These records will also help you monitor your employee costs, prepare financial statements, keep track of deductible expenses, prepare your taxes and support items reported on tax returns.

A Form W-4 is the Federal Income Tax Withholding and every employee must sign the form on or before the date of employment, and as the employer you must submit that form to the IRS.

The federal government also requires employee verification for eligibility to work in the United States within three days of hire. This is done by completing a Form I-9 and examining documents from your employee to confirm their citizenship or eligibility to work in the U.S.

When hiring employees, there are some Federal and State rules you must keep in mind. These are some simple common-sense guidelines for hiring employees:

- Do not discriminate based on race, color, gender, religion, handicap status.
- Respect the applicant's right to privacy: marital situation, economic background, personal life.
- Don't imply things you can't deliver: job security, benefits.
- Observe all laws relating to minimum wage, hiring young or immigrant workers.
- Follow the IRS guidelines for hiring independent contractors.
- Follow all IRS and State new hiring requirements

Processing payroll

Once employees are hired and you have registered with the appropriate agencies, obtained the necessary ID, and complied with the necessary regulations, the next step is processing payroll. There are basically three things you need to know 1) how much you are paying your employees, 2) how much you need to take out of each paycheck for the various Federal, State and Local taxes, and 3) a running total of how much you have paid your employees, how much has been taken out of their paychecks, and for which reason (i.e. social security taxes, state unemployment). You will need this information to file quarterly tax forms.

Below is an example of the overall process:

1. Pay your employees (either weekly, bi-weekly, bi-monthly).
2. Withhold the proper amount from each paycheck, keep track of the totals either with accounting software or manually.
3. Deposit the total Federal Taxes (Income, Social Security and Medicare) owed monthly to the IRS.
4. If applicable, deposit income or other State taxes to your State's taxing authority (this could be bi-weekly, monthly or quarterly).
5. Quarterly file IRS Form 941 summarizing what you have deposited monthly for the previous quarter. Yearly file the IRS Form 940.
6. Quarterly (or bi-weekly or monthly depending on the state), file the necessary State forms summarizing what you've deducted and deposited from paychecks.

If this process seems daunting, there are a number of payroll companies that can help your organization with this process. Check with your local chamber of commerce for a list of reputable payroll businesses.

Benefits and drawbacks of paid employees

When hiring paid staff, you have the opportunity to search for, interview and hire individuals that are best suited to the roles you have defined for your available positions and you will likely draw from a larger pool of eligible candidates than if you were seeking unpaid help.

And, unlike volunteers, you and your employee have a contractual relationship, so if the employee does not perform as promised or expected, you may terminate the relationship. Alternatively, for employees that are performing well you can expect longevity, especially if you have a merit program with annual pay raises.

The drawback to paid employees is that you will need to raise and sustain the funds necessary to pay and retain them. There is also considerable paperwork, accounting, payroll, insurances and other red tape you will have to contend with.

ACTION PLAN WORKSHEET: Staffing considerations

Project Goals and Strategies

These are goals for hiring paid staff and recruiting volunteers, as well as training personnel.

Sample Goals

<p>Staffing considerations</p> <p>Overall Goal: Have necessary staff, both paid and volunteer to ensure all aspects of the Sample Lake Association management program are successfully implemented.</p> <p>Year 1 Goal(s): Enlist the help of 10-15 volunteers to conduct initial infestation mapping project. Create section teams and comprehensive maps.</p> <p>Year 2 Goal(s): Hire 2 boat captains, 4 divers, and 3 crew to work the DASH unit. Make sure all staff is trained in proper removal, safety protocols, and divers are properly certified.</p> <p>Years 3-5 Goals: Cultivate long-term employees that will come back each season.</p>
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Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

9: Staffing considerations (Paid & Volunteer)					
Activity 1: Advertise for divers and captains in local newspaper and on Association website					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Create advertisement for positions	high		2 hours	J. Jameson	April
2. Post ads on website and submit to newspaper (local & Morning Sentinel)	med		1 hour	J. Jameson	May

10. Planning for safety

An often overlooked but important piece of a management program is a safety plan. There is no one plan that is perfect for every lake group; rather, a safety plan should be tailored to fit the needs and operations of each individual program. We don't advocate any particular plan, we are only offering ideas you should consider when putting together your own plan.

Topics Covered:

- The different types of risk to consider
- An example of a safety plan
- Insurance consideration

The benefits of maintaining a safe work environment go beyond minimizing injury to your employees. Employees have peace of mind when they are confident in the safety plan and training offered at the workplace and know that their fellow employees are trained in safety procedures. From a lake association perspective, a safety plan will minimize any medical expenses for injured employees, reduce lost work time, negate the need for legal costs and could potentially help reduce insurance premiums. There is no doubt that workplace safety is important; unfortunately, it is often overlooked, leaving workers and others on the job site exposed to risk.

Types of risk to consider and ways to minimize them

Lakes, ponds and rivers are important for recreation and commerce. Many of us are very comfortable around water and forget that lakes and ponds can be dangerous even for the most experienced swimmer or boater. When you add equipment like suction hoses or benthic barriers into the mix, you increase the potential for an emergency. There are two major areas to consider when implementing a safety plan for aquatic species management programs: in the water (scuba divers, snorkelers and swimmers) and on the boat.

There are many different types of boats employed for control techniques, from kayaks to shallow draft motorboats to large DASH boats. However, there are some basic safety tips that should be implemented regardless of the boat type or size.



Safety should always be a priority. Wearing PFDs and working in tandem, this variable watermilfoil crew is demonstrating two simple and effective safety practices.

Photo: Maine Volunteer Lake Monitoring Program.

- Before going out onto the water, inspect boats and other equipment to make sure they are in proper working condition
- Work in teams of at least two and make sure that someone on shore knows where you are going and how long you will be gone
- Make sure all required safety gear is on board; personal flotation devices, a whistle, fire extinguisher, warning horn, visual distress signal and diver-down flag. Each state has different laws regarding what is considered required equipment; be sure to check before going out on the water
- Check the weather the day prior to departure and pay close attention to any weather changes while you are out on the water; never go out on the water in a storm, as water conducts electricity; come back to shore whenever the weather appears threatening
- Only boat during daylight hours
- Pay attention to warning signs and navigational markers
- Know what to do in an emergency; post emergency numbers and protocols in each vessel to ensure that employees are able to quickly respond in an emergency
- Have as many personnel as possible trained in CPR and first-aid
- Make sure your Diver-Down flag is raised and visible to other boaters whenever you have a SCUBA diver in the water
- Make sure your boat is registered and legally able to operate

Individuals also need to do a safety check before entering the water. In addition to the items listed in boating safety, follow these precautions:

- Before entering the water, inspect all gear, including snorkel, mask, fins, buoyancy compensator, gauges, and tanks to ensure they are in proper working condition
- Diving equipment meets required Department of Transportation and standard dive specifications for serviceability
- SCUBA tanks are functionally tested and display the appropriate certification labels (annual visual inspection, hydrostatic test every 5 years)
- Divers/swimmers have an established method of communicating by hand signals with the boat captain and crew
- SCUBA divers should be certified with a minimum of basic SCUBA diving, as well as IAP removal certification

Implementing a safety plan

A safety plan can be part of the overall standard operating procedures of your control technique. It should take into consideration those procedures that help prevent emergency situations. A pre-season meeting with all employees to review your safety plan and procedures will help ensure that everyone understands what steps to take in an emergency.



Dive flags and signs will alert passing boaters that there is someone working underwater.

Photo: Maine Volunteer Lake Monitoring Program.

Safety plan example

We have provided a sample safety plan written by a lake organization in Maine as an example of what you can do. We do not endorse this particular plan or any other. A safety plan should be specific to your lake and the types of control techniques that you will be implementing.

SUCTION HARVESTING & DIVER SAFETY STANDARD OPERATING PROCEDURE

1. No person shall engage in diving operations unless s/he holds a current certification.
2. Suction harvesting ops will be planned around the competency of the least experienced diver.
3. Boat captain will notify the lake association president of the general location of harvester operations for the week. The dive plan will include the location of nearest hospital, names of divers and boat personnel, and estimated diving depths.
4. Boat captain will monitor all diving, and maintain cell phone communication with outside world, and notify the lake association president that dives are concluded for the day.
5. It is the diver's responsibility to refuse to dive if, in his/her judgment, conditions are unfavorable or he/she would be violating the precepts of his/her training.
6. No dive team member shall be permitted to dive for the duration of any known condition which is likely to adversely affect the safety and/or health of the diver or dive members.
7. Each diver shall ensure that his/her equipment is in proper working order and that the equipment is suitable for the type of harvesting operations undertaken.
8. Each diver shall have the capability of achieving positive buoyancy.
9. The decision to dive is that of the diver. Any diver may refuse to dive, without fear of penalty, whenever he/she feels it is unsafe to make the dive.
10. The diver may terminate the dive, without fear of penalty, whenever he/she feels it is unsafe to continue the dive.
11. After completion of the dive, each diver shall report any physical problems, symptoms of decompression sickness, or equipment malfunctions to the boat captain.
12. Divers should have a minimum surface interval of 12 hours before ascending to altitude.
13. All diving incidents requiring recompression treatment or resulting in moderate or serious injury or death shall be reported to the lake association and the Diving Control Board. The report will specify the circumstances of the incident and the extent of any injuries or illnesses.
14. Fire extinguisher, required PFDs, warning horn and First Aid Kit will be present on the boat at all times.
15. Diving Down Flag will be placed in water at all times.
16. Divers unfamiliar with harvesting techniques will be certified in harvesting by experienced, lead diver prior to engaging in paid harvesting operations.
17. All diving equipment shall meet required DOT and standard dive specifications for accuracy and serviceability.

