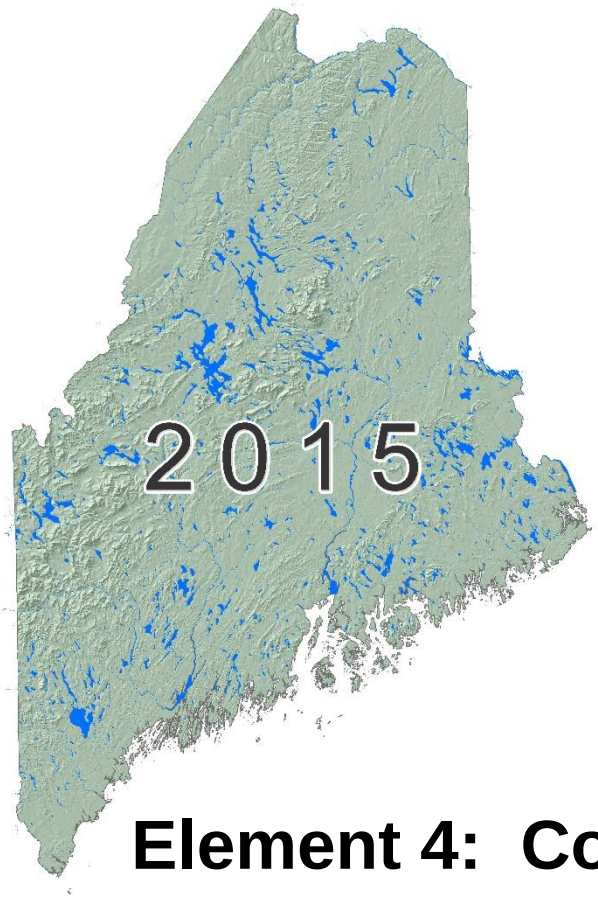

MAINE'S WILDLIFE ACTION PLAN

Element 4: Conservation Actions

Prepared by

Maine Department of Inland Fisheries and Wildlife

In collaboration with

Maine's Conservation Partners

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TABLE OF CONTENTS

Element 4: Conservation Actions

LIST OF TABLES

LIST OF FIGURES

KEY TO ACRONYMS

CMP	Conservation Measures Partnership
COA	Conservation Opportunity Areas
CWCS	Comprehensive Wildlife Conservation Strategy
MDMR	Maine Dept. of Marine Resources
MCP	Maine Coastal Program
MDIFW	Maine Dept. of Inland Fisheries and Wildlife
MNAP	Maine Natural Areas Program
MTA2C	Mount Agamenticus to the Sea Conservation Initiative
RCN	Regional Conservation Needs
SGCN	Species of Greatest Conservation Need
SMART	Specific, Measurable, Achievable, Results-oriented, and Time-bound
SWAP	State Wildlife Action Plan
SWG	State Wildlife Grants
TNC	The Nature Conservancy

4.0 ABSTRACT

The conservation actions contained in Maine's revised State Wildlife Action Plan (SWAP) consist of complementary coarse- and fine-filter approaches that maximize limited conservation dollars. The Maine Department of Inland Fisheries and Wildlife (MDIFW), the Maine Department of Marine Resources (MDMR), the Maine Coastal Program (MCP), the Maine Natural Areas Program (MNAP), and other conservation partners worked closely to develop a thorough catalog of coarse- and fine-filter conservation actions. We attempted to balance action specificity with flexibility so that actions can be adapted as needed to emerging issues and information. Conservation actions are non-regulatory approaches undertaken voluntarily by agencies and other conservation partners. Actions are not intended to replace current management strategies, but can be used to bolster existing efforts or inspire new ones.

The actions reflect several stages of prioritization. Conservation partners identified a total of 311 actions for Species of Greatest Conservation Need (SGCN). Of these, partners applied 197 actions to individual SGCN, 88 to guilds, and 26 to one or more taxonomic groups. We assigned nine of these actions to all SGCN species. Conservation partners also identified 322 habitat actions, including 165 marine and coastal habitat actions, 54 freshwater aquatic habitat actions, and 103 terrestrial and wetland habitat actions. Given the volume of habitat conservation actions identified, workgroups developed several themes to organize actions into discrete packages of related actions that address common stressors or use similar techniques. Actions within a theme are often complementary, and when undertaken together, may be the most effective and efficient use of conservation resources. Three 'super-themes' emerged across habitat groups: Connectivity, Invasive Species, and Mapping and Outreach. Actions included in these themes will be more effective with coordinated efforts across habitats. Each conservation action is linked to its target SGCN or habitat and the stressor(s) the action is addressing in a relational database, an idea proposed in the 2005 Comprehensive Wildlife Conservation Strategy (CWCS) and successfully developed as part of this Plan. We also identified 11 programmatic actions to help guide implementation and tracking of the 2015 Action Plan; we have broadly grouped these actions as Outreach and Engagement, Funding and Tracking, Action Development, and Regional Partnerships. In this chapter, we also propose criteria partners may wish to consider if evaluating how best to direct resources to conservation actions in the plan. We also discuss differences from Maine's 2005 CWCS.

4.1 INTRODUCTION

In the previous chapter, we identified the primary issues affecting Maine's Species of Greatest Conservation Need (SGCN) and their habitats. In this chapter, we discuss strategies ('conservation actions') to address the negative effects of stressors on SGCN and habitats. **Conservation actions are non-regulatory approaches undertaken voluntarily by agencies and other conservation partners. They are not intended to replace current management strategies, but can be used to bolster existing efforts or inspire new ones.** In this chapter, we describe our approach to developing conservation actions at the SGCN, habitat, and programmatic scales and introduce a strategy for prioritizing conservation projects over the next ten years.

Maine's 2015 Wildlife Action Plan consists of complementary coarse- and fine-filter conservation actions that maximize limited conservation dollars. Coarse-filter conservation actions are those applied broadly at large spatial scales (e.g., habitats) or groupings (e.g., communities) and benefit most species associated with that habitat or group. Coarse-filter actions focus largely on conserving plant and animal communities and the interactions among them. However, certain SGCN require 'fine-filter' actions designed to alleviate stressors not adequately addressed through coarse-filter actions.

"Conservation actions are non-regulatory approaches undertaken voluntarily by agencies and other conservation partners."

Conservation partners worked closely to develop a thorough catalog of coarse- and fine-filter conservation actions. We attempted to balance action specificity with flexibility so that actions can be adapted to emerging issues and information. These actions are extensive and comprehensive, and thus, their implementation will require a truly statewide collaborative effort among partners. Maine's conservation actions present a diverse set of opportunities from which conservation partners can select actions that reflect their interests and abilities. For example, some actions are suitable for private citizens while others are best accomplished by large regional inter-agency partnerships. We hope partners will see a role for themselves in the 2015 Wildlife Action Plan and identify new opportunities for collaboration.

4.1.1 SIGNIFICANT DIFFERENCES FROM MAINE'S 2005 PLAN

Both Maine's 2005 CWCS (MDIFW 2005) and the 2015 Wildlife Action Plan incorporate fine- and coarse-filter approaches to SGCN conservation. For SGCN in 2005, MDIFW relied heavily on the comprehensive species planning process to identify SGCN and habitat-scale actions. Our coarse-filter conservation efforts in the 2005 CWCS relied heavily on providing SGCN information to municipalities and land trusts for land-use planning and voluntary conservation. In the 2015 Wildlife Action Plan, however, MDIFW and MDMR species experts identified both broad and species-specific SGCN actions. We also worked with partners to expand our coarse-filter habitat conservation approaches to include a variety of education, outreach, management, and research actions aimed at multiple habitat scales.

In this Plan, we also:

1. Identified and developed actions (especially for habitats) collaboratively among agencies and other conservation partners; MDIFW also provided all conservation partners an opportunity to review and comment on conservation actions before posting the Wildlife Action Plan for the 30-day public comment period.

2. Developed habitat actions that directly address habitat stressors and not just stressors to SGCN.

3. Developed habitat action themes to help organize habitat actions into discrete packages that address a common set of stressors or use similar approaches to do so.

4. Added the action type 'new' or 'on-going' to distinguish between existing programs and those that need to be initiated.

