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Should Maine Develop a More Comprehensive Approach to Invasive Species Management?

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Background

Invasive species are a major threat to Maine’s environment, economy, and communities. Invasive species is defined as a non-native species (including seeds, eggs, spores, or other propagules) whose introduction causes or is likely to cause economic harm, environmental harm, or harm to human health. It could be a pathogen, arthropod, plant, mammal, fish, invertebrate, or other organism. For centuries, invasive species have affected our forests, agricultural lands, waterways, natural areas, infrastructure, and people. Invasive species do not respect human boundaries. These non-native organisms started arriving with the first European settlers over 400 years ago. Many of our most naturalized non-native plants like dandelion, plantain, or purslane were brought intentionally by early settlers as food plants. Some of these plants have become serious agricultural weeds and others confound perfect lawn aficionados. Many more recent introductions have also been planted intentionally as ornamental plants or have been stocked in our waters to provide improved angling opportunities. These species include knotweed which was introduced as an ornamental and honeybee forage plant¹ or largemouth bass² which were stocked in Maine waters for food and sport. Both organisms were first introduced in Maine in the 1800’s. Some of the most damaging forest invasive species are recent arrivals like emerald ash borer in 2018 or Beech leaf disease in 2021. Emerald ash borer moved across the eastern United States in less than 20 years from Michigan to Maine and was probably moved in firewood, nursery stock and other forest products. The movement of beech leaf disease is not well understood but it raced across the US from Ohio to Maine in only 10 years.

Federal, state, and local efforts to exclude, survey, monitor, eradicate or slow the spread of invasive species require large investments in human and fiscal resources (Figure 1). The most recent estimate for average annual invasive species costs nationally in the United States is between \$75 and \$20 billion.³ Internationally, the 2022 Conference of the Parties to the UN Biodiversity Conference (COP15) in Montreal has listed five drivers of wildlife extinctions and one of them is invasive species.⁴ Invasive species impact species extinction most dramatically on islands or in isolated habitats like alpine bogs on Mount Katahdin.

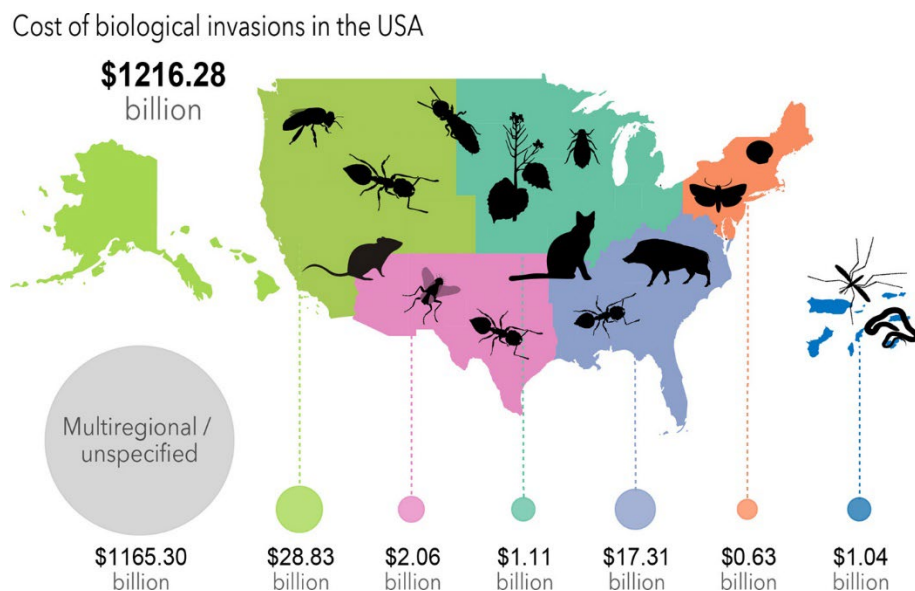


Figure 1. Total Invasive Species Cost 1960 – 2020 Fantle-Lepczyk et. al. 2021³

Impacts of Invasive Species

The impact of invasive species can be grouped into five overlapping categories: economic, ecological, medical, environmental, and recreational.

Economic Impact of Invasive Species

Excluding, monitoring, and managing invasive species in Maine costs millions of dollars. For example, the Maine Department of Agriculture, Conservation and Forestry spends over a million dollars annually on invasive species programs.⁵ The Maine Department of Environmental Protection and Maine Department of Inland Fisheries and Wildlife spend over two million dollars on monitoring and management of invasive aquatic plants, fish and invertebrates.⁵ Invasive aquatic plants, and insects such as the emerald ash borer, and hemlock woolly adelgid impact water quality enough to significantly depress lakeside property values.⁶ There are no good estimates on the economic losses caused by invasive species in Maine. Those losses include reduced agricultural production, structural damages, lost worker productivity, and many uncalculated ecosystem services. An example of lost ecosystem services that cause economic impacts is the loss of shading and wind breaks provided by ash and hemlock trees which are being devastated by invasive insects.⁷

Ecological Impact of Invasive Species

Invasive species can exclude, outcompete, and kill native plants, degrade the habitat of native animals, and reduce the biodiversity of Maine waterways, woodlands, and other natural areas. For example, forest ecology is affected by invasive barberry. Its berries are spread by birds into forested areas and the barberry plants readily sprout even in heavily shaded stands. Deer do not browse the barberry and eventually over browse the native plants, severely affecting the availability of native plants which provide essential foods for birds, mammals, and beneficial insects. Within a few years the forest floor is covered by barberry. If the forest is harvested or windthrown, the barberry prevents the natural regeneration of a new forest.

Medical Impact of Invasive Species

Multiple invasive arthropods are vectors for disease or cause human and animal illness in Maine. For example, the rock pool mosquito, *Aedes japonicus*, is a deadly invasive species. It is a vector of West Nile virus and eastern equine encephalitis. Although these diseases are currently rare in humans in Maine (EEE – 2 and WNV 3)⁸, as mosquito populations increase, the number of deaths and debilitations will most likely rise. In the last few years, the browntail moth caterpillar has wreaked havoc throughout coastal and central Maine. Its tiny poisonous hairs stick in the skin and lungs causing severe skin rashes and respiratory injury. Since 2012, human Lyme disease cases in Maine have ranged between 1,000 and 2,000 annually.⁹ The black-legged tick which vectors Lyme disease can also vector the deadly Powassan virus which caused two deaths in Maine in 2022. There is some debate about the native or invasive status of the black-legged tick in Maine, but regardless, the range of this tick has expanded dramatically over the last four decades.¹⁰ Some of its success may be related to the ever-increasing populations of barberry in southern and central Maine. Under the dense barberry cover white-footed mice and black-legged ticks thrive, creating a natural incubator for Lyme disease (Figure 2). Research in Maine and Connecticut has shown much greater human Lyme disease risk in areas where barberry infestations occur. Invasive plants can also cause harm, such as giant hogweed which can cause severe skin burns or sight loss.