Adapted from the Lake Arrowhead Conservation Council's variable watermilfoil management team.

Insurance & Liability

Most lake associations already have insurance of some type. When implementing a management program, additional insurance will be needed to cover equipment, personnel, and activities. There are a number of different categories of liability insurance, and associations may choose one type of coverage or several, depending on which options will fit the needed level of protection. Below is a description of the various categories; it is recommended that you contact an insurance agency that is versed in these types of insurances to assist you.

Directors and Officers Liability – This coverage insures corporate directors and officers against claims, usually brought by stockholders, alleging loss due to mismanagement. More individuals owning stock and more stringent standards imposed by the courts indicate a growing risk. An outside directorship liability policy is available as supplementary protection to assure sufficient limits for the exposure created when a company's director, officer or employee serves in an outside director position at its request.

Commercial General Liability – This coverage provides the insurance protection needed to pay damages for bodily injury or property damages for which the insured is legally responsible. The policy provides coverage for liability arising from personal injury and advertising injury. Coverage for medical expense is also provided. The policy also covers accidents occurring on the premises or away from the premises. Coverage is provided for injury or damages arising out of goods or products made or sold by the named insured. The insured is the named insured and the employees of the named insured. However, several individuals and organizations, other than the named insured, may be covered, depending upon certain circumstances specified in the policy. In addition to the limits, the policy provides supplemental payments for attorney fees, court costs and other expenses associated with a claim or the defense of a liability suit.

Commercial Automobile Liability – This coverage provides protection against legal liability arising out of the ownership, maintenance, or use of any insured automobile. The insuring agreement agrees to pay damages for bodily injury or property damage for which the insured is legally responsible because of an automobile accident resulting from the ownership, maintenance, or use of a covered auto. The insuring agreement also states that in addition to the payment of damages for which the insured is legally liable, the insurer also agrees to defend the insured for all legal defense cost. The defense cost is in addition to the policy limits.

Commercial Vessel Liability – This coverage provides protection against legal liability arising out of the ownership, maintenance, or use of any insured motorboat. The insuring agreement agrees to pay damages for bodily injury or property damage for which the insured is legally responsible because of an accident resulting from the ownership, maintenance, or use of a covered vessel. The insuring agreement also states that in addition to the payment of damages for which the insured is legally liable, the insurer also agrees to defend the insured for all legal defense cost. The defense cost is in addition to the policy limits.

ACTION PLAN WORKSHEET: Planning for safety

Project Goals and Strategies

These are your goals for safety which could include creating a safety plan, training staff, and preparing for emergencies. It would also include insurance goals, whether to acquire insurance, expand upon an existing policy, or maintain an annual policy.

Sample Goals

<p>Planning for safety</p> <p>Overall Goal: Have necessary insurance coverage for all aspects of the Sample Lake Association management program as well as safety protocol that is understood by all team members.</p> <p>Year 1 Goal(s): Contact insurance provider to discuss needed coverage. Gather information to create a safety protocol for divers, boaters, barrier installers and other relevant personnel.</p> <p>Year 2 Goal(s): Review coverage and renew insurance. Train all staff in safety protocols and post this information in appropriate locations for referral (e.g.: DASH boat, and barrier boat).</p> <p>Years 3-5 Goals: Continue review and annual renewal of insurance coverage. Make any necessary updates to safety and training protocols annually. Promote CPR and First Aid certification for all staff.</p>

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

10: Planning for safety					
Activity 1: Create safety plan for variable watermilfoil removal work on Lake Sample.					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Gather information on safety protocols	high		4 hours	S. Smith	March
2. Talk to SCUBA professionals about safety needs	high		2 hours	S. Smith	March
3. Talk to Associations with plans already in place	med		4 hours	S. Smith	April
4. Draft safety plan for review	med		6 hours	S. Smith & K. Barns	May

11. Recordkeeping and permit requirements

Aquatic plant management activities typically have state and local regulations and require some type of permitting process. You should check with your state environmental offices and local and county public works or planning departments to determine which permits are required for your particular control activity.

Keeping good records of your management program provides a good way to monitor your progress over time and in many cases is required for permits and grant reports. It is a good practice to start recordkeeping immediately and have a central repository / individual responsible for your information.

Topics Covered:

- Importance of recordkeeping
- Federal, state and local regulations

Recordkeeping

Keeping accurate and up-to-date information is vital to the success of any project. A recordkeeping system should be reliable, accurate, easy to follow, and simple. The information saved will be used to inform decisions for the future of your management program, meet permit requirements, write grant reports, track and record progress, and provide information for community outreach.

The master copy, and latest version, of all documents must be retained. It is best if one member of the management team is dedicated to maintaining and updated the records.

Important documents to retain include:

- meeting notes
- contact information (for agencies, steering committee and team members)
- copies of permits
- copies of SCUBA certification for divers
- control tally sheets
- infestation and survey maps
- internal and external report copies (government agencies, grantors, sponsors)
- copies of grant proposals
- volunteer numbers and time
- staff hours and costs
- equipment costs and maintenance

Permit requirements

Federal, state and local governments each have their own set of regulations for invasive plant removal and activities but typically they focus on the same areas: control, transportation, possession, sale and permitting. Most states coordinate with federal government IAP efforts, which involve many different agencies, including the U.S. Department of Agriculture, U.S. Fish and Wildlife Service, U.S. Department of Commerce, U.S. Army Corps of Engineers, and the U.S. Coast Guard. In 1990, the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) provided a framework for invasive aquatic species research, prevention and control. The act also encouraged states to develop and implement IAP management plans. In addition to the NANPCA, in 1999 an Executive Order established a National Invasive Species Council to coordinate all federal IAS activities.

Physical disruption of habitat, including plant removal, benthic barrier installation and herbicide application, often requires permits from state and/or local authorities. The permit process and requirements can vary greatly, depending on the type of control method employed and the state of issue. Keep in mind that your control activities may change over time, so it is important to stay in contact with representatives from the permitting agencies.

**! All removal of vegetation from Maine waters requires a
Maine Department of Environmental Protection permit.**

IAP control activities require a simplified permit from the DEP called Permit-by-Rule (PBR), and all individuals or groups planning to conduct control activities should contact the Maine DEP Invasive Species Program for assistance.

PBR is intended to save applicants the time and expense of filing a permit application while providing direction in the form of standards as to how an activity must be carried out. Hand removal (including DASH) and benthic barrier installation can be conducted under PBR, Section 12, Restoration of Natural Areas.

The applicant must file notice with the DEP prior to beginning work and must agree to follow prescribed standards. A moderate fee (under \$100) is required. Upon DEP's receipt of a complete and accurate form, you may begin work after waiting 14 days, if the notice is found to be deficient DEP will notify you within 14 days of receipt.

PBRs are valid for two years.

ACTION PLAN WORKSHEET: Recordkeeping and permit requirements

Project Goals and Strategies

This section sets up your recordkeeping procedures and expectations, as well as the steps needed to acquire any required permits for the control technologies you will use.

Sample Goals

Recordkeeping & permit requirements Overall Goal: Sample Lake Association will establish a recordkeeping process and obtain current permits. Year 1 Goal(s): Apply for necessary permits from the Maine Department of Environmental Protection, create a recordkeeping protocol by 2016. Year 2 Goal(s): Review permits and update as necessary, maintain records throughout season and create an annual report for Steering Committee by 2017. Years 3-5 Goals: Continue annual review of permits. Maintain records for annual report.

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

11: Recordkeeping and permit requirements					
Activity 1: Obtain Permit-by-Rule from MDEP for plant removal and benthic barrier use.					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Review Permit-by-Rule application	med		2 hours	S. Smith	January
2. Fill out and submit application	high		2 hours	S. Smith	February

12. Assessing your readiness

Conducting a readiness assessment will provide a good understanding of the current state of your organization and identify the resources you have on hand and those you need to acquire.

Topics covered:

- Human resource needs
- Material resource needs
- Financial and in-kind resource needs
- Developing a program budget
- Creating a readiness assessment matrix

Human Resources

The first thing to consider is the people you will need to develop and sustain your IAP management program. Determine the type of positions and number of people required for each of the activities. Creating a simple matrix of positions needed, pay, number of days, and number of people needed for the position can help with the process.

Volunteers: Volunteers can perform virtually all program tasks from leadership to control operations, website development, outreach, office assistance, fundraising and grant writing, legal, accounting, clerical services, equipment fabrication, food preparation and much more.

Paid employees and contracted service providers: Many groups involved in control efforts have found that paid help is essential to providing the reliability and predictability needed to keep their control effort moving forward. If you do decide to bring on paid staff, you will need to add all costs associated with paid staff to your budget.

Experts: Especially as you begin your control efforts, you will need to draw heavily upon the expertise of others. During the fact-finding stage you may have discovered experts that can provide critical guidance at the State, regional, and local level. Take account of the experts you now know and the kinds of expertise you are still lacking.