5. Developed programmatic actions to guide Wildlife Action Plan implementation, reporting, and partner involvement.

6. Prioritized actions based on biological priority for SGCN and habitats.

Conservation partners coordinated on all aspects of Plan development. © George Matula

7. Developed a prioritization approach to evaluate SWG-funded project proposals.

8. Linked conservation actions to SGCN, habitats, and stressors in a relational database.

4.1.2 GENERAL CONSIDERATIONS FOR DEVELOPMENT OF CONSERVATION ACTIONS

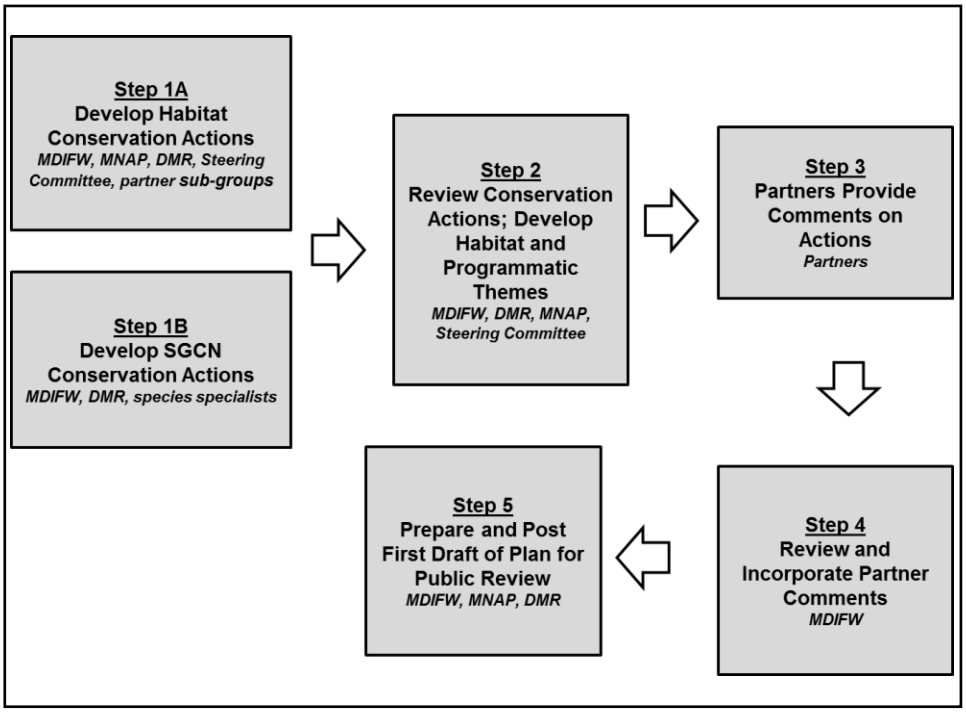
MDIFW collaborated closely with partners, species specialists, and habitat experts over a five-month period (February-July 2015) to develop SGCN and habitat conservation actions. While MDIFW used slightly different but parallel approaches to develop SGCN and habitat actions (Figure 4-1), conservation actions at both scales address specific stressor(s) to SGCN and habitats. We wrote conservation action descriptions broadly enough to allow for adaptive management over the next ten years, but with enough specificity to help assess performance (AFWA 2012). We also developed 11 programmatic actions that will guide SWAP implementation of the over the next ten years.

We identified comprehensive lists of 311 SGCN and 322 habitat conservation actions. These lists reflect several stages of consolidation and prioritization. First, we developed SGCN-

specific actions only for Priority 1 and Priority 2 species and addressed Priority 3 species at the guild level. Second, we only developed conservation actions for priority habitat and SGCN stressors, which we defined as stressors that were at least moderately actionable and moderately severe (Figure 4-1).

"MDIFW collaborated closely with partners, species specialists, and habitat experts over a five-month period (February-July 2015) to develop SGCN and habitat conservation actions."

Figure 4-1. Overall process for developing SGCN, habitat, and programmatic conservation actions. Agencies and partners involved at each stage are noted in italics.



Finally, we further prioritized our comprehensive list of actions based on biological priority (see below for further explanation).

We used the following categories to help organize and prioritize SGCN and habitat conservation actions:

1. **Action Category:** MDIFW assigned conservation actions to one of the following six broad categories to help organize related actions. While some actions fit into multiple categories, we assigned the best-fitting category for each action.

    a. **Habitat management:** Addresses stressors to SGCN habitats through habitat conservation, management, or stewardship.

    b. **Policy:** Addresses existing policies or the need for new policies that encourage conservation of SGCN and habitats; all actions in this category are strictly non-regulatory.

c. **Public outreach:** Addresses the need to raise the public's awareness of the stressors to SGCN and their habitats.

d. **Research:** Addresses gaps in our understanding of life history, productivity, mortality, habitat requirements, limiting factors, interactions with other species, and conservation needs of SGCN.

e. **Species Management:** Addresses management needs at the species or population level.

f. **Surveys and Monitoring:** Addresses data gaps and informational needs on the distribution, abundance, and status of SGCN.

2. **Biological Priority:** MDIFW assigned actions a biological priority based on how essential that action will be toward conserving a species or habitat over the next ten years. Biological priority does not take into account the economic or practical feasibility of actions. Because MDIFW developed actions only for priority stressors, there is no 'low' level of biological priority.

   a. **Critical**: Actions that are necessary for sustaining species or habitats in order to prevent the loss of populations or significant portions of habitats or habitat integrity in the next ten years.

   b. **High**: Actions that are important for conserving habitats or preventing the loss of SGCN populations but would not result in dire losses if not enacted over the next ten years.

   c. **Moderate:** Actions that would benefit habitats or SGCN but alone may not be crucial for their continued existence over the next ten years.

"Each conservation action is linked to its target SGCN or habitat and the stressor(s) the action is addressing in a relational database, an idea proposed in the 2005 CWCS and successfully developed as part of the 2015 Action Plan."

3. **Action Type:** This category indicates whether an action is already underway ('**on-going**') or if a new effort is needed ('**new**'). We included on-going actions in the 2015 Plan to acknowledge and provide continued support for on-going conservation efforts.

Each conservation action is linked to its target SGCN or habitat, the stressor(s) the action is addressing, and the above categories in a relational database, an idea proposed in the 2005 CWCS and successfully developed as part of the 2015 Wildlife Action Plan. This database allows users to quickly search by 1) habitat, SGCN, or stressor and 2) group actions by categories or programs of interest. MDIFW hopes to add additional information to habitat and SGCN conservation actions in the database (e.g., contact information for partners or agencies coordinating projects and information on project progress). Programmatic actions may eventually be added to the database, but are currently housed in this chapter.

4.2 SGCN CONSERVATION ACTIONS

4.2.1 SGCN ACTION BACKGROUND

Conservation actions for Maine's SGCN represent the Wildlife Action Plan's fine-filter approach to species conservation. Although we anticipate that coarse-filter, habitat-based actions will ultimately address most of the important problems facing SGCN, there are some species that require individual attention. In some cases, stressors impacting SGCN are not directly related to that species' habitat (e.g., white-nosed syndrome in bats), or individual SGCN have specific habitat requirements that cannot be reasonably addressed by generic conservation actions for habitats. Additionally, some SGCN have pre-existing conservation plans (e.g., Atlantic Salmon) where mangers have already determined actions to monitor and conserve the species. In these cases, MDIFW adopted actions from these established plans. In assigning conservation actions to SGCN, we hope to ensure that no SGCN 'falls through the cracks' over the next 10 years. At the same time, we attempted to limit the application of species-specific conservation actions to those SGCN with pressing conservation needs.

4.2.2 DEVELOPMENT OF SGCN CONSERVATION ACTIONS

We developed conservation actions as follows:

1. Species specialists within MDIFW and MDMR developed 23 species 'guilds' in order to streamline the assignment of conservation actions. These guilds consisted of groups of species facing similar conservation problems, and for which conservation actions could be developed concurrently. Guilds included Priority 1, Priority 2, and Priority 3 SGCN.

2. Using professional knowledge, species specialists assigned conservation actions to address stressors of medium-high or high priority (see Element 3) that had been assigned to Priority 1 or Priority 2 SGCN. Conservation actions that species specialists assigned to guilds applied to all species within the guild, regardless of the species priority level. For each conservation action, specialists assigned a rank for biological priority, action type, and action category using the criteria described in this chapter's introduction.

3. Once specialists completed initial assignments, a small group of MDIFW and marine species experts reviewed the draft list of conservation actions and identified several similar actions that had been applied to many species within a single taxonomic group, and in some cases, to multiple species across taxonomic groups. They refined these actions and applied them either to all SGCN species or to all SGCN within a taxonomic group, as appropriate.

4. A small group of staff reviewed and edited the full list of SGCN conservation actions to improve editorial consistency and ensure accuracy.