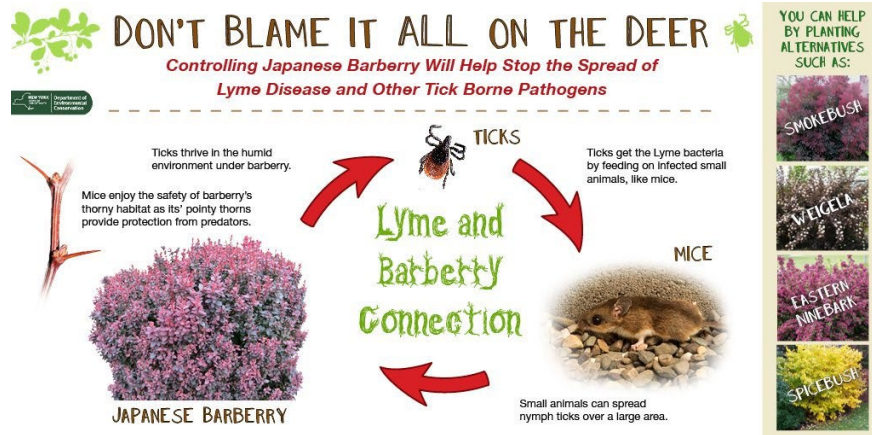


Figure 2 NY State DEC₁₆

Environmental Impact of Invasive Species

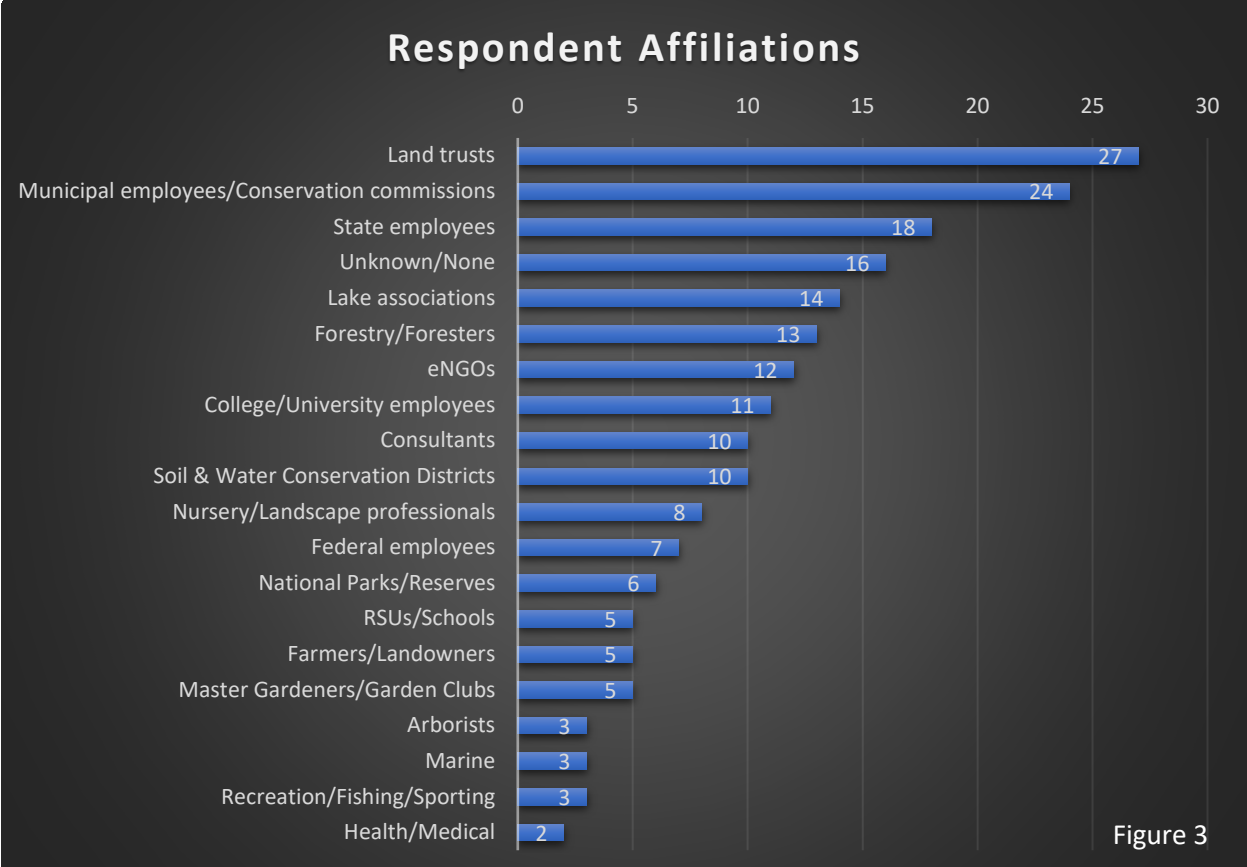
Invasive species also cause environmental harm. Knotweed colonizes the banks of rivers and streams which narrows the waterways causing increased flooding risk. Green crabs reduce the populations of clams in the mudflats which are the natural filters for the nutrient pollution that washes into Maine's bays during spring snowmelt and the increasing heavy rain events caused by climate change. Jumping worms destroy soil structure and their castings are highly susceptible to compaction and erosion causing siltation and phosphorus pollution.

Recreational Impact of Invasive Species

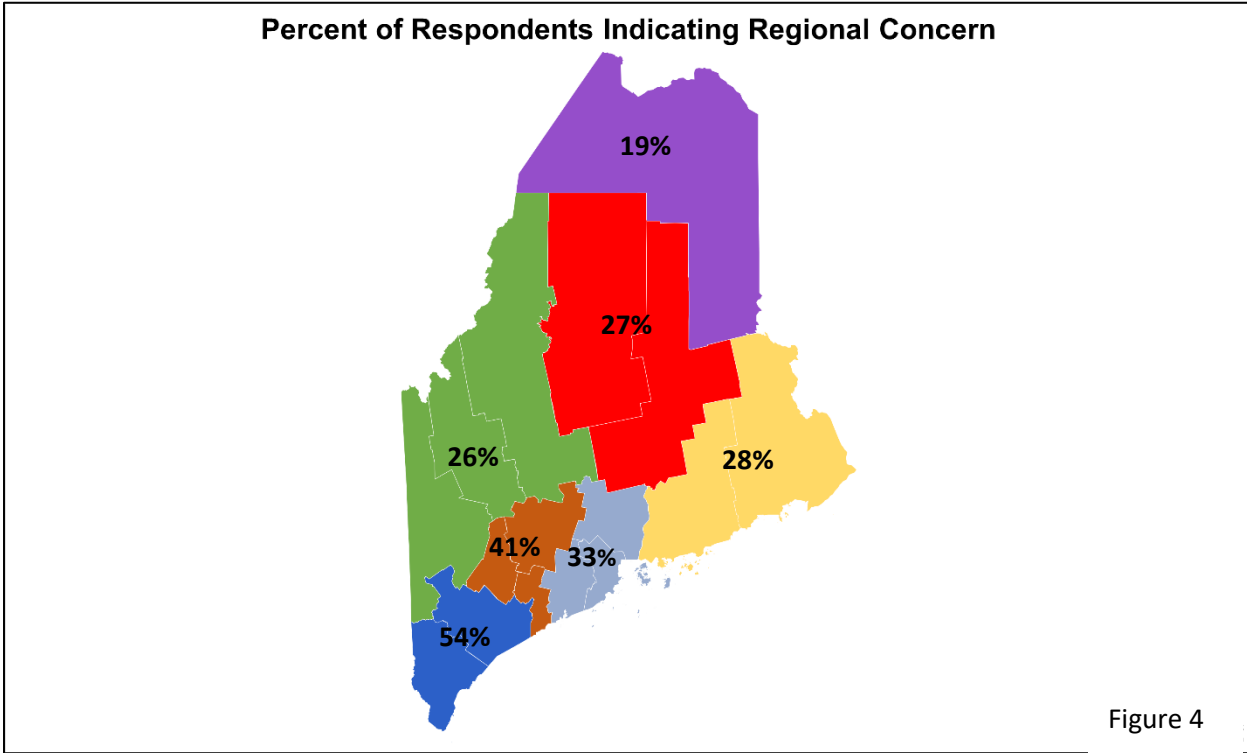
Direct spending on tourism-related trips by overnight visitors to Maine totaled nearly \$7.6 billion and more than 11.2 million visitors spent one or more nights in Maine in 2021.¹¹ Many of these visitors come to enjoy Maine's scenic coastline, lakes, mountains, and of course the seafood. However, bittersweet, barberry, and multiflora rose can make trails impassible. Milfoil and hydrilla can restrict access to waterways so that swimmers, anglers, and boaters cannot enjoy the lakes, rivers, and ponds. And, the fore-mentioned green crabs, also compete with lobsters for food and shelter. Lobster is one of Maine's most iconic foods and a visit to Maine without eating a lobster is incomplete.

Maine Invasive Species Policy Survey

Currently the state of invasive species management in Maine seems to be very siloed with little interagency or organizational coordination or prioritization. To assess the current situation, a survey was created and sent to approximately 600 recipients (Appendix 1). Recipients included representatives from state, federal, non-profit and private organizations that are known actors in the invasive species community in Maine. The survey was also posted on the Maine Invasive Species Network listserv.¹² There were 197 respondents which provides a significant but incomplete sample of the management efforts currently taking place in Maine. Respondents represented all potential affiliations involved in invasive species management (Figure 3). These respondents indicated they were concerned about all regions in Maine (Figure 4). The greatest concern is predictably for the most developed regions with over half concerned about Cumberland and York Counties (53%) and the least concern for Aroostook County (18%) (Figure 4). Additionally, respondents listed management of or concerns about species in all the major taxa groups in terrestrial, freshwater, and marine environments.



Respondent affiliations self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)



Percent of respondents indicating regional concern self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

Respondents indicated that the biggest impediments to effective invasive species management are a lack of public knowledge, need for more funding and staffing, and a lack of available controls (Figure 5). The second tier of impediments included human spread, negative perceptions about pesticides and biological controls, lack of enforcement, and not enough time to get the work done (Figure 5). The third tier of hurdles included need for regional coordination, long term management and follow-up, burdensome license and permit requirements, and the large size of populations of invasive species (Figure 5).