Position	Pay or Volunteer	# of people required	# of days of work
1. Benthic barrier manufacturing	volunteer	2-4	5
2. Benthic barrier installation	volunteer or paid (\$10/hr)	2-4	12
3. DASH captain	paid (\$15/hr)	2-3	12 wks @ 4day/wk 48 days
4. DASH crew	paid (\$10/hr)	3-5	12 wks @ 4day/wk 48 days
5. DASH divers	paid (\$20/hr)	3-4	12 wks @ 4day/wk 48 days
6. website updates	volunteer	1-2	12-14 days
7. bake sale – bakers	volunteers	5-6	1 day
8. bake sale – set up	volunteer	2	½ day
9. bake sale – sales	volunteer	2	½ day
This table is an example of a simple human resources matrix.			

Material Resources

The next thing to consider is the equipment, gear, facilities, space and other items you will need to implement your IAP management plan. Make a list of all that is needed. Indicate which items you already have in hand and which items may be available through in-kind donations. Be sure to consider equipment that can be adapted to a new use. A donated pontoon boat, for example, may be converted into a DASH boat. The following are some items to consider as you begin developing your list.

Boats: You will need access to several small shallow draft boats for screening surveys and mapping the infestation, as well as for fragment control and diver tending. Depending upon the type of control technology, you may also need one or more pontoon boats retrofitted for various control activities.

Control activity gear: Depends on the technique that will be used, could include benthic mat material, rebar, zipties, venturi system, hooka, air tanks, and wetsuit. A detailed list is available earlier in the ‘Determining control strategies’ topic.

Safety gear: Ensure the safety of the control crew by providing dive flags, PFDs (personal floatation devices), caution signage to warn other boaters. Be sure to consider cellphones and radios and other means of emergency lake-to-shore communication.

SCUBA and snorkeling gear: While certified SCUBA divers often provide their own equipment, you may want to consider providing wetsuits, air tanks, or other essential items. Or, perhaps have an extra set of fins or backup regulator in the case of missing, lost or failed equipment. Snorkelers are often used for screening surveys, infestation marking, and fragment control. Especially if you are using volunteers to perform these activities you may want to provide a mask and fins.

Office equipment: Program administration, public outreach, fund-raising, will all require access to office equipment: computer, printer, file space, office supplies.

Facilities: Consider the kinds of facilities that will be needed to store and construct control equipment, space for fund-raising and training events, or public meetings, access to private boat launches, office space.

Additional resources: Other possible needs to consider include resources to develop printed materials and to do mailings, a website domain name, transportation needs, food for meetings and work-days, and fundraising events.



Financial Resources

How much money are you going to need to achieve your goals . . . this year, next year, for the next five years? To accurately estimate this, you will need to create a budget that allows you to:

- Better estimate the funds you will need to achieve your goals
- Accurately track revenue and expenses over time
- Provide for expected and unexpected costs

The first step in the budget process is to identify your primary budget categories. One way to do this is to draw up a list of anticipated IAP program areas, and then make every program area its own budget category or line item. Based upon your findings during the information-gathering phase consider all of the costs (labor, materials, services, etc.) that may be associated with each program and estimate the corresponding line item budget. Attempt to provide as much detail as possible. Once you have identified line items and estimated a budget for each, provide a means to account for currently-existing, potential, and needed resources. For example, your budget sheet might have columns for tracking each of the following:

- Committed revenue
- Committed in-kind support
- Potential revenue
- Potential in-kind support
- Needed revenue
- Needed in-kind support

BUDGET TIPS

One way to set up your budget is to make each program element its own line item. Sample preliminary line items might include:

- Control activity administration
- Personnel
- Equipment and gear
- Equipment maintenance
- Insurance
- Mailings and newsletters
- Posters
- 501(c)(3) application fee
- website updates

After going through the exercise of projecting a budget for the first year of your project, you will have a much better handle on the amount of revenue and in-kind support you are going to need to bring in. For the preliminary budget you may decide it is best to only attempt to project costs out over a year or two. As your management program becomes more established and you gain experience, the information you are basing your line item budgets on will become more detailed, and your overall budget projections will be more accurate. Soon, you can start projecting costs out over the next five years.

Sample IAP Management Program Budget 2015

PROJECTED REVENUES		BUDGET	ACTUAL								
Town	budget request	20,000.00	12,000.00								
MEDEP Control Grant	grant application		6000.00								
Fundraising and in-kind services	various		15000.00								
TOTAL REVENUES 2015			33,000.00								
PROJECTED EXPENSES				BUDGETED				ACTUAL			
	Item / service need	Labor time/hrs	Labor cost est \$20.00/hr	Material Item cost	In-Kind	Total	Labor cost est \$20.00/hr	Material Item cost	In-Kind	Total	
DASH											
	Repairs to boat	24	\$ 480.00	\$ 2,800.00	\$ 480.00	\$ 3,760.00	\$ 480.00	\$ 3,000.00	\$ 500.00	\$ 3,980.00	
	Repairs to sluiceway	2	\$ 40.00	\$ 30.00	\$ 40.00	\$ 110.00	\$ 45.00	\$ 25.00	\$ 40.00	\$ 110.00	
	maintenance of motor & venturi	2	\$ 40.00	\$ 65.00	\$ 40.00	\$ 145.00	\$ 40.00	\$ 60.00	\$ 50.00	\$ 150.00	
	oil service	3	\$ 40.00	\$ 160.00	\$ 40.00	\$ 240.00	\$ 40.00	\$ 90.00	\$ 40.00	\$ 170.00	
Benthic Barriers											
	Construction of 20 new mats			\$ 500.00				\$ 500.00		\$ 500.00	
Fundraising											
	Brochure Mailing	4		\$ 250.00	\$ 80.00	\$ 330.00		\$ 220.00	\$ 80.00	\$ 300.00	
	Grant Writing	30		\$ 20.00	\$ 1,000.00	\$ 1,020.00		\$ 30.00	\$ 1,000.00	\$ 1,030.00	
	Appreal Letter	6	\$ 180.00	\$ 200.00	\$ 180.00	\$ 560.00	\$ 190.00	\$ 240.00	\$ 180.00	\$ 610.00	
Outreach											
	Milfoil Days Event	3	\$ 60.00	\$ 100.00	\$ 300.00	\$ 460.00	\$ 65.00	\$ 100.00	\$ 300.00	\$ 465.00	
	Training Session			\$ 200.00		\$ 200.00		\$ 200.00		\$ 200.00	
Staffing											
	Payroll for DASH Staff	480	\$ 8,800.00		\$ 800.00	\$ 9,600.00	\$ 9,000.00		\$ 800.00	\$ 9,800.00	
	Benthic Barrier Staff	40			\$ 800.00	\$ 800.00			\$ 800.00	\$ 800.00	
	Infestation Survey	150	\$ 3,000.00		\$ 3,000.00	\$ 6,000.00	\$ 3,000.00		\$ 3,000.00	\$ 6,000.00	
	Payroll Fees		\$ 1,000.00			\$ 1,000.00	\$ 1,000.00			\$ 1,000.00	
General Expenses											
	Insurance / Workman Comp		\$ 4,700.00			\$ 4,700.00	\$ 4,700.00			\$ 4,700.00	
	Legal/Accounting	10	\$ 200.00		\$ 200.00	\$ 400.00	\$ 200.00		\$ 200.00	\$ 400.00	
	Shipping and Gas			\$ 300.00		\$ 300.00		\$ 250.00		\$ 250.00	
Misc/Contingency											
						\$ 1,000.00				\$ 1,000.00	
TOTAL EXPENSES 2015						\$ 30,625.00				\$ 30,465.00	

This is an example of an IAP management program budget with expenses you may encounter.

ACTION PLAN WORKSHEET: Assessing your readiness

Project Goals and Strategies

The goals in this section describe how to obtain resources needed to implement a readiness assessment.

Sample Goals

Assessing your readiness Overall Goal: Perform an annual assessment of readiness and gather needed resources before the control season begins. Year 1 Goal(s): Assess initial readiness and available resources; create a plan for acquiring needed resources by 2016. Year 2 Goal(s): Have readiness and resource checklist pulled together for annual assessment by 2017. Years 3-5 Goals: Implement annual assessment strategy, appoint individual responsible for ongoing assessments.
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Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Sample Activities and Tasks

12: Assessing your readiness					
Activity 1: Determine what resources we currently have on hand.					
Tasks	Priority	Equipment	Time	Lead Person	Completion Date
1. Interview Association President to assess current resources	med		4 hours	M. Murphy	May
2. Talk to Association Finance Officer to assess fiscal resources	med		4 hours	M. Murphy	May

Section V

Supplemental Information



The emergent flower stalks of variable watermilfoil, on Thompson Lake, Oxford, Maine.

Photo: Jacolyn Bailey.

A. About Invasive Aquatic Species

Nearly every terrestrial, wetland, and aquatic ecosystem in the United States has been invaded by non-native species. The spread of invasive species, aquatic or terrestrial, is considered by the Union of Concerned Scientists (2008) as “one of the most serious global environmental challenges” of our time. These introduced species can cause habitat alteration and destruction and, in many instances, is the primary cause of species extinction (Mack et al. 2000; Kelly and Hawes 2005).

The rapid global expansion of trade, transportation, and travel has quickened the spread of non-native species and the costs they incur on society. Economic losses in the U.S. are estimated at \$137 billion per year (Pimentel et al. 2000). However, the costs of invasive species can be measured not just in economic harm, but also in social and environmental harm, such as, unemployment, damaged goods and equipment, recreational deprivation, environmental degradation, disease epidemics, and power failures (Vitousek et al. 1996; Simberloff 2003; Kelly and Hawes 2005).