5. MDIFW presented the draft list of SGCN conservation actions to conservation partners at a meeting on June 16, 2015 and distributed them by email for review and feedback. MDIFW modified SGCN conservation actions as appropriate.

6. On July 13, 2015, MDIFW posted the entire draft Wildlife Action Plan online for a 30-day public comment period (see Elements 7/8 for more information). MDIFW, agency partners, and the Steering Committee reviewed the comments received addressing SGCN conservation actions. MDIFW and the Steering Committee modified conservation actions as appropriate.

4.2.3 SUMMARY OF SGCN CONSERVATION ACTIONS

MDIFW and partners identified a total of 311 conservation actions for SGCN. Of these, we applied 26 actions to one or more taxonomic groups (Table 4-1), 88 to guilds of species (Tables 4-2 to 4-6), and 197 to individual SGCN (Tables 4-7 to 4-11). We assigned nine actions to all SGCN species and applied three to multiple taxonomic groups (Table 4-1). Of the remaining 299 actions, MDIFW and partners applied 127 to birds, 65 to reptiles, amphibians, or invertebrates, 16 to inland fish, 20 to mammals, and 78 to marine species (Table 4-12). We classified most actions as research or survey and monitoring, reflecting the pervasive need to gather more information on SGCN in order to facilitate their conservation. Nearly half of the SGCN conservation actions are already on-going in some form (although they may require enhancement). MDIFW and partners viewed approximately 20% of actions as critical to habitat conservation over the next ten years (Tables 4-13 and 4-14).

Table 4-1. Conservation Actions assigned to Taxonomic Groups.

Taxonomic Groups	Category	Biological Priority	Type	Description
All Terrestrial and Freshwater SGCN (Birds; Reptiles, Amphibians, and Invertebrates; Inland Fish; Mammals)	Habitat Management	High	On-going	Map and distribute information on species distribution, habitat requirements, and conservation actions with a goal of increased voluntary conservation by landowners, towns, and land trusts.
All SGCN (Birds; Reptiles, Amphibians, and Invertebrates; Inland Fish; Mammals; Marine)	Policy	High	New	Develop conservation actions for all medium-ranked stressors assigned to Priority 1 and Priority 2 SGCN
				Collaborate with partners to develop habitat management recommendations for all Priority 1 and Priority 2 SGCN and Guilds that are sensitive to certain intensive forest management practices.
				Review and update SGCN distribution maps on a regular basis throughout the Wildlife Action Plan implementation period.
				Ensure ETSC database tracking is in place and accurate for all Priority 1 SGCN, and develop a system for prioritizing ETSC database tracking for a higher proportion of Priority 2 SGCN than are currently tracked.
				Integrate SGCN habitat needs and Conservation Actions more explicitly into MDIFW Wildlife Management Area Plan reviews and updates, while maintaining the original management goals for each property.
			On-going	Conduct a comprehensive review of S-ranks and share with NatureServe
				Continue and improve quality of mapping and tracking of documented populations using MDIFW's ETSC database.
	Public Outreach	High	New	Provide increased partner and public access to SGCN species reports, maps, and conservation actions through MEGIS, or other venues.
			On-going	Increase public awareness of the economic and ecological value of SGCN and their conservation needs.
All Marine SGCN	Habitat Management	High	On-going	Assess new aquaculture sites for potential positive, benign, or negative species interactions. Continue to review the presence of and impacts to ecologically sensitive species and areas during the review process.
	Public Outreach	High	On-going	Increase capacity for collaborative data collection and management that fosters partnerships among harvesters, citizens, scientists, and managers.
				Increased leadership and education regarding climate change mitigation and adaptation

Table 4-1. *continued: page 2 of 2.*

Taxonomic Groups	Category	Biological Priority	Type	Description
All Marine SGCN (continued)	Research	Critical	On-going	Create species distribution maps to facilitate reduced response time to potential oil spills by creating 'hot' zones.
		High	New	Conduct laboratory and in situ research to understand the direct and indirect impacts of climate change (e.g. warming ocean temperatures, decreased salinity, increased eutrophication) and ocean acidification on individual species, food webs, and ecosystems.
				Conduct research to better understand impacts on marine SGCN and recovery from mechanical disturbances at various scales (e.g. dredging, dredge disposal, offshore infrastructure construction, mineral mining, etc.).
			On-going	Improve understanding of non-harvested species through targeted data collection, habitat surveys, and other efforts
				Map species distributions and abundances to track changes over time, identify ecologically important areas for multiple SGCN, and examine ecosystem interactions and predator-prey relationships.
				Conduct research to evaluate the impacts (including sublethal/lethal effects) of nutrients, chemicals, and other pollutants on marine SGCN to better understand risks to exposure, and monitor natural environments to understand where these stressors may be occurring.
				Investigate biological effects (both lethal and sublethal) of oil spills and related treatments and response techniques including oil dispersants, burning, etc., as well as the short and long term effect of oil spills.
				Determine accuracy of harvester and dealer reported landings for target species and bycatch.
		Moderate	On-going	Research the impacts of diversifying Maine's marine fisheries on both non-commercial and commercially important SGCN.
	Species Management	High	On-going	Improve evaluation of commercially-harvested intertidal and subtidal SGCN through designation of conserved areas and rotational management (e.g., scallops).
	Survey and Monitoring	High	On-going	Conduct surveys to monitor and better understand distribution and abundance.
		Moderate	On-going	Create an incentive-based reporting tool for non-commercial bycatch.
All Bird SGCN	Survey and Monitoring	High	New	Improve documentation of breeding status and distribution through an update to the Maine Breeding Bird Atlas.
All Reptile, Amphibian, and Invertebrate SGCN	Survey and Monitoring	High	On-going	Implement targeted professional surveys to better understand species distribution and status and to help direct conservation actions to newly documented populations.

Table 4-2. Conservation Actions assigned to Bird Guilds.

Guild	Species	Category	Biological Priority	Type	Description
Grassland birds	Northern Harrier, Upland Sandpiper, American Kestrel, Horned Lark, Grasshopper Sparrow, Field Sparrow, Bobolink, Eastern Meadowlark, Short-eared Owl, Barn Owl	Public Outreach	High	New	Develop a program to inform small landowners of the best methods for keeping fields open for grassland wildlife.
		Species Management	High	New	Collaborate with partners to develop a BMP guide for farmers to minimize negative effects of cutting hay/silage during the grassland bird nesting season. NRCS recommendations should be viewed as a start with increased emphasis on timing, field size, and bird behavioral cues.
Island Nesting Seabirds	Razorbill, Atlantic Puffin, Laughing Gull, Roseate Tern, Common Tern, Arctic Tern, Leach's Storm-petrel, Great Cormorant	Research	High	New	Determine the association with commercial fisheries and climate-induced changes to food availability.
				On-going	Determine which factors influence breeding success and productivity.
		Survey and Monitoring	High	On-going	Continue seabird restoration activities at historic nesting sites using social attraction, vegetation management, and predator control.
Marsh birds	Black Tern, Yellow Rail, American Coot, Common Gallinule, Sora, Sedge Wren, American Bittern, Least Bittern, Pied-billed Grebe	Habitat Management	High	New	Work with landowners to maximize hemi-marsh conditions and maintain stable water levels.
		Species Management	Moderate	New	Work with landowners to develop and post signs or other strategies for discouraging recreational users from disturbing nesting birds.
		Survey and Monitoring	High	New	Implement targeted surveys to better understand the distribution and status of this species and to help direct conservation actions to newly documented populations.

Table 4-2. *continued: page 2 of 2.*

Guild	Species	Category	Biological Priority	Type	Description
Shorebirds	Black-bellied Plover, American Oystercatcher, Ruddy Turnstone, Sanderling, Dunlin, Red Knot, Purple Sandpiper, Least Sandpiper, Semipalmated Sandpiper, Short-billed Dowitcher, Whimbrel, Red Phalarope, Lesser Yellowlegs, Greater Yellowlegs	Habitat Management	Moderate	New	Use voluntary agreements, conservation easements, conservation tax abatements and incentives to protect important habitats.
		Public Outreach	High	On-going	Provide outreach to pet owners, beachgoers, kayakers, beach managers, and landowners to raise public awareness on shorebirds and on the impacts of disturbance from recreational activities in coastal areas.
		Research	High	On-going	Work with the Maine Department of Marine Resources to conduct research to determine the impact of macroalgae harvest on wintering waterfowl.
					Identify prey resources in significant staging areas to determine potential limiting factors and optimal management techniques to promote these resources.
					Determine length of stay at stopover areas, site fidelity, local movements and premigration condition to determine if coastal habitats are meeting shorebird requirements for successful migration.
					Gain a better understanding of the extent and impacts of algae harvesting on staging and wintering shorebirds. Conduct long-term monitoring of ecosystem-wide impacts of cutting algae to determine potential impacts to shorebird habitats and invertebrate prey.
			Moderate	New	Determine limiting factors for SGCN shorebird species on breeding, migratory, or wintering areas.
		Species Management	High	New	Place symbolic stake and twine fencing around important beach roosting areas with signage to identify roosting areas.
		Survey and Monitoring	High	On-going	Identify and map priority feeding and roosting areas including offshore habitats, and implement protection initiatives. Enter data in IFW ETSC database.
					To determine population status, continue monitoring program for SGCN shorebird species at high priority migration sites coastwide. Continue to coordinate with ISS, PRISM, Atlantic Flyway ESMP programs.