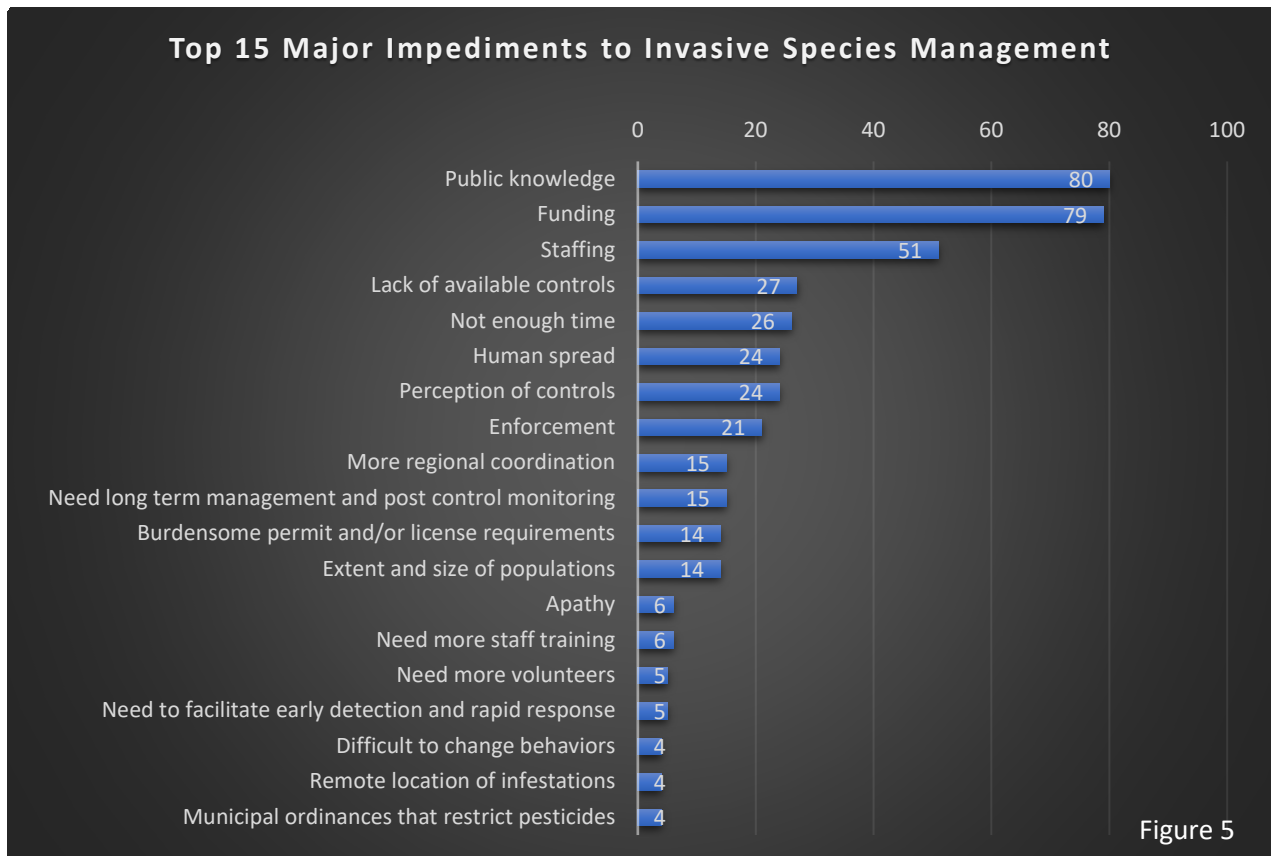


Figure 5

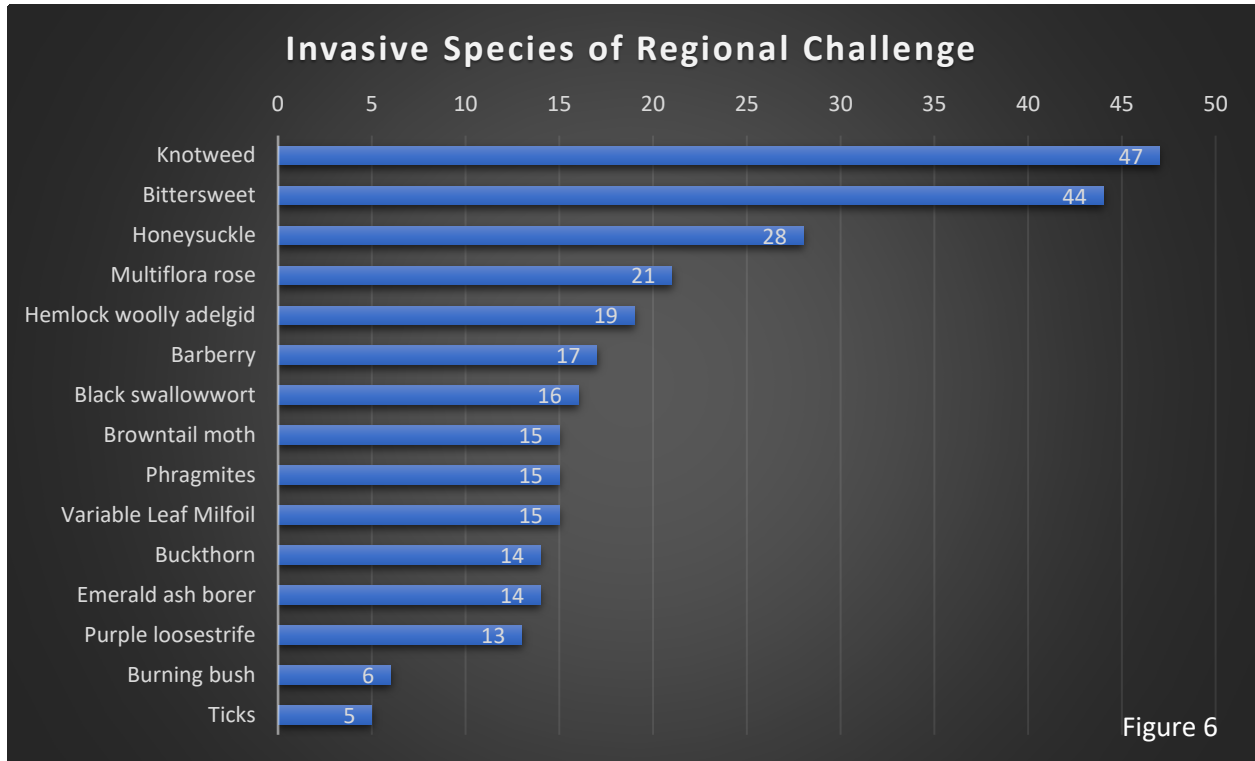
15 major impediments to IS management self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

Respondents listed 61 different species as a specific challenge to their region of Maine (Figure 6). They also listed ticks, people, fish, tree species, terrestrial plants, and deer as additional concerns (Figure 6). Other challenges included climate change, human movement, plant sales, municipal ordinances, large populations, abutters, remote locations, and inability to perform early detection and rapid response (Figure 6). This expansive list demonstrates the depth and breadth of regional concerns. It may be surprising to many that there are over 60 individual invasive species that pose a management challenge in Maine. While the top 15 challenging species include plants, insects, or ticks, and mammals; finfish, worms, tunicates and shellfish fill out the rest of the list.