What are invasive species?

An “invasive species” is defined as an organism that is 1) non-native (exotic) to the environment under consideration and 2) whose introduction causes or is likely to cause economic, social, or environmental harm (Executive Order No. 13112, 1999). They can be any kind of living organism: amphibians, plants, insects, fish, fungi, bacteria, or even an organism’s seeds or eggs. These invaders are typically highly adaptive, resilient and hardy, reproduce quickly and spread aggressively (Mack et al. 2000; Simberloff 2003). They are able to do this because the factors that ‘control’ them in their home range, such as competition or diseases, may not exist in the new habitat.

Over the centuries, as people have moved around the world, they have also moved organisms along with them. Plants and animals, and their products, are imported and exported to be used as food, construction materials, ornamental plants, livestock, pets, and more (Pimentel et al. 2000). In the U.S., most food crops and domesticated animals are exotic species however their useful value is apparent (Pimentel et al. 2000). Most introduced non-native species are simply benign. It is a small number that can cause serious problems in their new environments.

Some exotic organisms are intentionally imported and escape from captivity or are carelessly released into the environment and become invasive. While most importations are legal, smuggling also occurs. Some invasive species arrive as hitchhikers on commodities such as produce, nursery stock, and livestock. Others are stowaways in transport equipment, such as packing materials or a ship’s ballast water. (“National Management Plan: Executive Summary.”)

Additionally, an invasive species does not have to come from another country. For example, largemouth bass are native to the Mississippi and the Great Lakes, but are considered to be an invasive species in Umbagog Lake, Maine because they compete with native wild brook trout for habitat and other resources (Boucher).



Curly-leaf pondweed (*Potamogeton crispus*).
Photo: Dennis Roberge.

Why are lakes important?

Lakes are more than just aesthetically pleasing; they influence our quality of life, help strengthen our economy, and provide a number of environmental benefits. Lakes provide countless recreational opportunities like swimming, boating, and water skiing, and are often the ‘getaway’ that provides necessary relaxation and recharging from the hectic pace of life. Economically, lakes are the foundation of many State tourism and fishing industries (“Clean Lakes” November 2013). They provide 70% of the U.S with drinking water, supply water for irrigation, hydropower, farming, and various other industries (“Clean Lakes” November 2013).

In Maine, 50% of the population gets its drinking water from surface sources.

Ecologically, lakes and their surrounding watersheds ease the impact of floods and droughts by storing water and replenishing groundwater (Bronmark and Hansson 1998). They are biodiversity conservation areas, supporting complex food web interactions and providing habitat that supports many threatened and endangered species (Bronmark and Hansson 1998).

It is easy to see that lakes are more than just a simple body of water that people use for recreational activities. They are important ecosystems that, when valued and cared for, can sustain a healthy balance of aquatic life, provide us with enjoyment, and help support our social and economic needs.

Visitors to Maine lakes spend \$2.3 billion annually, generating and sustaining:

- \$3.5 billion total economic activity in Maine
- \$1.8 billion in annual income for Maine residents
- 50,000 jobs

From 1997 study by Kevin Boyle & Steve Kahl; figures updated in 2005 by T. Allen, Center for Tourism Research and Analysis, update commissioned by Maine Congress of Lakes’ Association.

How do invasive aquatic species affect our lakes?

Aquatic invasives are nuisance exotic species that inhabit water, and include plants, fungi, fish, mollusks, other animals and even pathogens. They have been shown to negatively affect the ecosystems they invade by altering resource use, changing the physical ecosystem structure, affecting resident biota, and changing the hydrological regime and nutrient cycling (Vitousek 1990b; Gordon 1998; Crooks 2002). They also affect commercial, agricultural, aquacultural and recreational activities on lakes hindering economic development, decreasing aesthetic value and serving as vectors of disease (“What are ANS?” November 2013).

Since the 1930s, the Rusty crayfish (*Orconectes rusticus*) has spread from the Midwest to the southern and central states of the east coast (Lodge et al. 2006). They outcompete native species of crayfish for resources and also deprive native fish of their prey and cover (Lodge et al. 2006). It is not just plants and animals that can do damage. Didymo (*Didymosphenia geminata*) is an invasive freshwater microscopic alga that has invaded the northeast (“Didymo (Rock Snot)” November 2013). It forms on the bottoms of rocky-river beds and smothers aquatic life-forms on the stream bottom (“Didymo (Rock Snot)”). These altered stream conditions change the community of native insects which can affect trout and other fish by limiting their food (“Didymo (Rock Snot)” November 2013).

Introductions of non-native aquatic plants have increased dramatically over the last two decades (Armstrong 1995; Vitousek et al. 1996a; Pimentel et al. 2004; Richardson and Pysek 2006). Many U.S. states report more than 50% of their water bodies infested with an exotic aquatic plant and in most cases have multiple invasive plants in a single waterbody (Pimentel et al. 2000). Maine is no exception, but the degree of invasion is less severe.

As with all invaders, exotic aquatic plants outcompete native vegetation and can create a monoculture that affects the food web (Mack et al. 2000; Kelly and Hawes 2005). These invasive plants often grow in thick, dense mats and clog boat motors and deter people from swimming and other water-related activities (Mack et al. 2000).

Are all aquatic plants bad?

Definitely not! Native aquatic plants are essential to lake ecosystems, playing a key role in aquatic ecosystem functions such as primary productivity and nutrient cycling (Wilson and Ricciardi 2009; Bornette and Puijalon 2011). Aquatic animal communities are influenced by the composition of native aquatic plant communities, and, if these plant communities change due to the introduction of an invasive species, it can impact all of the animals relying on it (Sarvino and Stein 1982; Leber 1985; Carpenter and Lodge 1986). Aquatic plants, called macrophytes, are strongly dependent on water quality and respond to both internal and external disturbances; which make them excellent indicators of lake health (Beck et al. 2010). Since aquatic plants are immobile and easy to identify and sample, they are often used to assess lake community health (Beck et al. 2010).

There is a positive relationship between the complexity of a habitat and biotic diversity (Crooks 2002). Native plant communities are composed of different plant species with different physical attributes, and this provides a structurally-rich habitat for associated insects, fish and wildlife (Tolonen et al. 2003). This complexity provides microhabitats that can provide refuge for prey organisms, structure for egg attachment and fish nesting sites and spawning areas for fish (Bronmark and Hansson 1998; Schneider 2000).

How do invasive aquatic plants impact fish & other wildlife?

It is estimated that there are 5,000 introduced plants in the United States alone, over 90 are aquatic invasives (Pimentel et al. 2000). In many regions of the world, up to 80% of the endangered species are threatened due to the pressures of exotic species (Armstrong 1995). New exotic species are introduced to the United States every year, and of those that become established, approximately 10% will become serious pests (Richardson and Pysek 2006).

Aquatic Insects and Crustaceans (macroinvertebrates)

Aquatic insects and crustaceans are an integral part of the aquatic food web, providing energy and nutrients to aquatic animals. They break down materials from plants, dead animals and fungi, and they are prey to fish, carnivorous invertebrates, birds, and reptiles (Wootton et al. 1996; Merritt et al. 2008; Hoekman et al. 2009). When insects shred and eat organic matter, they are releasing otherwise unavailable sources of nutrients and carbon (Bronmark and Hansson 1998). They provide a critical link between plants and fish, making them the foundation of lake fisheries (Sarvino and Stein 1982; Weatherhead and James 2001). Insect communities are influenced by plant architecture, food availability and light penetration (Leber 1985; Carpenter and Lodge 1986). A change to plant community biomass and architecture affects aquatic insect species abundance and lowers species richness, which in turn affects fisheries (Diehl and Kornijow 1997; Phillips 2008). And, that is exactly what invasive plants do; they change the

architecture and biomass of macrophyte communities, providing less diversity through monotypic populations, which decreases insect diversity and abundance (Keast 1984; Wilson and Ricciardi 2009).

Fish & Wildlife

Fish are considered one of the most important predators in lake systems (Bronmark and Hansson 1998). Largely carnivorous, they feed on insects, crustaceans, and other fish (Wetzel 1983). They can also be prey for mammals and birds and their larvae are often prey for large predatory insects. Aquatic plant populations are important habitat for freshwater fish as they are used for foraging, refuge, and spawning (Keast 1984; Cheruvilil et al. 2002). Diverse plant communities provide optimal habitat for fish, whereas invasive plants form dense monotypic stands and are associated with diminution of habitat quality and diversity (Keast 1984; Wilson and Ricciardi 2009). Studies of the interactions of Eurasian watermilfoil (*Myriophyllum spicatum*) and large-mouth bass and also hydrilla and bluegills have shown that these invasive plants have caused a reduction in the abundance of fish species (Mittelbach et al. 1995). This decline in fish abundance forces birds and mammals to find other food sources which upset the ecological balance of the entire system (Wetzel 1983).

As a property owner on a lake, how do IAPs affect me?

Invasive aquatic species also have negative economic and social impacts. Invaders can disrupt recreational activities such as swimming, paddling, and boating. Dense populations of invasive plants can wrap around a person making swimming through them almost impossible and dangerous. Paddling becomes more difficult through dense stands of plants, and boat motors get tangled and bogged down when travelling through infested areas. Fishing opportunities can be reduced due to the alteration of sport fishing habitat and stressed fish communities (Theel et al. 2008). At the most basic level, exotic plant infestations lower aesthetic values of lakes and ponds.