Table 4-3. Conservation Actions assigned to Reptile, Amphibian, and Invertebrate Guilds.

Guild	Species	Category	Biological Priority	Type	Description
Bumble Bees	Rusty-patched Bumble Bee, Ashton's Cuckoo Bumble Bee, Lemon Cuckoo Bumble Bee, Fernald's Cuckoo Bumble Bee, Yellow Bumble Bee, Brownbelted Bumble Bee, Indiscriminate Cuckoo Bumble Bee, American Bumble Bee, Sanderson's Bumble Bee, Yellowbanded Bumble Bee	Public Outreach	Moderate	New	Develop and implement outreach materials to raise public awareness of native pollinator ecology, threats and conservation needs, and to encourage use of Integrated Pest Management practices.
		Research	High	New	Produce a statewide atlas and conservation assessment.
		Survey and Monitoring	High	On-going	Conduct statewide surveys to document species diversity, distribution and relative abundance.
Dry Barrens Lepidoptera	Dusted Skipper, Sleepy Duskywing, Leonard's Skipper, Cobweb Skipper, Southern Cloudywing, Edwards' Hairstreak, Coral Hairstreak, Similar Underwing, Oblique Zale, Barrens Itame, Twilight Moth, Barrens Metarranthis Moth, Nepytia pellucidaria, Chaetaglaea ce	Habitat Management	Critical	New	Conduct a statewide review of potential high quality barrens habitat that is threatened by succession and identify strategic habitat restoration actions for implementation by key conservation partners.
		Species Management	Critical	New	Prepare occurrence maps and pesticide spray consultation guidelines for rare Lepidoptera and distribute to strategic partners including Maine Bureau of Pesticides Control.

Table 4-3. *continued: page 2 of 3.*

Guild	Species	Category	Biological Priority	Type	Description
Forested Wetlands Lepidoptera	Hessel's Hairstreak, Satyr Comma, Appalachian Brown, Spicebush Swallowtail	Research	High	New	Prepare a statewide atlas and conservation assessment.
Lacustrine Odonates	Comet Darner, Dusky Dancer, Tule Bluet, Big Bluet, New England Bluet, Scarlet Bluet, Citrine Forktail, Rambur's Forktail, Ringed Emerald, Lilypad Clubtail, Common Sanddragon, Needhams Skimmer, Carolina Saddlebags, Black Saddlebags, Martha's Pennant	Research	High	New	Prepare a statewide atlas and conservation assessment.
Palustrine Odonates	Sedge Darner, Swamp Darner, Spatterdock Darner, Quebec Emerald, Ringed Boghaunter, Canada Whiteface, Painted Skimmer, Zigzag Darner, Incurvate Emerald, Elfin Skimmer	Research	High	New	Prepare a statewide atlas and conservation assessment.

Table 4-3. *continued: page 3 of 3.*

Guild	Species	Category	Biological Priority	Type	Description
Peatland Lepidoptera	Bog Elfin, Clayton's Copper, Crowberry Blue, Frigga Fritillary, New England Buckmoth	Species Management	Critical	New	Prepare occurrence maps and pesticide spray consultation guidelines for rare Lepidoptera and distribute to strategic partners including Maine Bureau of Pesticides Control.
Riverine Odonates	Arrowhead Spiketail, Broadtailed Shadowdragon, Rapids Clubtail, Cobra Clubtail, Southern Pygmy Clubtail, Extra-striped Snaketail, Boreal Snaketail, Pygmy Snaketail, Arrow Clubtail, Ocellated Emerald	Research	High	New	Prepare a statewide atlas and conservation assessment.

Table 4-4. Conservation Actions assigned to Inland Fish Guilds.

Guild	Species	Category	Biological Priority	Type	Description
Rare Minnows	Creek Chubsucker, Eastern Silvery Minnow, Pearl Dace, Bridle Shiner, Blacknose Shiner, Longnose Dace	Research	Critical	New	Determine population abundance, habitat use, size and age structure and interaction with other fish species in representative waters.
					Develop a robust, reliable method to assess population trends, habitat associations, and geographic distribution.
					Determine susceptibility and risks associated with certain disease scenarios.
Whitefishes	Lake Whitefish, Round Whitefish	Research	Critical	On-going	Determine population abundance, habitat use, size and age structure and interaction with other fish species in representative waters.
		Research Species Management	High	On-going	Identify factors that have contributed to declining populations of lake whitefish.
			Critical	On-going	Develop and implement rehabilitation programs for fisheries that have declined.

Table 4-5. Conservation Actions assigned to Mammal Guilds.

Guild	Species	Category	Biological Priority	Type	Description
Cave bats	Big Brown Bat, Eastern Smallfooted Myotis, Little Brown Bat, Northern Long-eared Myotis, Tricolored Bat	Public Outreach	Moderate	New	Investigate the feasibility of gating known hibernaculum.
		Research	High	On-going	Conduct research and monitoring to address knowledge gaps, with a focus on developing baseline presence/absence data, monitoring and identifying new hibernacula, and furthering our understanding of habitat selection by cave bat species, including the use of cavity trees.

Table 4-6. Conservation Actions assigned to Marine Guilds.

Guild	Category	Biological Priority	Type	Description
Bivalves	Policy	Critical	On-going	Through education and collaboration, reduce the use of antifouling agents and biocides that negatively affect SGCN, and investigate alternative biofouling agents.
Brachiopod	Policy	Critical	New	Reduce the collection and possession of live specimens.
				Through education and collaboration, reduce the use of antifouling agents and biocides that negatively affect SGCN, and investigate alternative biofouling agents.
	Public Outreach	High	On-going	Encourage the use of more targeted fishing gear in order to reduce bycatch and habitat disturbance.
	Research	High	New	Develop molecular tools to identify where specimens are collected.
Cnidaria	Policy	Critical	New	Reduce the collection and possession of live specimens.
				Through education and collaboration, reduce the use of antifouling agents and biocides that negatively affect SGCN, and investigate alternative biofouling agents.
	Public Outreach	High	On-going	Encourage the use of more targeted fishing gear in order to reduce bycatch and habitat disturbance.
	Research	High	New	Develop molecular tools to identify where specimens are collected.
Diadromous Fish	Policy	High	On-going	Encourage improved municipal planning for siting for new or retrofitting development, taking into account future environmental change, to improve connectivity for diadromous fish passage.
	Public Outreach	High	On-going	Conduct education to increase awareness of the importance of these species to maintaining productive ecosystem functioning.
				Encourage the use of more targeted fishing gear in order to reduce bycatch and habitat disturbance.
		Moderate	On-going	Continue to work with the fishing industry to develop gear modifications that reduce bycatch of diadromous fishes.
	Research	Critical	On-going	Determine the location and timing of critical habitat use (for endangered species) and important habitat use for diadromous fishes at different life history stages.
		High	New	Investigate methods to reduce incidental bycatch in commercial and recreational fisheries.
				Improve understanding of the relative roles of natural predation, fishing mortality, and climate change in stock dynamics.
			On-going	Improve understanding of species distribution especially in regards to ecosystem interactions, predator-prey relationships, and prey buffering concepts. Gather information to support management, including stock assessments, population genetics, population monitoring, etc.
	Survey and Monitoring	Critical	On-going	Monitor population stock status through surveys and sampling programs.