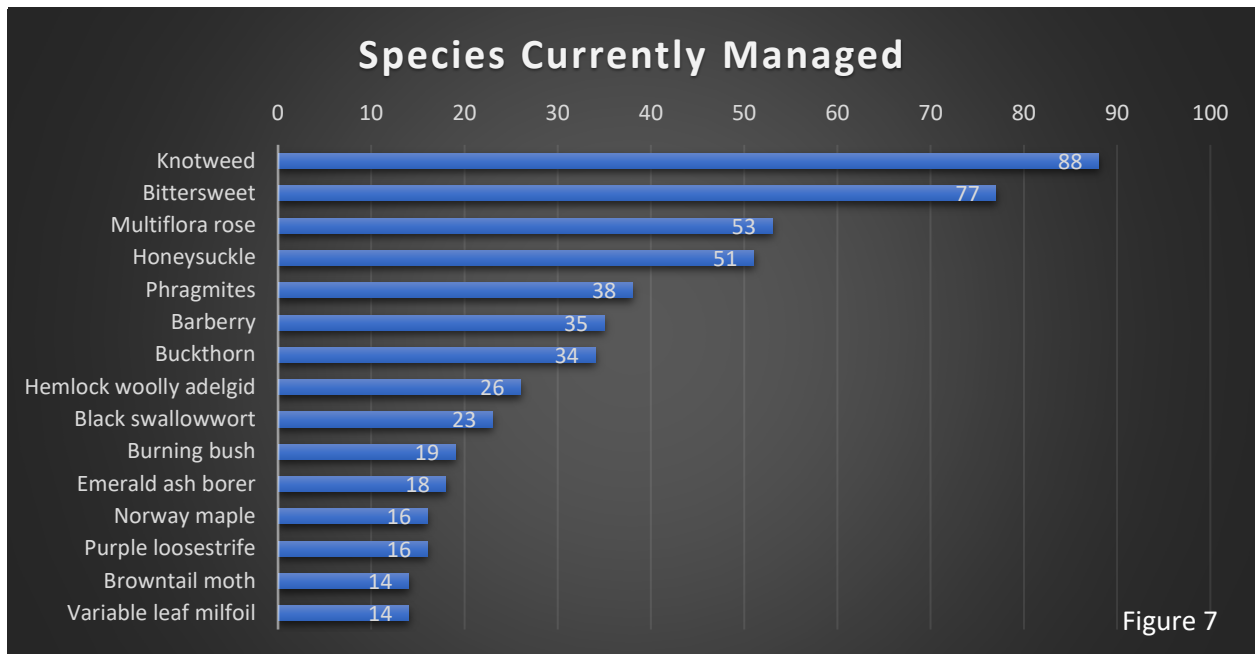
The species that respondents listed as those they are currently trying to manage or are most concerned with (Figure 7) is predictably similar to the regional concern listing (Figure 6). The only difference is that ticks are on the regional concern list and Norway maple is on the currently managed list.

Terrestrial invasive plants appear to be the largest management concern among the respondents (Figure 7); however, current funding levels do not reflect this as a priority. Currently, the state level of funding and staffing for terrestrial invasive plant management is significantly lower than aquatic invasive plant management, a difference of approximately one million dollars. This disproportionate funding may indicate a policy weakness that should be addressed. The lower numbers for marine and freshwater

organisms and terrestrial mammals may not be a true indicator of the overall level of concern for these taxa.



Invasive species of regional challenge self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)



Invasive species currently managed self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

Respondents had 46 different suggestions for improving invasive species management for all taxa in Maine (Figure 8). The top three are increased funding and grants, more and improved education and outreach, encouraging agency cooperation, and development of partnerships (Figure 8). The next tier includes increased staffing, improving public awareness and acceptance, increased surveillance, improved

early detection and rapid response, improved regulations, more pesticide use, and better enforcement or fines (Figure 8). Finally, they listed landowner cost share programs, staff and/or volunteer training, better websites and/or technical assistance, more research, no pesticide bans or municipal ordinances, and native plant incentives (Figure 8). Predictably the suggestions for improvement are solutions to the impediments cataloged above.

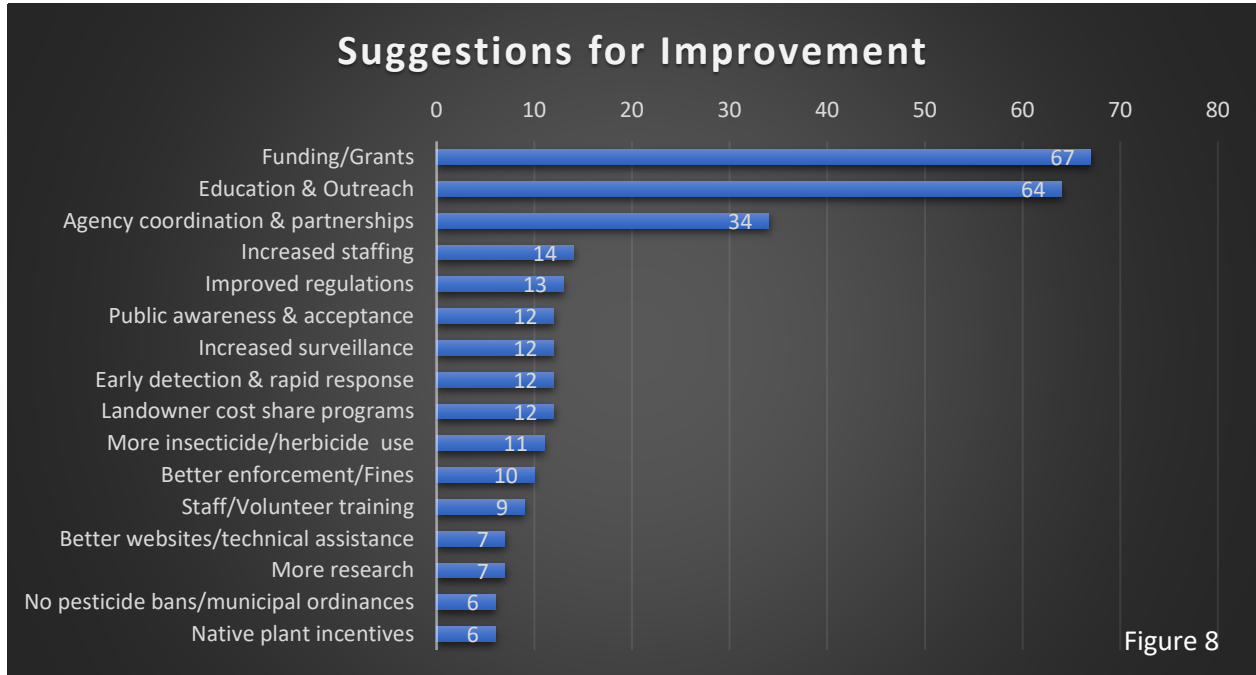
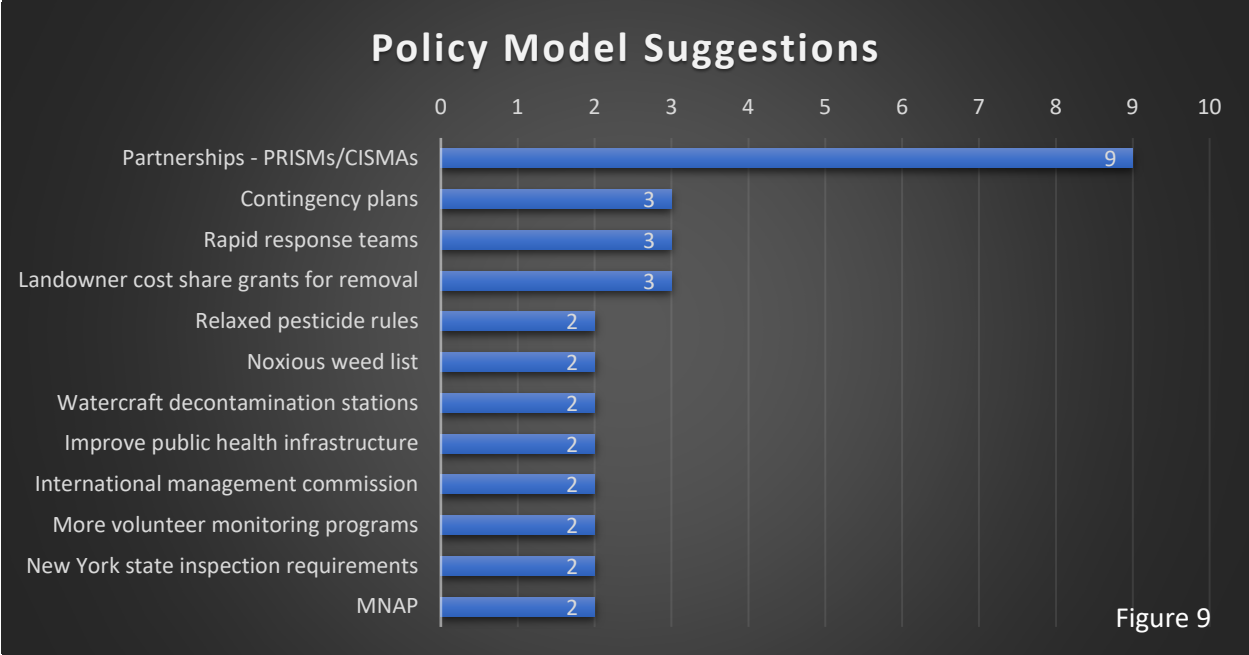


Figure 8

Suggestions for improving IS management self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

There were 30 different policy models suggested by respondents that Maine might want to emulate to help improve invasive species management (Figure 9), including 12 different suggestions that were recommended by more than one respondent (Figure 9). These models included partnerships for invasive species management (PRISM), contingency plans, rapid response teams, landowner cost share grants for removal, relaxed pesticide rules for invasive species management, noxious weed lists, watercraft decontamination stations, improving public health infrastructure, an international management commission, more volunteer programs, New York state inspection requirements, and the Maine Natural Areas Program (MNAP) approach (Figure 9).