Economic impacts from invasive species affect businesses and property owners. Invasive species can clog dam gates and intake pipes, causing the need for regular repairs. Tourism can decline due to fewer recreational opportunities, affecting businesses in the community. Managing and controlling invasive aquatic plants can cost a substantial sum of money, needing to be raised annually. Invaders can even lead to the reduction of waterfront property values. (“Introduction to Aquatic Invasive Species” November 2013)

The social impacts can be complex and divisive. For example, a lake association contending with an infestation may want to limit or deny access to all boaters. However, residents without shore front property who have no other means of access to the lake would find this solution unsatisfactory. It is not always clear what to do.

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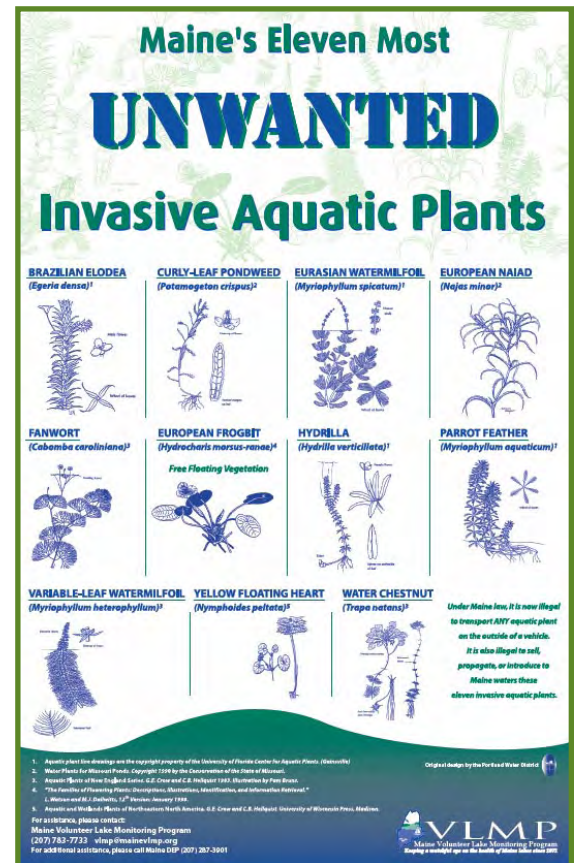
B. What Maine is doing to tackle the IAP problem

In the late 1990s lake residents of the State of Maine, non-profit organizations and state agencies recognized that something needed to be done about invasive exotic species. Over the course of the next decade, these groups came together to encourage the legislature to enact laws that would prevent further infestations, protect uninfested waterways, and manage those invaders the state already had.

Maine's Regulations and Laws

The sale, propagation, or introduction in to Maine water of eleven invasive aquatic plants was outlawed by legislation passed in 2000. Currently (2014), five of these prohibited plants are known to be established in Maine waters: variable watermilfoil (*Myriophyllum heterophyllum*), hybrid variable watermilfoil (*Myriophyllum heterophyllum x laxum*) Eurasian watermilfoil (*Myriophyllum spicatum*), curly-leaf pondweed (*Potamogeton crispus*), hydrilla (*Hydrilla verticillata*) and European naiad (*Najas minor*).

In 2001, further legislation was enacted instituting additional regulations, programs and planning requirements. In addition to establishing a dedicated funding mechanism to support statewide efforts to address the threat of invasive aquatic species, the new law established an Interagency Task Force on Invasive Aquatic Plants and Nuisance Species. The Task Force, comprised of State agency personnel and private citizens representing diverse stakeholder interests, quickly got to work on Maine's Action Plan for Managing Invasive Aquatic Species, a federally-approved plan that provides guidance for statewide action in Maine. In order to make an impact and convey the importance of these previous laws, penalties for non-compliance with invasive aquatic species laws were increased in 2004.



Maine's three focus areas

Maine's Invasive Aquatic Species Action Plan was developed in 2002 to address the threat of invasive aquatic species to the State's 6,000 lakes and ponds and thousands of miles of river and stream habitat. The action plan identifies three basic challenges: **prevention**, **early detection** and **rapid response**.

Prevention: Unlike most other states, the percentage of waterbodies in Maine with known infestations is relatively low. Maine is in the enviable position of still having a chance to prevent the introduction of aquatic invaders. Actions taken to reduce the risk of spreading aquatic invaders, when practiced on a widespread scale, provide the most efficient, environmentally sound and cost-effective means of addressing the threat. For this reason, Maine's action plan places a strong emphasis on prevention.

Courtesy Boat Inspectors (CBIs), trained and coordinated by Lakes Environmental Association (LEA) and Maine Lakes Society (MLS), provide an important educational outreach to boaters and other recreational users at public boat launches. These voluntary inspections help to reduce the spread of IAPs by boats, trailers, and associated equipment. Inspectors discuss with boaters the risk posed by IAPs, show them how to inspect and remove vegetation from equipment, urge them to inspect before and after every launch, and answer questions regarding IAPs.

CBI Inspections: Doing It Right!

During a bass tournament, it is just as important to do courtesy boat inspections as any other time. But, they are typically more hectic since the anglers are eager to get on the water and start fishing. Thanks to a diligent CBI, the end of this story is a happy one. During a quick but thorough inspection, Dr. David Potter found on the underside of a trailer a water chestnut (*Trapa natans*) seed clinging to the carpet wrapped around the trailer. Fortunately for Unity Pond this CBI was on his toes and made a spectacular save!



In 2012, almost 82,000 boat inspections were conducted by CBIs and there were 280 “saves” of invasive plants being found on a boat or trailer either entering or leaving a waterbody.

Early Detection: The *early detection* of an aquatic invader provides the best (and sometimes only) hope for successful control and eradication. Routine, methodical, and ongoing waterbody surveys by trained volunteers are the only quality and cost effective way of achieving this goal.

Quality assurance is achieved in Maine through the training, certification, and technical support services established by the Maine Volunteer Lake Monitoring Program’s (VLMP) Invasive Plant Patrol (IPP) program. Since 2001 IAP survey activity has increased from one to 458 waterbodies, and continues to grow.

To support the work of the IPP volunteers and others, the VLMP has developed a number of publications, hand-outs, web resources and curricular materials, which include: the *Maine Field Guide to Invasive Aquatic Plants*, the *Quick Key to Ruling out Maine’s Eleven Most Unwanted Invasive Aquatic Plants*, the *Virtual Herbarium*, and the *Friend or Foe Learning Kit*. (www.mainevlmp.org)

Rapid Response: The prospects for eradication (or, effective management at minimum risk to the aquatic ecosystem), is greatly increased by swift, well-planned, and properly executed controls.

In January 2006, the State of Maine adopted its *Rapid Response Plan for Aquatic Invasive Plants, Fish and Other Fauna*. The plan outlines a process that will be taken by State Agency personnel in response to all newly reported infestations.

Maine’s Rapid Response Plan

The plan is intended to ensure that appropriate protocols, trained personnel, equipment, permits, and other resources are ready to go to contain or eradicate newly detected illegal aquatic plant or animal introductions as they are reported to or discovered by State Agency personnel. The plan is available at the State of Maine website under the Maine Department of Environmental Protection’s Invasive Aquatic Plants program (www.maine.gov/DEP). Though Maine’s *Rapid Response Plan* officially pertains to newly detected infestations only (i.e. infestations confirmed after the final approval of the plan in 2006), the document contains information useful to any control effort, and is also a good resource for those engaged in managing older (pre-2006) infestations.

The primary goal of the plan is to ensure that initial eradication and/or containment efforts are deployed as quickly as possible, “*within the first season of detection, and, preferably, to treat the infestation in less than 30 days.*” This initial response may include physical techniques or chemical treatments aimed at knocking out an invasive species before it has a chance to proliferate. Maine DEP will determine the initial response on a site-specific basis, taking into account the following factors:

- Species, density and distribution of the target invasive aquatic plant
- Growth stage of the invasive plant and associated native aquatic vegetation
- Water body basin and flow characteristics (depth, volume, flow, discharge, other environmental characteristics and water quality of the water body/basin)
- Current uses of the waterbody (drinking water, fishing, wildlife, recreation, etc.)
- Resources required and available (personnel, supplies and equipment)
- Advantages and disadvantages related to economic and environmental costs
- Amount of time in the field season to implement control strategy

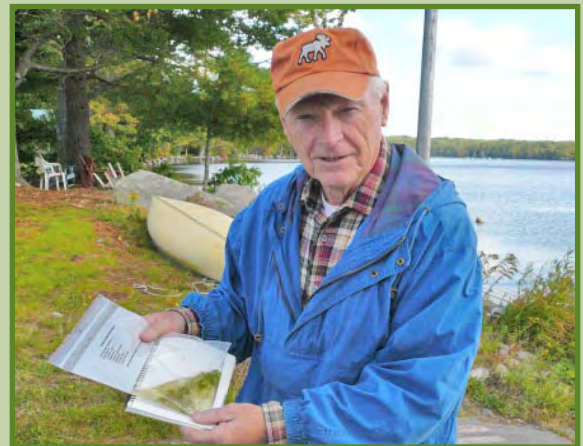
In cases where immediate eradication is not possible, the protocol calls for MEDEP to work in partnership with local officials and associations to develop a longer-term management strategy. The goal in these cases is to determine the best possible plan of action to contain the invader (aiming for eventual eradication when possible) and minimize spread within the waterbody and to other waterbodies. Local participation is seen as crucial to the success of any long-term management effort.