Table 4-6. *continued: page 2 of 3.*

Guild	Category	Biological Priority	Type	Description
Echinoderms	Policy	Critical	On-going	Through education and collaboration, reduce the use of antifouling agents and biocides that negatively affect SGCN, and investigate alternative biofouling agents.
	Public Outreach	High	On-going	Encourage the use of more targeted fishing gear in order to reduce bycatch and habitat disturbance.
	Research	High	New	Investigate the effect of various harvesting practices on the integrity of habitats and trophic and ecological systems.
				Research to understand how effects such as habitat modifications, population changes, and pollution can influence SGCN.
				Identify species that are resilient to ocean acidification (OA) and rises in sea surface temperature (SST).
			On-going	Expand existing education and research among researchers and managers to improve understanding and management ability.
				Conduct research to support management, including but not limited to stock assessments, population genetics, population monitoring, etc.
	Survey and Monitoring	High	New	Ground-truth mapped habitat and compare to historical maps to monitor change over time, may require updating mapping plans to map more frequently.
Gastropods	Policy	Critical	New	Reduce the collection and possession of live specimens.
				Reduce the use of tributyltin compounds as a biocide and antifouling prophylactic.
	Public Outreach	High	On-going	Encourage the use of more targeted fishing gear in order to reduce bycatch and habitat disturbance.
	Research	High	New	Develop molecular tools to identify where specimens are collected.
	Survey and Monitoring	High	New	Ground-truth mapped habitat and compare to historical maps to monitor change over time, may require updating mapping plans to map more frequently.
Seaturtles	Habitat Management	Moderate	On-going	Reduce the amount of ghost gear that could increase the risk of entanglement for sea turtles.
	Public Outreach	High	New	Conduct outreach with fishermen to increase reporting for entangled turtles.

Table 4-6. *continued: page 3 of 3.*

Guild	Category	Biological Priority	Type	Description
Seaturtles (continued)	Public Outreach (continued)	Moderate	New	Conduct outreach and trainings to improve the detection of and response time to entangled turtles in Maine waters.
			On-going	Continue to work with the fishing industry to develop gear modifications that reduce the risk of entanglement and conduct outreach on gear best practices to use.
	Survey and Monitoring	Critical	On-going	Conduct baseline surveys to determine the seasonal density and distribution of fixed fishing gear.
		High	On-going	Gather baseline data on the configurations of fixed fishing gear used as a function of seasonality and distance from shore.
		Moderate	New	Conduct surveys (aerial, boat based) to determine the distribution of sea turtles in the coastal waters of Maine.
Shrimp	Policy	Critical	New	Through education and collaboration, reduce the use of antifouling agents and biocides that negatively affect SGCN, and investigate alternative biofouling agents.
	Research	High	New	Develop molecular tools to identify where specimens are collected.
			On-going	Expand existing education and research among researchers and managers to improve understanding and close data gaps in order to inform management.
	Survey and Monitoring	High	New	Ground-truth mapped habitat and compare to historical maps to monitor change over time, may require updating mapping plans to map more frequently.
Whales	Habitat Management	Moderate	On-going	Reduce the amount of ghost gear that could increase the risk of entanglement for large whales.
	Public Outreach	High	On-going	Continue to work with the fishing industry to develop gear modifications that reduce the risk of entanglement and conduct outreach on gear best practices to use.
		Moderate	On-going	Conduct outreach and trainings to improve the detection of and response time to entangled whales in Maine waters.
	Survey and Monitoring	Critical	New	Conduct surveys (aerial, boat based and/or passive acoustic) to determine the distribution of large whales in the coastal waters of Maine.
			On-going	Conduct baseline surveys to determine the seasonal density and distribution of fixed fishing gear.
		High	On-going	Gather baseline data on the configurations of fixed fishing gear used as a function of seasonality and distance from shore.
				Determine the high overlap areas between whales, high risk behaviors or persistent habitat use and fixed fishing gear.

Table 4-7. Conservation Actions assigned to Bird SGCN.

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Aythya marila	Greater Scaup	Public Outreach	High	On-going	Install signage at boat ramps
		Survey and Monitoring	High	On-going	Continue monitoring through the mid-winter waterfowl survey
Histrionicus histrionicus	Harlequin Duck	Habitat Management	Critical	New	Continue to work with the Maine Department of Marine Resources to coordinate macroalgae harvest in important wintering sites and determine the level of impact on wintering birds
Bartramia longicauda	Upland Sandpiper	Survey and Monitoring	Critical	New	Support state and regional efforts to survey/inventory populations of Upland Sandpiper leading to an estimate of population trend
Calidris canutus rufa	Red Knot	Species Management	High	New	Partner with municipalities and BP&L to develop beach management agreements to minimize impacts to feeding and roosting red knots using beach habitats.
Calidris maritima	Purple Sandpiper	Habitat Management	Critical	On-going	Continue to work with the Maine Department of Marine Resources to coordinate macroalgae harvest in important wintering sites and determine the level of impact on wintering birds
		Survey and Monitoring	Critical	On-going	Continue annual long term monitoring plan to determine if the Purple Sandpiper population is in severe decline. Combine annual survey with a coastwide survey to be conducted every 5 years.
Charadrius melodus	Piping Plover	Habitat Management	High	On-going	Collaborate with partners to develop long-term, non-regulatory habitat protection via management agreements or conservation easements.
		Public Outreach	High	On-going	Continue efforts to educate beach recreationalists, landowners and municipal officials regarding ecology and life history requirements.
		Species Management	Critical	On-going	Continue current management activities including: stake and twine symbolic fencing around nesting areas, exclosures around nests, posting signage to identify nesting areas, and locating and monitoring nesting pairs.
					Conduct intensive predator management including lethal and nonlethal removal of native and nonnative predators from nesting and brood rearing areas.
		Survey and Monitoring	High	On-going	Continue efforts to annually monitor abundance, distribution, and productivity.
			Moderate	On-going	Continue efforts to recruit and provide training sessions for volunteer beach monitors.

Table 4-7. *continued: page 2 of 6.*

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Numenius phaeopus	Whimbrel	Research	High	New	Determine population status, pre migration body condition, and importance of commercial blueberry barrens to staging whimbrels.
					Determine potential impacts from hazing and disturbance occurring on commercial blueberry barrens
Sterna dougallii	Roseate Tern	Species Management	High	On-going	Increase breeding population distribution and productivity
Sternula antillarum	Least Tern	Habitat Management	High	On-going	Develop long-term, non-regulatory habitat protection via management agreements or conservation easements.
		Public Outreach	High	On-going	Continue efforts to educate beach recreationalists, landowners and municipal officials regarding ecology and life history requirements.
		Species Management	Critical	On-going	Continue current management activities including: stake and twine symbolic fencing around nesting areas, exclosures around colonies, posting signage to identify nesting areas, and locating and monitoring nesting pairs.
					Continue targeted management of native and nonnative predators at nesting and brood rearing areas, including lethal and nonlethal methods
		Survey and Monitoring	High	On-going	Continue efforts to annually monitor abundance, distribution, and productivity.
		Survey and Monitoring	Moderate	On-going	Continue efforts to recruit and provide training sessions for volunteer beach monitors.
Tringa flavipes	Lesser Yellowlegs	Research	High	New	To determine if recent population declines are due to impacts occurring in Maine, conduct research to: identify food quality and quantity at lesser yellowleg staging areas; assess premigration body condition; length of stay; other potential limiting
		Survey and Monitoring	High	New	Survey inland wetlands to identify and map important inland staging areas.
Tringa solitaria	Solitary Sandpiper	Survey and Monitoring	High	New	Survey inland wetlands to identify and map important inland staging areas.
Falco peregrinus	Peregrine Falcon	Public Outreach	Moderate	New	Develop an information pamphlet and website content focused on the importance of hikers and rock climbers limiting disturbance to nesting peregrines.
		Species Management	High	On-going	Work with landowners to reduce seasonal disturbances within 1/4 mile of occupied nests
					Encourage voluntary trail closures until five weeks after the last bird has fledged