The partnerships model has been instituted with some success in a few states. New York¹², Michigan¹³, and Florida¹⁴ all have regional partnerships that are funded through a central invasive species advisory council or similar mechanism. Maine’s invasive aquatic plant management program has benefited greatly from a partnership approach where funds from the Preserve Maine Waters stickers (\$15.00 for residents and \$35.00 for boats registered outside of Maine) are distributed to multiple lake associations and other groups to help provide for training and recruiting volunteer lake monitors, courtesy boat inspectors, and paying for invasive plant management.



Policy model suggestions self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

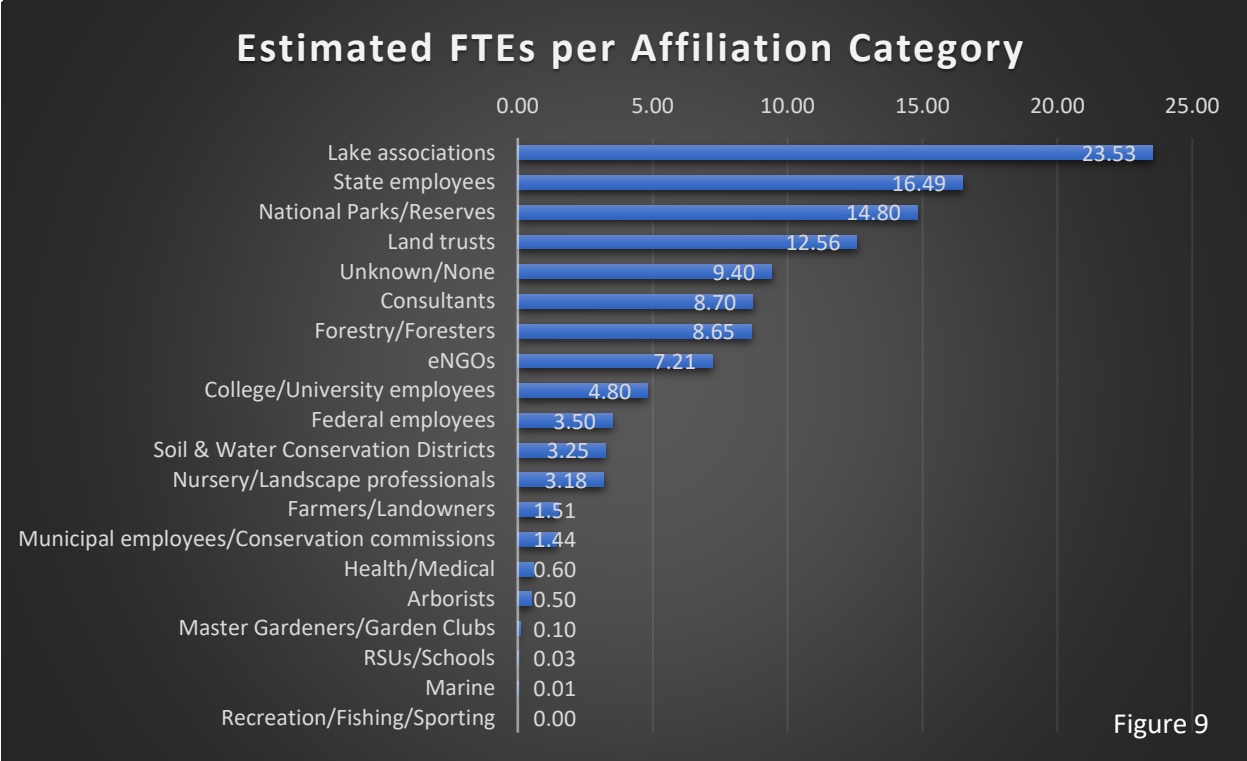
More than half of the respondents reported that they have staff or volunteers that work on managing invasive species. The total number of FTEs (Full-time equivalent personnel – 1FTE = 2000 hours) was 120.24 with an overall average of 0.61 FTE across all respondents. The total of the budgets for all respondents was over \$3 million and the overall average for all respondents was about \$19,000. Unfortunately, there is little coordination between all these groups with staff and volunteers and the money being spent by these groups may not be managing the species of highest concern.

Table 1. Full-time equivalent personnel (FTE) and budget for invasive species management reported by respondents in the Maine Invasive Species Policy Survey (N = 197 respondents).

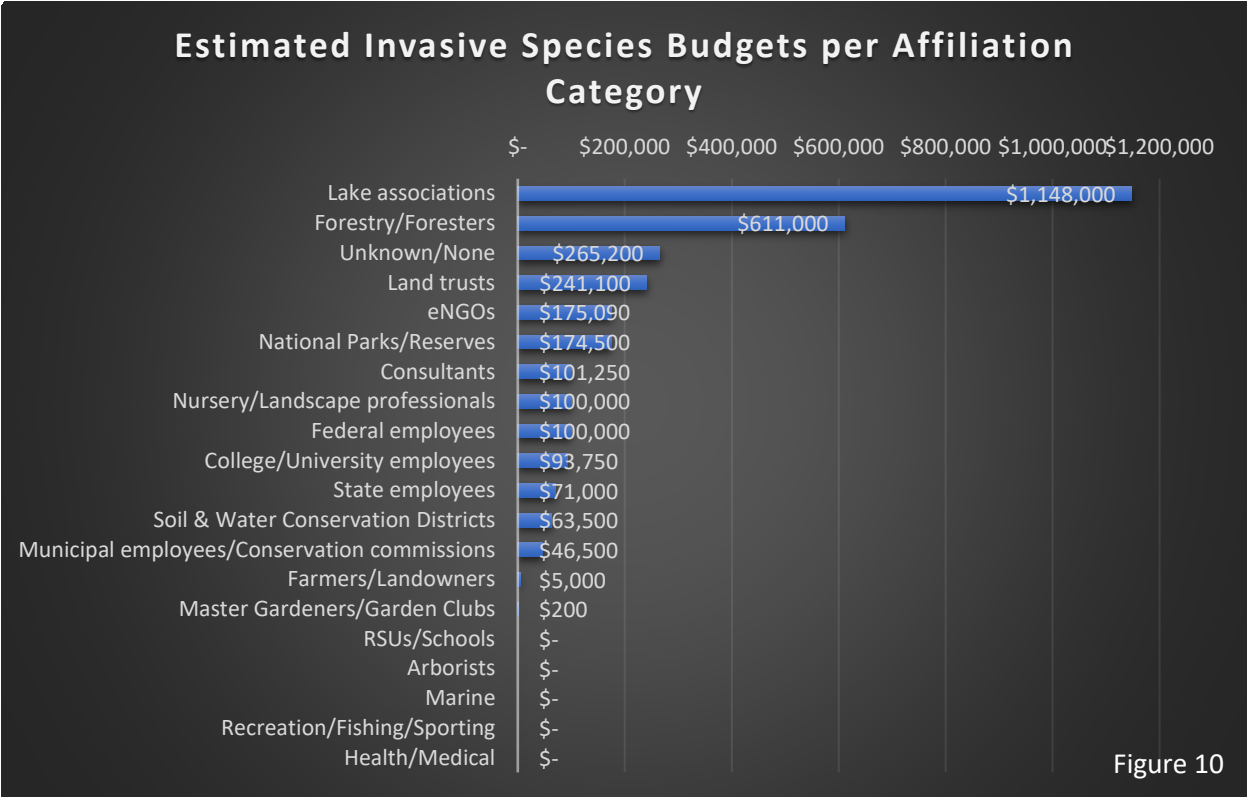
	FTE Personnel	Hours (1FTE = 2,000 hours)	Budget
<i>Total</i>	120.24	240,480	\$ 3,196,090.00
<i>Average</i>	0.61	1,220	\$ 16,223.00

Breaking down FTEs and budgets by affiliation category (Figure 9) demonstrates how haphazard the funding and staffing is across different taxa groups and management sectors. It also shows that lake associations are the best funded and staffed sector. The lake association budget total is almost double the next category (forestry/foresters) and their FTEs are 50% higher than the next category (state employees) (Figure 10). The funding estimates for state invasive species management are not complete and are likely similar to or greater than the lake association budgets. The FTE estimates may also be a bit low for overall state efforts.