Collaborative efforts

Lake groups with successful IAP management programs engage in collaboration with other organizations to maximize what are often limited resources. Collaborations can be formed for many reasons: to share information, equipment or expertise; engage the community; and find funding sources. Because species can spread beyond property lines, it is important to connect private landowners and public land managers with invasive plant expertise and assistance programs across boundaries. All stakeholders, both public and private, can benefit from collaborative efforts to reduce the threat of invasive aquatic plants.

Volunteers are the Key to Keeping Our Lakes IAP Free!

On September 20, 2009 Dick Butterfield, a Damariscotta Lake Watershed Association member and MVLMP Invasive Plant Patroller began the task of surveying the shoreline to the north and south of his property on Damariscotta Lake. As he paddled into a small shallow cove, he realized that the plants looked “not quite right.” According to Dick, a dense carpet of plants “solid enough to walk on” filled the cove. Using identification keys he received during his IPP training he recognized it may be an invasive plant. He bagged a sample, sent it in for verification and two days later it was confirmed as hydrilla. Two days later the Maine DEP quickly went to work employing containment screens and initiating controls. If it hadn’t been for Dick’s training and willingness to survey his shoreline, this infestation could have spread across the lake.



Local effort (Community Lakes Association and 4-H)

The Community Lakes Association is an organization whose mission is to “protect the health and beauty of the 11 ponds and lakes in and around the Maine towns of Greenwood, Woodstock, and Songo Pond in Bethel.” Two of the ponds have infestations of variable watermilfoil. The association has been working hard to manage them, and on Bryant Pond, there happens to be a 4H Camp. In 2009, the CLA forged a strong partnership with the 4H Camp and trained students in variable watermilfoil identification, and mat making and installation. More opportunities arose out of this partnership including a unique idea put forth by a camp staff member to use a robotic submarine carrying an underwater camera to scout the lake bottom for variable watermilfoil.

State-wide effort (Maine Milfoil Initiative)

The Maine Milfoil Initiative (MMI) was formed in 2008 to address the variable watermilfoil infestation threat in Maine’s lakes. The MMI initiated the most comprehensive variable watermilfoil mitigation project in Maine history. It was the first group in the state to bring together lake groups to research and identify best practices to be shared by lake associations of all sizes throughout Maine and beyond. Prior to the MMI, lake groups worked in isolation, rarely coming together to bring common thinking to the problem.

The MMI was a collaborative effort between a college, three non-profit organizations and seven lake associations. Its mission was to address the variable watermilfoil infestation threat through a focused program of prevention, research, management, mitigation, and eradication through the application of best practices. The group addressed the two major problems that were hindering the management, mitigation, and eradication of variable watermilfoil: (1) that, without collaboration lake groups were trying scattered methods and struggling alone throughout the process; and (2) despite years of hard work, no focused scientific study had ever been done to determine whether the practices being implemented were truly effective on the invasive variable watermilfoil plant. The program was a three-year project that helped jump-start the management programs of some lakes and supplement the on-going efforts of others.

C. Resources

Maine State Invasive Species Organizations

Maine Volunteer Lake Monitoring Program (www.mainevlmp.org) – a state-wide citizen lake monitoring program with more than 1,000 active volunteers. Their website is an excellent resource for general water quality information, invasive aquatic species information, Maine screening and mapping survey forms, instruction on building various styles of viewscopes, Invasive Plant Patrol and control methods (DASH, benthic barriers) workshop information, aquatic plant identification pages, and a host of other great resources.

Lakes Environmental Association (www.mainelakes.org) – a lake protection organization in the Lakes Region of Western Maine. Their website provides great information on the Maine Courtesy Boat Inspection (CBI) program, how to build a boat wash station, variable watermilfoil background and control effort updates for their region, and grant application forms for both the CBI and Invasive Aquatic Plant Removal grants.

Maine Lakes Society (www.mainecola.org) – a statewide network of individuals and lake associations interested in protecting and preserving Maine lakes, formerly known as the Maine Congress of Lake Associations. Their website provides information on the Maine LakeSmart program, current legislation and policies regarding lakes, and data on Maine lake associations.

Lakes of Maine (www.lakesofmaine.org) – a collaboration of the Maine VLMP, Maine DEP, University of Maine, and KnowledgeBase Library. An online source for information about Maine's lakes, including maps, charts, data, documents, and more.

Maine Department of Environmental Protection (www.maine.gov/dep/) – Links to Maine's action plan for managing invasive aquatic species, how to report an invasive plant, reports, maps, pamphlets, permit information, and lots of other useful resources.

Maine Inland Fisheries & Wildlife (www.maine.gov/ifw/) – information on the invasive fish issue in Maine, fish identification, Maine lakes survey maps, Maine laws regarding invasive aquatic plants.

National Invasive Species Organizations

US Fish and Wildlife Service, Invasive Species (www.fws.gov/invasives/) - provides links to information on aquatic invaders, grants, laws and regulations, and USFWS invasive programs.

USDA Plants Database (www.plants.usda.gov/) - The PLANTS Database provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. It includes names, plant symbols, checklists, distributional data, species abstracts, characteristics, images, crop information, automated tools, onward Web links, and references.

UF-IFAS Center for Aquatic and Invasive Plants (www.plants.ifas.ufl.edu) – An excellent resource for information on invasive plants with identification information, a plant glossary, links to publications and journal articles related to invasive plants, and lots more.

The National Invasive Species Council (invasivespecies.gov) – Their website provides information on prevention, early detection, management, and research of invasive species nationally.

Northeast Aquatic Nuisance Species Panel (www.northeastans.org) – A website that allows users to create a customized field guide to aquatic invasive species.

Aquatic Plant Management Society (www.apms.org) – An international organization focused on the management and study of aquatic plants. Their website provides links to their publication, the [Journal of Aquatic Plant Management](#).

Center for Invasive Species and Ecosystem Health (www.invasive.org) – An archive of high quality images for educational applications. The focus of the images is on species of economic concern, invasive species, integrated pest management, plants, insects, fungi, wildlife, and other natural resource issues.

Grant Writing Resources

Maine Philanthropy Center (www.mainephilanthropy.org) – The regional repository for the Foundation Center which also offers one-on-one assistance on grant research and writing.

Maine Association of Nonprofits (www.nonprofitmaine.org) – Offers education and resources designed to provide nonprofit leaders, staff, board members and volunteers with the necessary knowledge and skills to help their organization become more effective and well-run. They also help organizations start the 501(c)(3) process.

Nonprofit Resource Center (www.nprcenter.org) – Provide access to grant funder databases, fundraising workshop, and a broad array of workshops and assistance for nonprofit organizations.

The Foundation Center (www.foundationcenter.org) - The Center maintains a comprehensive database on U.S. and global grantmakers and their grants.

Foundation Search America (www.foundationsearch.com) – An online database of foundations with funding history, preferences and contacts.

GrantStation (www.grantstation.com) – A searchable database of private grantmakers.

The Philanthropy Journal (www.philanthropyjournal.org) – An electronic periodical that focuses on nonprofit news, resources, and articles.

Guidestar (www.guidestar.org) – Information on IRS-registered nonprofit organization.

The Grantsmanship Center (www.tgci.com) – An organization that provides training for grant writing and research. Their website offers publications, a blog, an eMagazine, articles, podcasts and webcasts related to grantsmanship.

The Chronicle of Philanthropy (www.philanthropy.com) – An online news source that provides current information on grants and grantmakers. Their website also has lists of grants, fundraising ideas and techniques, and statistics.

D. Forms

All of the following forms are available on the Maine Volunteer Lake Monitoring Program's website www.mainevlmp.org.

Screening Survey Documentation Form & Instructions – This form is used for surveying lakes without a known IAP infestation. The forms have a native plant lists on the back that is available by common names or Latin names. An instructions form is available that goes over in detail how to fill out the Screening Survey Form.

Invasive Aquatic Plant Infestation Survey Form & Instructions – This form is used for surveying lakes with known infestations. An instructions form is available that goes over in detail how to fill out the Infestation Survey Form.

Suspicious Plant Form – This form should be filled out and submitted (along with a plant sample if possible*) to the Maine VLMP if a suspicious plant is found. Instructions are available on how to properly package and ship a plant specimen.

Suspicious Organism Form – This form should be filled out and submitted (along with a sample if possible*) to the Maine VLMP if a suspicious organism is found. Instructions are available on how to properly package and ship a plant specimen.

*A digital photograph can often be sent in by email to vlmp@mainevlmp.org for the initial identification.

E. IAP Action Plan Sample

Invasive Aquatic Plant Action Plan

FOR

Sample Lake, Poland, Maine

2016 - 2020

PREPARED BY Sample Lake Association IAP Committee
Prepared January 23, 2016, Updated Initial Plan

I. INTRODUCTION

Site Description:

Sample Lake is an 800 acre water body bordered by the towns of Poland, Otisfield, Gray and New Gloucester. There are 123 residences, of which 29 are year round. There are docks at 112 of the residences, most of which are removed for the winter. There are 3 individual road associations managing unpaved, dirt roads, all of which are maintained for access in the winter. There are 14 miles of shoreline with 0.5 miles abutting cow pastures, 4 miles of protected woodlands, and the rest residential properties with a mixture of lawn and trees. There is one public boat launch on the north end of the lake and 2 private access points at individual homes.