Table 4-7. *continued: page 3 of 6.*

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Ammodramus caudacutus	Saltmarsh Sparrow	Habitat Management	High	On-going	Support current Phragmites control efforts in southern Maine and expand to other regions as needed. Monitor effectiveness by conducting point counts to determine bird response.
		Research	High	New	Determine the relative impacts of point source (river-born) vs non-point source (atmospheric) contamination by Mercury.
					Investigate what role, if any, non-native invasive species have in habitat loss or reduction in habitat quality. Determine mitigation measures appropriate for Maine saltmarshes.
			Moderate	New	Determine whether the restoration of tidal action would improve resiliency to sea level rise and whether restricted areas would serve as High marsh refugia, at least temporarily
		Species Management	Moderate	New	Determine whether gene flow from Nelson's sparrow will lead to loss of Saltmarsh Sparrow genotype from Maine, and whether certain marshes may be more resistant to hybridization?
		Survey and Monitoring	Critical	New	Develop a long-term monitoring program which allows for evaluation of effects of human perturbations, natural changes to habitat and management actions to reverse/mitigate such actions.
Ammodramus nelson	Nelson's Sparrow	Research	High	New	Investigate what role, if any, non-native invasive species have in habitat loss or reduction in habitat quality. Determine mitigation measures appropriate for Maine saltmarshes.
			Moderate	New	Assess whether Mercury is a problem at marshes across Maine and whether certain marshes pose a Higher risk
			Moderate	New	Determine the relative impacts of point source (landfills) vs non-point source (atmospheric) contamination by Mercury on post-fledgling survival
		Survey and Monitoring	High	New	Develop a long-term monitoring program which allows for evaluation of effects of human perturbations, natural changes to habitat and management actions to reverse/mitigate such actions.
Ammodramus savannarum	Grasshopper Sparrow	Habitat Management	Critical	New	Conduct landscape analysis to determine potential for other sites for this species, what management would be necessary, and current ownership
			High	On-going	Maintain known nesting areas in native grasses, little bluestem, or low-growing shrubs like lowbush blueberry and prevent conversion to other land uses
			Moderate	New	Restore old, unused gravel pits and agricultural fields to grasslands and low shrubs

Table 4-7. *continued: page 4 of 6.*

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Ammodramus savannarum (continued)	Grasshopper Sparrow (continued)	Public Outreach	Critical	New	Contact landowners at formerly occupied (Wells, Sanford) and potential sites (near Poland) to examine opportunities for habitat enhancement and management of species.
		Research	Critical	New	Conduct research on population status, productivity levels, and limiting factors at individual sites, and use this information to update a Population Viability Analysis
			High	New	Assess effects of past and present management practices at the Kennebunk Plains by comparing with long-term population data by management unit over time
		Survey and Monitoring	Critical	On-going	Continue to monitor populations at Kennebunk Plains and the former Naval Air Station in Brunswick
			High	New	Expand monitoring effort to other potential or previously occupied sites (Sanford Airport, Wells Barrens, Poland Spring fields)
		Habitat Management	High	New	Encourage landowners to manage the amount and timing of pre-commercial thinning in areas occupied by this species, and to leave residual patches in areas that are thinned
					Encourage land managers to rotate harvests and create a mixed distribution of stand ages, which might undergo pre-commercial thinning and cutting at different times, thus temporally balancing the amount of habitat available at a given time.
		Policy	High	New	For suitable/occupied habitat on public lands (BPL) incorporate stand management BMPs into public land management policy.
Catharus bicknelli	Bicknell's Thrush	Research	High	New	Determine how this species responds to specific forestry practices on the landscape.
					Assess the effects of climate change on habitat loss, occupancy, and predicted range shift.
		Species Management	Critical	New	Work to ensure that developments at high elevation that entail land clearing, specifically permanent conversion of forest to non-forest (road, gravel, grass) avoid areas occupied by Bicknell's Thrush
			High	On-going	Participate in work of International Bicknell's Thrush Conservation Group (IBTCG) to track progress on conservation and research actions, discuss funding needs and revise the wildlife action plan as appropriate to ensure that emerging information is used to inform
		Survey and Monitoring	High	On-going	Support Mountain Birdwatch 2.0, an international, volunteer-based program to track Bicknell's Thrush populations across their breeding range.

Table 4-7. *continued: page 5 of 6.*

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Euphagus carolinus	Rusty Blackbird	Research	High	New	Examine the food web of boreal forest wetlands and determine the role of aquatic invertebrates (Tricoptera, Odonata) in maintaining Rusty Blackbird abundance and productivity.
					Investigate postfledging habitat use relative to timber harvest practices
					Evaluate the effects of precommercial thinning on nesting habitat quality and determine whether nesting success is more sensitive to pre-commercial thinning in some landscapes than in others
				On-going	Support cross-agency data sharing to better understand breeding range-wide survival and fecundity.
		Species Management	High	New	Work with partners on wintering grounds to develop a full life cycle model of demography
Progne subis	Purple Martin	Habitat Management	High	New	Support further development, and increase awareness of, existing BMPs for purple martin colony management in concert with Purple Martin Conservation Association
		Public Outreach	High	On-going	Increase public awareness of the Purple Martin Conservation Association and its activities
		Research	High	On-going	Support Scout Arrival Study, monitoring of arrival times, through Purple Martin Conservation Association
					Support Purple Martin Nest Cavity Research Project which uses mini martin cams to monitor nestling development and engage volunteers; consider a live web cam
		Species Management	High	New	Provide support or otherwise increase awareness of the mentor program for Purple Martin colony landlords consistent with efforts of the Purple Martin Conservation Association
		Survey and Monitoring	Critical	New	Conduct an inventory of breeding colonies, possibly using eBird.
			High	On-going	Promote the registration of existing colonies through Purple Martin Conservation Association
				On-going	Support Project Martinwatch, a weekly nest monitoring program, through Purple Martin Conservation Association
Riparia riparia	Bank Swallow	Public Outreach	High	New	Collaborate with gravel pit operators to develop Best Management Practices for reclamation of abandoned pits
		Research	Critical	New	Gather more information on the influence of Neonicotinoid (systemic) pesticides on populations of aerial insectivores.

Table 4-7. *continued: page 6 of 6.*

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Sturnella magna	Eastern Meadowlark	Habitat Management	Critical	New	Improve habitat quality and abundance.
Nycticorax nycticorax	Black-crowned Night-heron	Research	High	New	Determine whether prefledging success and productivity rates are contributing to declining numbers
			Moderate	New	Investigate effect of aerial predators (gulls, crows, eagles) on nesting success.
		Species Management	Moderate	New	Develop outreach program to educate landowners and recreational users about black-crowned night herons' breeding habitat requirements and sensitivity to disturbance.
					In cooperation with landowners and partners, develop and post signs at colonies encouraging users to keep a wide berth during nesting.
		Survey and Monitoring	High	New	Implement targeted surveys to better understand the distribution and status of this species and to help direct conservation actions to Newly documented populations

Table 4-8. Conservation Actions assigned to Reptile, Amphibian, and Invertebrate SGCN.

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
AMPHIBIA (Amphibians)					
Ambystoma laterale	Blue-spotted Salamander	Policy	Moderate	On-going	Cooperate with University of Maine and the Maine Department of Environmental Protection to research and implement a voluntary Special Area Management Program (SAMP) by towns.
		Research	High	On-going	Develop an improved understanding of habitat and movement ecology with the goal of informing Best Management Practices and other targeted species conservation actions
		Survey and Monitoring	High	On-going	Pure diploid (and non-hybrid) populations of Ambystoma laterale are believed to be rare in Maine and throughout their range. Systematic tissue sampling is needed to document the extent and distribution of all genotypes within the species complex, with a focus on identifying cryptic diploid populations requiring potential targeted conservation attention.
REPTILIA (Reptiles)					
Coluber constrictor constrictor	Northern Black Racer	Habitat Management	Critical	On-going	Manage black racer habitat to improve and expand upon habitat that is available where populations occur.
		Survey and Monitoring	Moderate	New	Identify potential road crossing hotspots using GIS and monitor mortality at those locations with road surveys to prioritize the most problematic road segments for mitigation measures such as cautionary signage, exclusionary fencing, and under-road passages.
Storeria dekayi dekayi	Northern Brownsnake	Survey and Monitoring	Moderate	New	Implement targeted professional surveys to better understand the distribution and status of this species and to help direct conservation actions to Newly documented populations
Thamnophis sauritus	Eastern Ribbon Snake	Policy	Moderate	On-going	Cooperate with University of Maine and the Maine Department of Environmental Protection to research and implement a voluntary Special Area Management Program (SAMP) by towns.
		Research	High	New	Develop an improved understanding of habitat and movement ecology to help develop Best Management Practices and other targeted species conservation actions