Forestry/Foresters, National Parks/Reserves, Land trusts, eNGOs, consultants and Colleges/Universities also have significant staff and budget resources. These resources are also spread over the entire state, so some form of partnerships or regional coordination might improve the efficacy of the collective efforts.



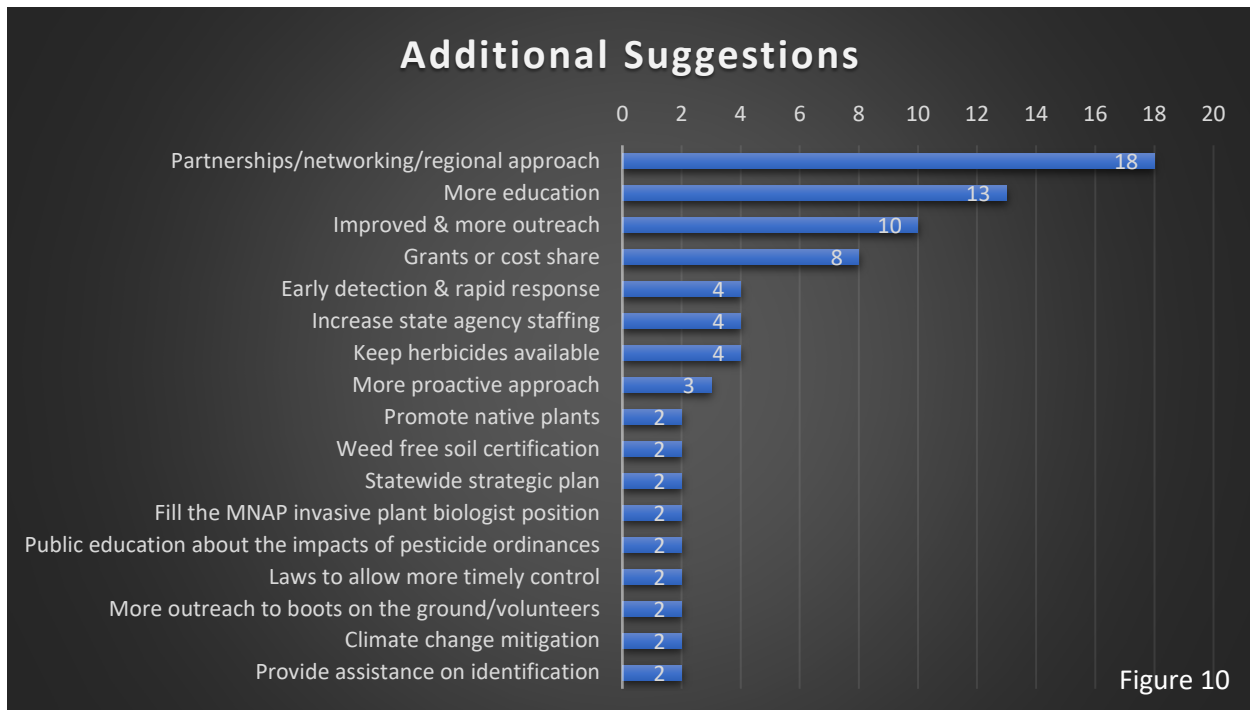
Estimated FTEs per affiliation category self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)



Estimated IS budgets per affiliation category self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

Most respondents added at least one additional suggestion (Figure 10). Seventeen of the suggestions were repeated at least once by the respondents (Figure 10). The top four were repeated over eight times and

included partnerships/networking/regional approaches, improved and increased outreach, more education, and grants or cost share programs (Figure 10). The next tier included increased state agency staffing, early detection and rapid response, keeping herbicides available, and a more proactive approach (Figure 10). There were nine suggestions with two responses: promote native plants, weed free soil certification, statewide strategic plan, filling the invasive plant biologist position at the Maine Natural Areas Program, public education about the impacts of municipal pesticide ordinances, laws to allow for more timely control of invasive species, more outreach to boots on the ground and volunteers, climate change mitigation, and providing invasive species identification assistance (Figure 10). Because partnerships/networking/regional approach was the top additional suggestion as well it seems to indicate support for that approach.



Additional suggestions self-reported to the Maine Invasive Species Policy Survey (N = 197 respondents)

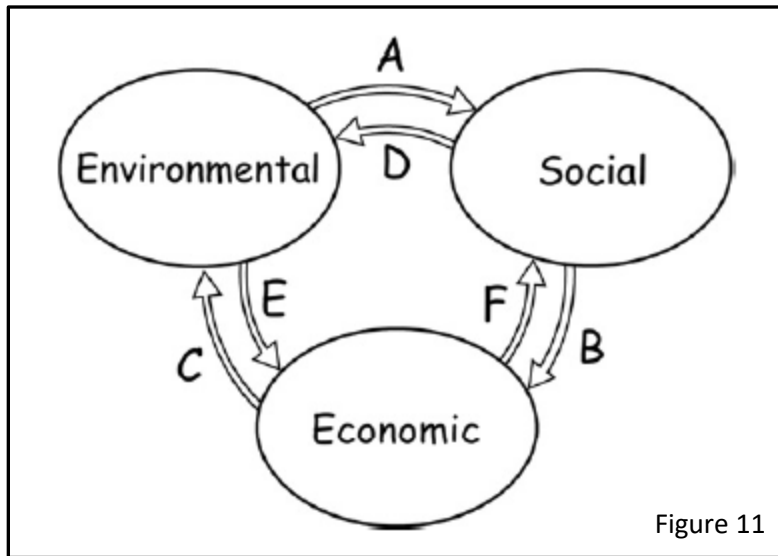
Survey Results and Incites

The Maine Invasive Species Policy Survey appears to be consistent with the findings of a 2011 article in the *Journal of Environmental Management* by Diane Larson, et al.¹⁷ In that article written over 10 years ago, the authors wrote, “Our ability to effectively manage invasions is limited by the efficacy of available management tools and economic and political constraints. Resource managers with limited funds and labor must often react to immediate threats, with few resources remaining for developing and implementing comprehensive long-term management plans. Funding for current invasive species management is clearly insufficient, but given that rates of invasion are expected to accelerate, it is increasingly important that we ask the question: is effective invasive species management sustainable?”¹⁷

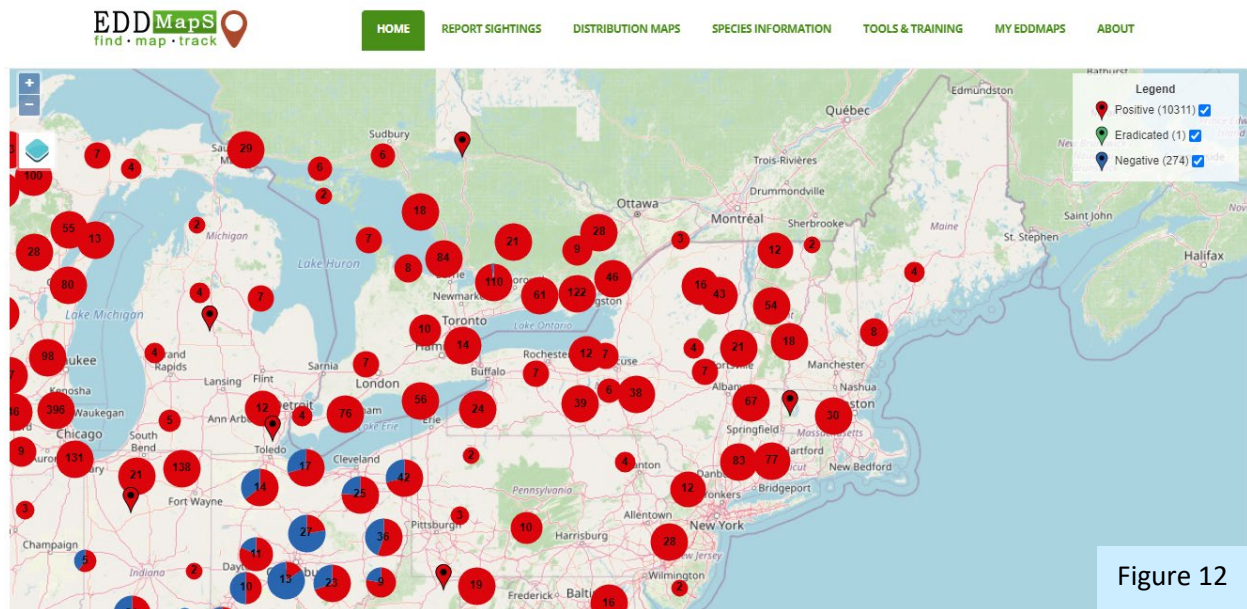
Our survey reveals consistent concerns about funding, staffing, education, outreach and lack of organization and prioritization. Invasive species management requires consistent surveillance and monitoring to detect infestations early to allow for the potential to eradicate new invasives before they become well established in the state. Once new species are established, successful management requires long-term funding, staffing and commitment to control or slow the spread of the invasive species and assure that the habitat is restored as much as possible.