Current Condition:

A survey of Sample Lake was completed in 2015 by a group of 11 IPP trained volunteers using the observation characteristics developed by the Maine VLMP. They found that 60% of Sample Lake is infested with variable watermilfoil: 20% of the infestation is small dense patches (SDP), 15% is moderately infested (MIA), and the remaining 25% is large dense patches of variable watermilfoil. The 40% of the lake that is not infested breaks down to 15% being a stretch of barren, exposed area and 25% having a mixture of native plants. The dominant native plants are pickerel weed, white-water lilies, and American waterweed. The surveyors also noted spatterdock, little-floating heart, pipewort, military rush, and purple bladderwort. See the attached map for detailed information on locations of infested sites and native plant populations.

Desired Condition:

The desired outcome of the Sample Lake management program is that our lake will be 90-95% clear of variable watermilfoil. Primary areas of boating and waterskiing will again be available for use as they will be clear of large variable watermilfoil populations and consist of no or only small clusters of plants or individual plants that can be controlled with a maintenance removal program. The 3 small, shallow coves containing significant populations of plants will be reduced by 80% and controlled with a maintenance removal program. Native plants will return to previously infested areas.

Priorities:

Year 1 priorities are to raise the necessary funds to build a DASH boat, build the DASH boat over the winter, install benthic barriers in the 3 small, shallow coves during the summer season, and begin an educational campaign targeting residents on Lake Sample.

Year 2 priorities will be to assemble a DASH crew consisting of paid staff, focus initial DASH work around the 1 public and 2 private boat launches and the areas of high boat traffic, create an annual milfoil day/picnic to be used as a fundraiser, present at Poland, Otisfield, Gray and New Gloucester's town meeting to raise awareness and request funding support, and continue the benthic barrier program in the coves.

Years 3-5 will focus on evaluating our removal progress, continuing both the DASH and benthic barrier programs, continue fundraising efforts, and public education.

II. PROJECT GOALS, STRATEGIES, AND TIMELINE

The action plan described below will guide the invasive species management efforts of Lake Sample for the next five years [2016 - 2020]. This plan will be reviewed annually to assess progress made toward the goals. Given the density and abundance of invasive plant populations, eliminating all occurrences from Lake Sample is unlikely. With steady work each year, however, many patches can be reduced or eliminated, further spread can be checked, new infestations prevented, and native species allowed to thrive.

Project Goals and Strategies

The following section outlines the action plan goals for the management program and briefly describes the strategies decided upon, where relevant. Making the goals clear will help keep the program on course and targeted.

IAP Steering Committee

Overall Goal: Have an IAP steering committee that includes expertise in management, control technologies, fundraising, and grant writing by 2020.

Year 1 Goal(s): Form an IAP steering committee comprised of Sample Lake Association members and key stakeholders (marina owners, concerned residence, bass fishing organizations, town officers, teachers, etc) from the community by October 2016.

Year 2 Goal(s): Assess expertise of committee members and assign program areas to those with relevant experience by 2017.

Years 3-5 Goals: Continue to grow the IAP steering committee with interested individuals and those with needed expertise in fundraising and grant writing.

Building Program Support

Overall Goal: Engage the surrounding communities and business in the Sample Lake Association IAP management program through an ongoing effort of programming and educational outreach.

Year 1 Goal(s): Gather contact information for target groups including town officials, lake residence, youth camps, etc. Create a plan for reaching out to these groups and beyond. Determine types of programs to host.

Year 2 Goal(s): By 2017, the Sample Lake Association – IAP steering committee will host 4 meetings, mail out informational flyers, and meet with town officials in order to raise awareness of the variable watermilfoil infestation to a minimum of 70% of the population in the surrounding communities (Poland, Gray, Peru, Dixfield).

Years 3-5 Goals: Continue on-going effort of outreach. Create a “Milfoil Days” event that will occur annually to raise awareness by bringing the community together for a barbeque and fun run (individuals participating will dress up as variable watermilfoil or “variable watermilfoil controllers”).

Activities & Tasks for 2016 YEAR 1 of 5

Surveying Your Lake

Overall Goal: Establish an annual screening survey program by 2020.

Year 1 Goal(s): Identify a project coordinator for the plant survey program. Recruit and train volunteers by 2017.

Year 2 Goal(s): Include native plant identification during the IAP plant surveys and create a map of dominant native species.

Years 3-5 Goals: Continue screening survey efforts and expand number of volunteers trained and participating in the program.

Fundraising

Overall Goal: Establish an ongoing program of grant submissions and funding sources to continue the IAP management program efforts.

Year 1 Goal(s): Enlist a trained grant writer to lead the effort and gather information on targeted funders: state agencies, foundations, lake residents, surrounding municipalities by 2016.

Year 2 Goal(s): Begin an annual fundraising campaign targeting lake residents and submit a minimum of 5 grant proposals to appropriate grantors by 2017.

Years 3-5 Goals: By 2020, Sample Lake Association will raise \$30,000 each year through a targeted program of grant applications to relevant foundations and organizations, 3 annual fundraisers (a mail campaign, pot-luck dinner and milfoil days picnic) and support from surrounding towns (Poland, Gray, Peru, Dixfield).

Strategy: The Sample Lake Association will initially start its fundraising efforts by reaching out to lake residents and municipalities. We will then solicit foundations and other grantors in addition to local resources.

Sustaining the Effort

Overall Goal: The Sample Lake management program will monitor its efforts through a combination of plant surveys, evaluating volunteer programs, and assessing how effective we are at accomplishing goals.

Year 1 Goal(s): By 2016, Lake Sample Association will have enough volunteers to complete a screening survey and will begin reaching out to the lake community for funding and educational purposes.

Year 2 Goal(s): By 2017, Lake Sample Association will host a volunteer recruitment day, implement a speaker's bureau of local talent, and conduct our first goals assessment of the IAP management program.

Years 3-5 Goals: Continue annual volunteer recruitment and goal assessment.

Evaluating the Infestation

Overall Goal: Establish an annual mapping program that documents (ideally using GIS) the ongoing efforts of the management program by 2020.

Year 1 Goal(s): Establish a project coordinator and enlist and train volunteers to begin a mapping program by 2017.

Activities & Tasks for 2016 YEAR 1 of 5

Year 2 Goal(s): Incorporate the use of GIS mapping into evaluation efforts. Either have a volunteer do map production or hire a professional company.

Years 3-5 Goals: Continue mapping efforts and expand number of volunteers trained and participating in the program.

Setting Site-specific Control Objectives

Overall Goal: Determine the appropriate control actions for each infestation site within Sample Lake. Perform an annual assessment and make necessary changes before the control season begins.

Year 1 Goal(s): Assess initial infestation map and determine control technology and intensity by May 2016.

Year 2 Goal(s): Create removal map, indicating priority areas, and timeline for field season by June 2016.

Years 3-5 Goals: Review progress and update status of infested areas annually. Make changes to following years site-specific control activities as needed.

Determining Control Strategies

Overall Goal: Establish an ongoing DASH and benthic barrier program to eradicate variable watermilfoil.

Year 1 Goal(s): By 2016, Sample Lake Association will purchase and construct a Diver Assisted Suction Harvester and hire a team of 5 divers and 3 captains to implement a 5-day-a-week variable watermilfoil removal program during the months of July – September.

Year 2 Goal(s): By 2017, the Sample Lake Association will have a control program in place with all necessary staff and equipment and will conduct a minimum of 30 control days.

Years 3-5 Goals: By 2020, the variable watermilfoil infestation on Sample Lake will be reduced by 60% and native plants returned to at least 30% of their original habitat and will contain healthy populations of key plant and fish species (plants: white waterlily, spatterdock; fish: brook trout, salmon, spotted sunfish and pickerel).

Strategy: Sample Lake Association will implement a program using a combination of Diver Assisted Suction Harvesting followed by benthic barrier deployment in areas of deeper water (> 4 feet). In shallow areas, manual removal and benthic barriers will be implemented as indicated on the attached map.

Staffing Considerations

Overall Goal: Have necessary staff, both paid and volunteer to ensure all aspects of the Sample Lake Association management program are successfully implemented.

Year 1 Goal(s): Enlist the help of 10-15 volunteers to conduct initial infestation mapping project. Create section teams and comprehensive maps.

Year 2 Goal(s): Hire 2 boat captains, 4 divers, and 3 crew to work the DASH unit. Make sure all staff is trained in proper removal, safety protocols, and divers are properly certified.

Years 3-5 Goals: Cultivate long-term employees that will come back each season.

Activities & Tasks for 2016 YEAR 1 of 5

Planning for Safety

Overall Goal: Have necessary insurance coverage for all aspects of the Sample Lake Association management program as well as safety protocol that is understood by all team members.

Year 1 Goal(s): Contact insurance provider to discuss needed coverage. Gather information to create a safety protocol for divers, boaters, barrier installers and other relevant personnel.

Year 2 Goal(s): Review coverage and renew insurance. Train all staff in safety protocols and post this information in appropriate locations for referral (e.g.: DASH boat, and barrier boat).

Years 3-5 Goals: Continue review and annual renewal of insurance coverage. Make any necessary updates to safety and training protocols annually. Promote CPR and First Aid certification for all staff.

Recordkeeping & Permit Requirements

Overall Goal: Sample Lake Association will establish a recordkeeping process and obtain current permits.

Year 1 Goal(s): Apply for necessary permits from the Maine Department of Environmental Protection, create a recordkeeping protocol by 2016.

Year 2 Goal(s): Review permits and update as necessary, maintain records throughout season and create an annual report for Steering Committee by 2017.