Table 4-8. *continued: page 2 of 5.*

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
REPTILIA (Reptiles) *continued*					
Clemmys guttata	Spotted Turtle	Habitat Management	High	New	Research and coordinate the development of a publically available Potential Vernal Pool map product that covers the entire State, or at least all organized townships
		Policy	Moderate	On-going	Cooperate with University of Maine and the Maine Department of Environmental Protection to research and implement a voluntary Special Area Management Program (SAMP) by towns.
		Public Outreach	High	On-going	Continue to build public awareness of risks posed by roadways with seasonally appropriate press release that also warns motorists to be on the lookout for turtles during spring/early summer.
		Species Management	Critical	New	Identify potential road crossing hotspots using GIS and monitor mortality at those locations with road surveys to prioritize the most problematic road segments for mitigation measures such as cautionary signage and exclusionary fencing.
					Install road crossing structures consisting of under-road passageways and guidance fencing where High-mortality road segments bisect habitat that hosts High priority populations
			High	On-going	Continue the cautionary road crossing signage program, and expand the number of locations with signs as additional road crossing hotspots are identified.
					Deter casual collection by educating the public on the importance of leaving turtles where they find them
Emydoidea blandingii	Blanding's Turtle	Habitat Management	High	New	Manage and where necessary create nesting habitat to improve viability of High-priority Blanding's turtle populations
			High	New	Research and coordinate the development of a publicly available Potential Vernal Pool map product that covers the entire State, or at least all organized townships
		Policy	Moderate	On-going	Cooperate with University of Maine and the Maine Department of Environmental Protection to research and implement a voluntary Special Area Management Program (SAMP) by towns.
		Public Outreach	High	On-going	Continue to build public awareness of risks posed by roadways with seasonally appropriate press release that also warns motorists to be on the lookout for turtles during spring/early summer.

Table 4-8. *continued: page 3 of 5.*

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
REPTILIA (Reptiles) *continued*					
Emydoidea blandingii (continued)	Blanding's Turtle (continued)	Research	Critical	On-going	Identify potential road crossing hotspots using GIS and monitor mortality at those locations with road surveys to prioritize the most problematic road segments for mitigation measures such as cautionary signage, exclusionary fencing, and under-road passages.
		Species Management	Critical	New	Install road crossing structures consisting of under-road passageways and guidance fencing where high-mortality road segments bisect habitat that hosts high priority populations.
			High	On-going	Continue the cautionary road crossing signage program, and expand the number of locations with signs as additional road crossing hotspots are identified.
Glyptemys insculpta	Wood Turtle	Policy	High	On-going	Deter casual collection by educating the public on the importance of leaving turtles where they find them
		Public Outreach	Moderate	On-going	Continue to build public awareness of risks to wood turtles posed by roadways with seasonally appropriate press release that also warns motorists to be on the lookout for turtles during spring/early summer.
		Species Management	High	New	Install road crossing structures consisting of under-road passageways and guidance fencing where High-mortality road segments bisect habitat that hosts High priority populations
			High	On-going	Identify potential road crossing hotspots using GIS and monitor mortality at those locations with road surveys to prioritize the most problematic road segments for mitigation measures such as cautionary signage and exclusionary fencing.
			Moderate	On-going	Expand cautionary road crossing signage program to include wood turtle as important road crossing hotspots are identified for this species.
BIVALVIA (Bivalves)					
Alasmidonta varicosa	Brook Floater	Survey and Monitoring	Critical	On-going	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Lampsilis cariosa	Yellow Lampmussel	Survey and Monitoring	Critical	New	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Leptodea ochracea	Tidewater Mucket	Survey and Monitoring	Critical	New	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.

Table 4-8. *continued: page 4 of 5.*

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
GASTRPODA (Gastropods)					
Stagnicola mighelsi	Bigmouth Pondsnail	Research	High	New	Examine effects of dams as well as water quality changes from residential and agricultural pollutant and nutrient runoff on bigmouth pondsnail populations
				On-going	Develop an improved understanding of habitat and movement ecology with the goal of informing Best Management Practices and other targeted species conservation actions
Cicindela marginipennis	Cobblestone Tiger Beetle	Research	High	New	Develop an improved understanding of habitat and movement ecology with the goal of informing Best Management Practices and other targeted species conservation actions
INSECTA (Insects)					
Epeorus frisoni	Roaring Brook Mayfly	Survey and Monitoring	High	On-going	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Siphlonisca aerodromia	Tomah Mayfly	Survey and Monitoring	High	On-going	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Boloria chariclea grandis	Purple Lesser Fritillary	Research	High	New	Prepare a statewide atlas and conservation assessment.
		Species Management	Critical	New	Prepare occurrence maps and pesticide spray consultation guidelines for rare Lepidoptera and distribute to strategic partners including Maine Bureau of Pesticides Control.
			Moderate	New	Collaborate with the Maine Forest Service and other partners to develop Forestry Species Management Guidelines for distribution to cooperative landowners and the forest management community.
Callophrys gryneus	Juniper Hairstreak	Habitat Management	Critical	New	Research host tree regeneration ecology and develop site restoration management strategies for distribution to cooperative landowners.
		Research	High	New	Prepare a statewide atlas and conservation assessment.
Callophrys hesseli	Hessel's Hairstreak	Habitat Management	Moderate	New	Conduct a comprehensive review of silvicultural effects on Atlantic White Cedar habitat (e.g., regeneration, composition, structure)
		Species Management	Moderate	New	Collaborate with the Maine Forest Service and other partners to develop Forestry Species Management Guidelines for distribution to cooperative landowners and the forest management community.
Erora laeta	Early Hairstreak	Research	High	New	Prepare a statewide atlas and conservation assessment.

Table 4-8. *continued: page 5 of 5.*

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
INSECTA (Insects) *continued*					
Erynnis brizo	Sleepy Duskywing	Research	High	New	Prepare a statewide atlas and conservation assessment.
Lycaena dorcas claytoni	Clayton's Copper	Habitat Management	Critical	New	Conduct selective thinning at sites where forest canopy is encroaching and shading out host plant stands.
		Research	High	New	Prepare a statewide atlas and conservation assessment.
		Survey and Monitoring	Critical	On-going	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Lycia rachelae	Twilight Moth	Research	High	New	Identify host plant(s) and document extent of habitat use outside Pitch Pine - Scrub Oak barrens
		Survey and Monitoring	High	New	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Oeneis polixenes katahdin	Katahdin Arctic	Habitat Management	High	New	Work with BSP and MNAP to develop tundra habitat monitoring procedures for assessing potential impacts from off-trail recreation.
		Research	High	New	Prepare a statewide atlas and conservation assessment.
		Survey and Monitoring	High	New	Work with Baxter State Park to develop species monitoring protocols that are robust enough to detect potential trends in population size.
Plebejus idas	Northern Blue	Research	High	New	Prepare a statewide atlas and conservation assessment.
		Species Management	Critical	New	Prepare occurrence maps and pesticide spray consultation guidelines for rare Lepidoptera and distribute to strategic partners including Maine Bureau of Pesticides Control.
Plebejus idas empetri	Crowberry Blue	Research	High	New	Prepare a statewide atlas and conservation assessment.
Satyrium edwardsii	Edwards' Hairstreak	Research	High	New	Prepare a statewide atlas and conservation assessment.
Zanclognatha martha	Pine Barrens Zanclognatha	Survey and Monitoring	High	New	Develop and implement a systematic protocol for monitoring population size, demographics, and trends.
Gomphus quadricolor	Rapids Clubtail	Survey and Monitoring	Critical	New	Conduct surveys to determine the status of the historic population(s) on the Saco River. This species may no longer be extant in Maine.
Williamsonia lintneri	Ringed Boghaunter	Research	High	New	Develop an improved understanding of habitat and movement ecology with the goal of informing Best Management Practices and other targeted species conservation actions

Table 4-9. Conservation Actions assigned to Inland Fish SGCN.

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Esox americanus americanus	Redfin Pickerel	Habitat Management	Critical	On-going	Work with landowners to enhance and restore riparian buffers on redfin pickerel occupied streams within agricultural lands.
					Enhance and improve fish passage to proximal habitats so redfin pickerel can migrate to and colonize new habitats as necessary.
			High	On-going	Work with agricultural landowners to restrict or eliminate livestock access to streams occupied by redfin pickerel.
Etheostoma fusiforme	Swamp Darter	Research	High	New	Conduct research to develop an improved understanding of seasonal habitat requirements for all size and age classes
					Conduct research to develop an improved understanding of spawning ecology
					Conduct research to develop an improved understanding of trophic ecology
		Survey and Monitoring	High	On-going	Implement targeted professional surveys to better understand the distribution and status of this species and to help direct conservation actions to newly documented populations
Salvelinus alpinus oquassa	Arctic Charr	Habitat Management	High	On-going	Identify key aquatic habitats such as spawning sites and coordinate protection with federal, state, or NGOs and willing private landowners
					Identify key terrestrial habitats connected or adjacent to aquatic habitats that are essential to maintaining viability of populations
		Research	High	On-going	Investigate and describe all life history and life cycle requirements of each population to provide for maximum protection of each population
		Species Management	Critical	On-going	Assess population status at each location where the species is present
			High	On-going	Assess the utilization of charr by recreational anglers, including harvest rates and the attitudes of participating anglers

Table 4-10. Conservation Actions assigned to Mammal SGCN.