Case Study: Successful Management of Maine’s Invasive Aquatic Plants

As highlighted in the paper by Larson et al.¹⁷, sustainable invasive species management programs must address three key pillars: environmental, social, and economic objectives. When any one of these pillars are left out, the efforts suffer and are no longer sustainable.¹⁷ One success story is the management efforts for Maine’s invasive aquatic plants. These efforts address all three pillars (Figure 11), and therefore have developed the most robust network of partnerships and have demonstrated the most consistent results in eradication and reduced spread. Maine is one of few states with a low percentage of waters with known invasive species infestation. The map below (Figure 12) demonstrates how few lakes in Maine are infested with Eurasian water milfoil compared to the surrounding states. This is not just a coincidence.



The three pillars of sustainable invasive species management₉



Positive reported sightings of Eurasian water milfoil – December 2022

There has been a strong volunteer lake monitoring program (VLMP) in Maine since 1971.¹⁸ The program was established by the Legislature and was initially housed at the University of Maine. Subsequently, it moved to the Maine Department of Environmental Protection (DEP) until 1996 and then because of state budget shortfalls VLMP became a freestanding non-profit organization. In 2003 the VLMP Center for Invasive Aquatic Plants was established to support Maine's Invasive Aquatic Species Action Plan. This approach has endured and remained successful because it continually addresses the three pillars of a sustainable framework.

Environmental Pillar: Monitoring

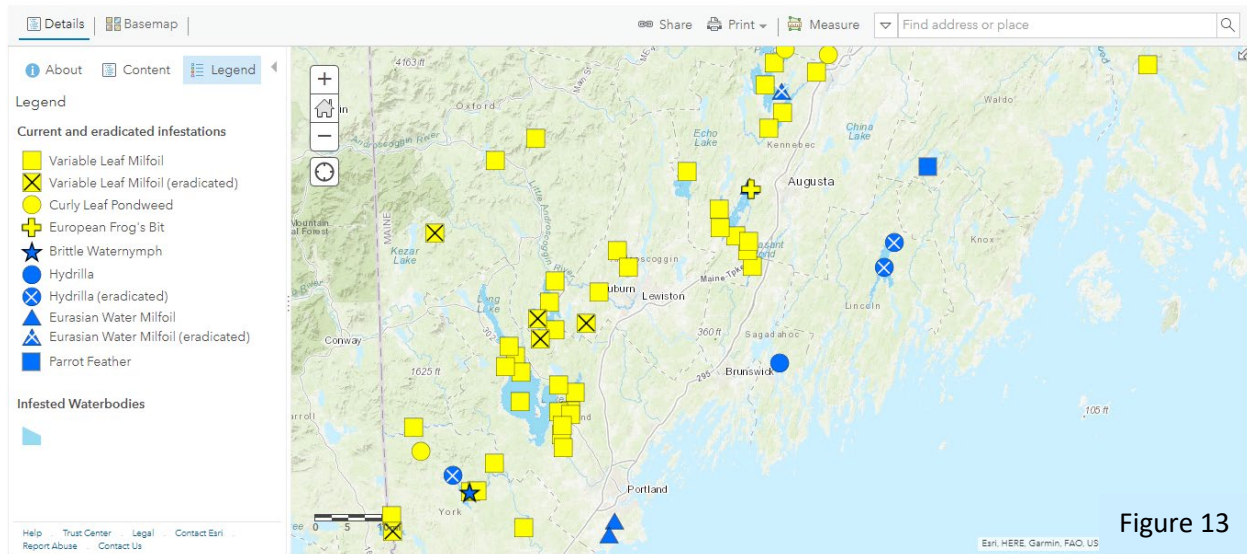
The environmental pillar is held up with a strong monitoring presence with well trained volunteers on the majority of Maine's lakes who survey susceptible waters on an annual basis and report findings to the Maine DEP. Many also train and stand-up courtesy boat inspectors at boat ramps to prevent infested boats and equipment from spreading invasive plants and/or invertebrates into un-infested waters and to stop invasive plant fragments or other viable organisms from leaving already infested lakes. Finally, in the event of a new discovery, Maine DEP has a rapid response fund available to quickly eradicate any new invasive plant.

Social Pillar: Associations, Non-profits, and Annual Meetings

To cover the social pillar there is a strong coalition of lake associations as well as statewide non-profits that help support those associations. There is also a longstanding annual meeting to provide updates on lake and pond infestation statuses, new research, funding opportunities, and policy objectives. The many lake associations and other non-profit entities also provide continuous education and outreach to waterfront property owners, legislators, and the public. An additional strength in this sector is a long-established Maine Interagency Task Force on Invasive Aquatic Plants and Nuisance Species.¹⁹ This task force has been in place since 2001 and has helped coordinate the work of multiple agencies and non-profits to address priorities developed by the group. It has also been tasked with the development of a comprehensive state invasive aquatic plants and nuisance species management plan. Finally, the Task Force is challenged to develop and maintain regional contacts and cooperation. The group reports annually to the Departments of Inland Fisheries and Wildlife (IF&W), Department of Marine Resources (DMR) and the Legislature. This feedback loop helps to keep the policy recommendation and implementation process moving.

Economic Pillar: Consistent and Reliable Funding

To cover the economic pillar, the invasive aquatic plant and nuisance species programs have been defended well in legislative hearings by demonstrating how infestations impact Maine's tourism industry, lakefront property values,⁶ and the overall reputation of Maine as a clean and refreshing place to work live and recreate. This strong advocacy has resulted in a consistent and reliable funding source. What was initially coined as the "milfoil" sticker has lasted the test of time. Anyone registering a powered watercraft in Maine or launching a powered watercraft on Maine inland waters is required to pay for a Lakes and Rivers Protection Fund sticker (\$45.00 non-resident and \$15.00 resident fee) that is affixed to their watercraft. This fee currently generates 1.85 million dollars annually of which 80% goes to Maine DEP and 20% goes to Maine IF&W.⁵ Each of these agencies then provides funding to local and regional organizations with staffing and volunteers to address local aquatic invasive species concerns. The Agencies also have internal programs to provide herbicide applications for invasive plant control or piscicide (fish-specific pesticides) applications to reclaim ponds infested with invasive fish species. Finally, reliable and consistent funding has provided enough money to show the public positive results. To date, Maine DEP has eradicated nine invasive aquatic plant infestations from Maine lakes over the last 20 years (Figure 13).²⁰



Maine DEP invasive aquatic plant status map – December 2022₂₀

A Need for the Three Pillars: Other Taxa Lacking Organization

Unfortunately, groups managing other invasive taxa in Maine do not have a similar approach to invasive species management. There is no interagency task force or similar group to help develop management plans or to determine which species may be environmental, social or economic priorities. Funding is not consistent nor reliable. There also is no consistent regional coordination and few if any regional partnerships.

The lack of a central task force or a similar stakeholder group leaves disparate agencies in competition for limited funding and staffing and provides no method to help these agencies develop priority listings of species. Currently invasive forest insects such as browntail moth, hemlock woolly adelgid and emerald ash borer are receiving plenty of attention with multiple staff assigned to help slow the spread of these high impact species, while little or no attention is provided to species like stiltgrass or green crabs.

There is a need for a more comprehensive look at where the state should be expending its resources and which species could create the largest impacts environmentally, socially or economically. This does not naturally happen when multiple competing agencies are working within their own silos. An office or agency at the Governor's Office level could be a potential solution to this dilemma.

Most invasive species management programs in Maine are funded through competitive grants and/or cooperative agreements from the United States Department of Agriculture (USDA), United States Department of the Interior (DOI), United States Department of Commerce (DOC) or the Environmental Protection Agency (EPA). Some state agency personnel that work on invasive species management are funded through the state general fund or through other dedicated revenues, but most of the personnel that provide active management on the ground are seasonal positions funded by soft money.

As indicated by the survey most non-profit organizations fund invasive species management with grants from state agencies, private and non-profit companies as well as individual contributions from their membership or the general public.

In both cases above the funding is short-term, inconsistent and unreliable. Effective and efficient invasive species management requires reliable and long-term funding. Many of the survey respondents mentioned

their frustration with this issue and provided examples of management efforts that failed because of the lack of a sustained effort.