Years 3-5 Goals: Continue annual review of permits. Maintain records for annual report.

Assessing Your Readiness

Overall Goal: Perform an annual assessment of readiness and gather needed resources before the control season begins.

Year 1 Goal(s): Assess initial readiness and available resources; create a plan for acquiring needed resources by 2016.

Year 2 Goal(s): Have readiness and resource checklist pulled together for annual assessment by 2017.

Years 3-5 Goals: Implement annual assessment strategy, appoint individual responsible for ongoing assessments.

Project Activities and Tasks

This section of the action plan identifies a timeline, lists of needed equipment, staffing and/or volunteer needs and all the tasks necessary to implement those activities.

Activities & Tasks for 2016 YEAR 1 of 5

1: Forming an IAP steering committee

Activity 1: Hold initial stakeholder meeting in May 2016						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Develop list of people to invite	high		2 hours	S. Adams	March	
2. Determine date of meeting	high		2 hours		March	
3. Arrange for meeting space	high	room to hold 50 ppl	2 hour		April	
4. Organize presentations	high		3 hours		April	
5. Order refreshments	high	plates, utensils, napkins	0.5 hours		May	
Activity 2: Enlist Steering Committee members						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3: Determine non-profit status by April 2016						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

2: Building program support

Activity 1: Develop 4-H camp partnership to train adults and teens in plant identification and buoy placement						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Contact Director at 4-H camp to discuss partnership	med		1 hour	P. Cruise	March	
2. Meet with staff to brainstorm best way to involve local adults & teens	med		3 hours	S. Johnson	March	
3.						
Activity 2: Contact local and state media with press release on removal work, partnerships, and progress in 2016						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Create press release @ management program						
2. Disseminate press release to media list via email & fax						
3.						
Activity 3: Install signs at boat ramps with “check your boat” information and a brochure about Sample Lake efforts						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Contact DEP @ signage available						
2. Pick up & install sign						

Activities & Tasks for 2016 YEAR 1 of 5

3: Surveying your lake

Activity 1: Enlist volunteers to assist with screening survey program						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Host informational meeting	high		3 hours	S. Monson	May	
2. Host screening survey training	high		6 hours	S. Murray	June	
3. Assign sectors / provide base maps	high		2 hours	N. Murray & J. Kingston	July	
4. Conduct first year screening survey	med		many hours	N. Murray & J. Kingston	August	
5.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

4: Fundraising

Activity 1: Determine key foundations for submitting proposals for our work						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Review list of foundations and determine fit for Sample Lake	high		7 hours	B. Newton	March	
2. Create calendar of due dates	high		2 hours	B. Newton	March	
3.						
4.						
5.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

4: Fundraising (continued)

Activity 4:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
4.						
5.						
Activity 5:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 6:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

5: Sustaining the effort

Activity 1: Host volunteer award and thank you event in late September						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Find event venue that holds 30 people	high		2 hours	J. Jay	July	
2. Order awards	high		2 hours	J. Jay	July	
3. Hire caterer			1 hour	J. Jay	August	
4.						
5.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

6: Evaluating the infestation

Activity 1: Enlist volunteers to assist with infestation mapping program						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Host informational meeting	high		3 hours	N. Murray	May	
2. Host mapping training	high		6 hours	N. Murray	July	
3. Mapping practice day / assign sectors	high		4 hours	N. Murray & J. Kingston	August	
4. Conduct first year survey	med		many	N. Murray & J. Kingston	end of September	
5.						
Activity 2: Using GPS coordinates create a map with details of VLM infestation size and density for Sample Lake						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

7: Setting site-specific control objectives

Activity 1: Create map with all infested areas identified, characterized, and prioritized						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Create base map from mapping survey info	med		10 hours	M. Murphy	May	
2. Meet with IAP steering committee; discuss control methods to use	med		4 hours	M. Murphy	May	
3.						
4.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

8: Determining control strategies

Activity 1: Create 100 benthic barriers & install in Beaver Cove and Mumford Cove						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Purchase materials for 100 benthic barriers	high	mat material, rebar, zip-ties, clear duct tape	3 hours	H. McMann	April	
2. Gather volunteers to build mats	med	at least 5 ppl	4 hours	T. Smith	April	
3. Build mats	high		10 hours	H. McMann	May	
4.						
Activity 2: Enlist volunteers to design & build DASH boat // DASH Team						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3: Place DEP Milfoil buoys in high density populations at south end of Lake to reduce fragmentation from boaters						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

8: Determining control strategies (continued)

Activity 4: Build DASH boat from donated pontoon boat						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
4.						
5.						
Activity 5:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 6:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

9: Staffing considerations (Paid & Volunteer)

Activity 1: Advertise for divers and captains in local newspaper and on Association website						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Create ad for positions	high		2 hours	J. Jameson	April	
2. Post ads on website & submit to newspaper (local & Morning Sentinel)	high		1 hour	J. Jameson	May	
3.						
4.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

10. Planning for safety

Activity 1: Create safety plan for variable watermilfoil removal work on Lake Sample						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Gather information on safety protocols	high		4 hours	S. Smith	March	
2. Talk to SCUBA professionals about safety needs	high		2 hours	S. Smith	March	
3. Talk to Associations with plans already in place	med		4 hours	S. Smith	April	
4. Draft safety plan for review	high		6 hours	S. Smith & K. Barns	May	
Activity 2: Contact insurance agent about types of insurance Lake Sample Association needs to conduct an IAS Management Program						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

11: Recordkeeping & permit requirements

Activity 1: Obtain Permit-by-Rule from MDEP for plant removal and benthic barrier use						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Review Permit-By-Rule application	med		2 hours	S. Smith	January	
2. Fill out and submit application	high		4 hours	S. Smith	February	
3.						
4.						
5.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

Activities & Tasks for 2016 YEAR 1 of 5

12: Assessing your readiness

Activity 1: Determine what resources we currently have on hand.						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1. Interview Association President to assess current resources	med		4 hours	M. Murphy	May	
2. Talk to Association Finance Officer to assess fiscal resources	med		4 hours	M. Murphy	May	
3.						
4.						
Activity 2:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						
3.						
Activity 3:						
Tasks	Priority	Equipment	Time	Lead Person	Completion Date	
1.						
2.						

About the Authors



Jacolyn E. Bailey is an aquatic plant biologist with over a decade of experience managing invasive aquatic plants and conducting ecological field research. She was the Project Director of the Maine Milfoil Initiative at Saint Joseph's College, a ground breaking three-year program that united isolated citizen groups fighting invasive aquatic species, for training, education, research, and mutual sharing which resulted in innovative technologies and collaboration. Jacolyn earned her MS in Ecology and Environmental Science from the University of Maine studying physical control methods for variable watermilfoil. She studied rainforest management in Yungaburra, Australia, is an avid whitewater rafter, and a certified Maine Master Naturalist. Prior to her graduate studies, Jacolyn worked as an international trade specialist

helping Maine's environmental firms export their products and services overseas. This experience provided her with a look at the global consequences of invasive species and the need to focus on this issue. Jacolyn is an instructor for the Maine Volunteer Lake Monitoring Program, a skilled aquatic botanist, and one of Maine's most experienced milfoil divers. She lends her skills and extensive expertise to numerous early detection and manual control projects across the State of Maine.

Roberta J. Hill is an aquatic ecologist and environmental educator who has been active in the field of lake water quality protection and community outreach in Maine for nearly twenty years. Roberta has led community-based projects ranging from watershed surveys, to non-point source remediation, to invasive aquatic plant monitoring, and has also been instrumental in the creation of some of Maine's most successful and comprehensive environmental education programs for K-12 students. Roberta is currently the Invasive Species Program Director for the Maine Volunteer Lake Monitoring Program. Serving in that role for the past twelve years, Roberta has worked in close collaboration with lake associations, conservation groups and State Government, to train over 3000 individuals, including volunteers, professionals, agency personnel, students, teachers and others, to screen Maine waterbodies for the presence of invasive aquatic plants. The VLMP's Invasive Plant Patrol program is widely seen as a model for citizen-based early detection. Roberta is the principal author of the *Maine Field Guide to Invasive Aquatic Plants*.





Saint Joseph's College on Sebago Lake and home to the Maine Milfoil Initiative, provides a career-focused, personalized liberal arts & sciences education, offering more than 70 bachelors, certificates & graduate degrees for on-campus & online students. The Lakes Region's largest economic entity, Saint Joseph's embraces a dual focus of wellness & sustainability.



The **Maine Volunteer Lake Monitoring Program** is the longest-standing and largest state-wide citizen lake monitoring program in the U.S. They train, certify, and provide technical support to hundreds of volunteers who monitor water quality indicators, assess watershed health and function, and screen lakes for invasive aquatic plants and animals.



The **Lakes Environmental Association's** work with a local legislator in 1999 helped pass the first "Milfoil Bill". The Maine Milfoil Summit and the Courtesy Boat Inspection program are LEA innovations. LEA's most important contribution to the plant control fight are the technologies developed in the Songo River in Naples.

Maine Lakes

The **Congress of Lake Associations**, now the **Maine Lakes Society**, is a non-profit, charitable organization consisting of a statewide network of individuals and lake associations devoted solely to the protection and preservation of Maine lakes.



The **Maine Department of Environmental Protection**, Invasive Species Program's mission is to reduce the risk of introduction and further spread of invasive aquatic plants in the state's 6,000 ponds, lakes, and streams.