Both Maine DEP and Maine IF&W have rapid response plans in place for invasive aquatic plants²¹ and other aquatic nuisance species.²² This type of formal planning has not been put in place at the state level for terrestrial invasive species or marine species. Maine DEP also sets aside a portion of their dedicated funding for rapid response situations annually. In 2010 The Gulf of Maine Council on the Marine Environment did publish the Marine Invasive Species - State of the Gulf of Maine Report²³ but there is a dearth of this type of information available for invasive terrestrial plants, forest insects and diseases, earthworms, ticks, mosquitoes, mammals, and birds. Also, there are no funds budgeted for invasive species rapid response for new infestations of these terrestrial organisms by other state agencies.

The survey also revealed a large deficit in knowledge regarding the identification and impacts of invasive species and the need for additional and more effective outreach to multiple audiences. Many disparate education and outreach efforts exist at the state, local and non-profit levels but there is little coordination amongst state agencies and regional organizations to help reach the most important audiences efficiently and effectively. Some of the national campaigns that have been funded through USDA, DOI and DOC like Don't Move Firewood²⁴, Clean-Drain-Dry²⁵, and Play-Clean-Go²⁶ are promoted in Maine, however, making this type of outreach as impactful as needed requires more and better trained staffing.

Part of the social pillar of sustainable invasive species management is the effective enforcement of laws and rules. The survey revealed concerns about the effectiveness of the current rules and laws and the lack of enforcement of those rules and laws. A need for improved regulations and better enforcement showed up in the top of the suggestions for improvements (Figure 8) as well as in the major impediments list (Figure 5). Most enforcement of invasive species law falls on the state Forest Rangers and Game Wardens. Both groups are overtaxed by their collective duties, which include providing fire protection and protecting wildlife from illegal takings. Preventing the international importation of new invasive species falls on the federal Department of Homeland Security - Customs and Border Patrol. Their agricultural compliance personnel are well trained but equally overwhelmed by the number of imports coming into our ports and border crossings. When it comes to importation from other states there are no agency personnel routinely inspecting vehicles or shipments crossing through the New Hampshire border.

Signs warn of the illegality of bringing in firewood or invasive aquatic plants, but signs alone are a small deterrent. The Department of Agriculture, Conservation and Forestry has promulgated rules that quarantine specific invasive forest insect and diseases or ban the sale of invasive terrestrial plant and have inspection and compliance agreement processes in place to implement these rules, but those mechanisms only work well when businesses are highly cooperative.²⁷

Policy Recommendations

In the next legislative session, we recommend support for the Senior Planner position to be included in the Department of Agriculture, Conservation and Forestry budget. This position would be a two-year project position attached to the Plant Health programs and would be assigned the task of researching effective strategies for invasive species management, analyzing other state, federal or non-profit approaches and the efficacy of those approaches, and working with the DACF Director of Policy & Community Engagement to develop a departmental bill to introduce into the second session of the 131st Maine Legislature that addresses the policy weaknesses uncovered by the survey conducted for this paper and any additional research findings.

Recommended research areas:

- How to build partnerships and capacity
- Need for a centralized framework for sharing invasive species information
- How to set priorities for invasive species management and advanced preparedness
- Improving ways to engage and inform the public
- Improve invasive species prevention and early detection
- Improve rapid response to invasive species
- Improving the ability to restore ecosystem integrity and resilience
- How to evaluate success

Questions to consider as a basis for development of a legislative document:

- Should Maine establish an Invasive Species Advisory Council (ISAC) to help develop IS management policy, set IS management priorities and make funding decisions?
- Should the council be staffed by a Statewide Coordinator and additional staff as funding allows?
- Should Maine establish a Comprehensive Invasive Species Management Office (CISMO)?
- Should the CISMO be attached to the Governor's Office or a Departmental agency?
- Should Maine encourage the development of regional invasive species management partnerships (RISMPs) or areas managed by public/private partnerships including municipalities, NGOs, Soil and Water Conservation Districts and other organizations?
- Should Maine establish an Invasive Species Trust Fund to support:
 - the ISAC;
 - the Statewide Coordinator and staff salaries, office equipment, space and other expenses;
 - development of a Statewide Strategic Invasive Species Plan;
 - research and pilot projects; and
 - grants to RISMPs or other organizations?

Conclusion

Maine should consider following in the footsteps of Pennsylvania²⁸ and Massachusetts²⁹ and do a thorough analysis of the current invasive species programs and approaches and determine if instituting a more comprehensive approach like that used by the states of New York and Michigan can be implemented effectively in a smaller state like Maine. Most survey respondents agreed that there should be a comprehensive approach to fight invasives, along with dedicated resources and continued research. The survey also indicated that there is no uniform approach to address invasives, and the state's efforts to control terrestrial invasives was characterized as slow and reactionary. Therefore, rapid response and control activities are needed to reduce and eliminate new and existing populations of invasive species in Maine.

Cooperation and partnerships at all levels must exist to effectively prevent and manage invasive species beyond rapid response. State agencies cannot fight the battle alone. Diverse and expansive partnerships with local leadership should also be considered.

The survey respondents clearly stated that more staff and dedicated funding sources are essential. Many also supported a comprehensive and collective approach among state, county, municipal, and private entities, such as the Partnerships for Regional Invasive Species Management (PRISM) model. This public-private partnership model, which is currently being used in New York state, has a proven track record for helping prevent and minimize the harm caused by invasive species. More specifically, the PRISM model would, among other things, provide early detection and rapid response, stakeholder education, volunteer recruitment and training, and prevention programs. The survey also revealed the large number and variety of organizations working on invasive species management and the lack of coordination between those groups and abutting land managers.

Hopefully in the next decade, Maine can act to be more effective and efficient at preventing and managing invasive species. I personally hope this capstone project becomes a spark that helps ignite the fire.

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1. https://www.in.gov/dnr/files/Japanese_Knotweed.pdf
2. <https://www.maine.gov/ifw/fish-wildlife/fisheries/species-information/largemouth-bass.html>
3. <https://www.sciencedirect.com/science/article/pii/S0048969721063968>
4. <https://www.unep.org/news-and-stories/story/5-key-drivers-nature-crisis>
5. Personal conversations with program leaders
6. <https://www.maine.gov/dep/water/invasives/costs.html>
7. <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-016-0103-6/>
8. <https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/arboviral-surveillance-arch.shtml>
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24. <https://www.dontmovefirewood.org/>
25. <https://www.fws.gov/story/clean-drain-dry>
26. <https://playcleango.org/>
27. <https://www.maine.gov/dacf/php/horticulture/index.shtml>
28. https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/GISC/Pages/default.aspx
29. <https://malegislature.gov/Bills/192/S563>

Invasive Species Policy Survey

The purpose of this survey is to help improve Maine's management of invasive species and to help develop more effective invasive species policy. (Invasive species is defined as a non-native species (including seeds, eggs, spores, or other propagules) whose introduction causes or is likely to cause economic harm, environmental harm, or harm to human health. It could be a pathogen, arthropod, plant, mammal, fish, invertebrate, or other organism.) Thank you for your help.

Required

1.Name

2.Affiliation

3.What region or regions are you most concerned with regarding invasive species? (Check all that apply)

- Aroostook County
- Washington and Hancock Counties
- Penobscot and Piscataquis Counties
- Waldo, Knox, Lincoln Counties
- Androscoggin, Kennebec and Sagadahoc Counties
- Somerset, Franklin and Oxford Counties
- Cumberland and York Counties

4.Email address (Optional)

5.What are the major impediments to managing invasive species in Maine? (see definition above)

6. Are there specific invasive species challenges in your part of Maine that may be different or more challenging? If so, please list the species and their location.

7. Please suggest approaches to improving invasive species management (for all taxa) in Maine.

8. Are there other state policy models that you think Maine should emulate? (Please provide examples and links)

9. What invasive species are you currently trying to manage or are most concerned about?

10. On average, how many FTEs do you have working on invasive species in your organization?

(1 FTE=Approximately 2000 hours)

11. On average, what is your invasive species program budget (please include the total cost of salaries and fringe (combined together), outreach, survey, monitoring, control or other efforts).

12. Please add any other ideas or comments you think might be helpful.



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https://forms.office.com/Pages/AnalysisPage.aspx?AnalyzerToken=TMfr4yAMXTUUQv839XughCZAtj62HKFB&id=q6g_QX0gYkubzeojy-GTpbAT_Eph-ZPiW-fp1JadyRUMTFSNDFLVzZBRldFMU1JRUIBWUhsVDIHSi4u