Scientific Name	Common Name	Category	Biological Priority	Type	Description
Sylvilagus transitionalis	New England Cottontail	Habitat Management	Critical	On-going	Restore early successional habitat in southern Maine following guidance in the New England Cottontail Conservation Strategy.
		Public Outreach	High	On-going	Improve public perception of the value of early successional habitat following guidance in the New England Cottontail Conservation Strategy.
		Species Management	High	On-going	Conduct a captive breeding program following guidance in the New England Cottontail Conservation Strategy.
		Survey and Monitoring	High	New	Conduct active restoration of early-successional brushy habitat on both private and public lands in southern Maine, and monitor the success of habitat restoration using methodologies identified in the Rangewide Conservation Strategy.
					Monitor released individuals from the captive breeding program using radio telemetry to determine survival and use of landscape. Alternatively, populations may be monitored using mark-recapture techniques that rely on genotype.
Synaptomys borealis sphagnicola	Northern Bog Lemming	Policy	Moderate	On-going	Develop a policy where the Maine Forest Service or LURC would notify IFW of forest management plans where cutting was planned on High elevation sites (above 2,700 feet).
		Research	Moderate	New	Develop a technique to identify northern bog lemmings using e-DNA found in small water bodies associated with alpine sites.

Table 4-11. Conservation Actions assigned to Marine SGCN.

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
ACTINOPTERYGII (Ray-finned fishes)					
Pseudopleuronectes americanus	Winter Flounder	Research	Moderate	New	Identify areas where winter flounder spawn
				On-going	Conduct research regarding winter flounder habitat needs for various life stages and determine the importance of unique habitat systems such as eelgrass on survivability
		Survey and Monitoring	High	On-going	Monitor water quality at winter flounder habitats to determine effect of changing water quality on winter flounder biology and survivability (e.g. temperature and sex ratio relationships).
CHONDRICHTHYES (Sharks and skates)					
Isurus oxyrinchus	Shortfin Mako	Research	High	New	Determine the location and timing of important habitat use at different life history stages
					Identify methods to reduce incidental bycatch by recreational anglers
					Develop an improved understanding of discard mortality rates
Lamna nasus	Porbeagle	Research	Critical	New	Determine the location and timing of important habitat use at different life history stages
					Identify methods to reduce incidental bycatch by recreational anglers
					Develop an improved understanding of discard mortality rates
Amblyraja radiata	Thorny Skate	Research	Critical	New	Develop an improved understanding of discard mortality rates
					Determine the location and timing of important habitat use at different life history stages
					Update life history data across species range
Dipturus laevis	Barndoor Skate	Research	High	New	Develop an improved understanding of discard mortality rates
					Update life history data across species range
			Moderate	New	Determine the location and timing of important habitat use at different life history stages
Leucoraja ocellata	Winter Skate	Research	High	New	Update life history data across species range
Malacoraja senta	Smooth Skate	Research	Critical	New	Develop an improved understanding of discard mortality rates
					Determine the location and timing of important habitat use at different life history stages

Table 4-11. *continued: page 2 of 3.*

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
ECHINOIDEA (Echinoderms)					
Strongylocentrotus droebachiensis	Green Sea Urchin	Public Outreach	High	On-going	Design and encourage the use of more size-selective fishing gear
		Research	High	New	Determine the relative roles of natural predation, fishing mortality, and climate change in stock dynamics
					Assess the feasibility and advantages of local or area species management approaches
				On-going	Conduct research to support stock assessment and population dynamics modeling
			Moderate	New	Determine the feasibility of reseeding programs
		Species Management	High	On-going	Support community engagement in developing a fisheries management plan
		Survey and Monitoring	Critical	On-going	Monitor stock status through surveys and sampling programs
HOLOTHUROIDEA (Sea cucumbers)					
Cucumaria frondosa	Orange-footed Sea Cucumber	Public Outreach	High	On-going	Design and encourage the use of more size-selective fishing gear
		Research	High	New	Conduct research to support management, including stock assessments, reproduction, growth and aging data, and habitat mapping
			Moderate	New	Assess the feasibility and advantages of local or area species management approaches
		Species Management	Moderate	New	Support community engagement in developing a fisheries management plan
		Survey and Monitoring	High	New	Monitor stock status through surveys and sampling programs

Table 4-11. *continued: page 3 of 3.*

CLASS Scientific Name	Common Name	Category	Biological Priority	Type	Description
MALACOSTRACA (Crabs, lobsters, and shrimp)					
Pandalus borealis	Northern Shrimp	Public Outreach	High	On-going	Design and encourage the use of more size-selective fishing gear
		Research	High	New	Conduct research to support stock assessment and population dynamics modeling
				On-going	Determine the relative roles of natural predation, fishing mortality, and climate change in stock dynamics
		Survey and Monitoring	Critical	On-going	Monitor stock status through surveys and sampling programs
MAMMALIA (Mammals)					
Phocoena phocoena	Harbor Porpoise	Public Outreach	Moderate	On-going	Continue to work with the fishing industry to develop gear modifications that reduce the risk of entanglement and conduct outreach on gear best practices to use
MEROSTOMATA (Horseshoe crabs)					
Limulus polyphemus	Horseshoe Crab	Habitat Management	High	On-going	Collaborate with partners to conserve undeveloped shoreline and adjacent areas that is known or potential habitat for horseshoe crab
		Public Outreach	High	On-going	Encourage use of selective fishing gear that minimizes bycatch and impacts to habitat.
		Research	High	On-going	Promote research to fill data gaps and inform managers
			Moderate	On-going	Identify areas where degraded water quality may adversely impact horseshoe crabs
		Survey and Monitoring	High	New	Conduct surveys to monitor and better understand distribution and abundance

Table 4-12. SGCN conservation actions by Action Category.

Taxonomic Group	Habitat Management	Policy	Public Outreach	Research	Species Management	Survey and Monitoring	Total
Birds	24	9	12	34	21	25	**125**
Inland Fish	5	0	0	6	2	3	**16**
Mammals	3	4	1	4	3	5	**20**
Marine	1	0	8	44	12	13	**78**
Reptiles, Amphibians, and Invertebrates	9	5	3	17	13	13	**60**
Total	**42**	**18**	**24**	**105**	**51**	**59**	**299**

Table 4-13. SGCN conservation actions by Type.

Taxonomic Group	New	On-going	Total
Birds	65	60	**125**
Inland Fish	3	13	**16**
Mammals	10	10	**20**
Marine	35	43	**78**
Reptiles, Amphibians, and Invertebrates	38	22	**60**
Total	**151**	**148**	**299**

Table 4-14. SGCN conservation actions by Biological Priority.

Taxonomic Group	Critical	High	Moderate	Total
Birds	19	73	33	**125**
Inland Fish	4	12	0	**16**
Mammals	3	14	3	**20**
Marine	15	42	21	**78**
Reptiles, Amphibians, and Invertebrates	14	35	11	**60**
Total	**55**	**176**	**68**	**299**

4.3 HABITAT CONSERVATION ACTIONS

4.3.1 HABITAT ACTION BACKGROUND

Maine's 2015 Wildlife Action Plan takes a holistic approach to SGCN conservation by focusing on both species and habitats. Habitat-scale conservation uses a coarse-filter approach whereby strategies applied to habitats likely benefit many of the species that occur there. Because habitat-scale actions simultaneously benefit multiple species, they often are an efficient way to stretch limited conservation dollars and often complement species-specific approaches. While this Plan identifies over 300 SGCN actions, many of the most common stressors to Maine's SGCN are associated with habitats (see Element 3).

Maine's landscape is diverse, from subtidal gravel beds to alpine tundra, and the issues facing these habitats are complex, from localized land-use conversion to regional impacts of climate change. In order to systematically address these complexities, MDIFW, the Steering Committee, and conservation partner representatives worked in small groups (10-15 people) to draft habitat-scale conservation actions based on The Open Standards for the Practice of Conservation (hereafter referred to as 'Open Standards'; Conservation Measures Partnership [CMP] 2013). While widespread conservation partner involvement was crucial at all stages of Wildlife Action Plan development, the Steering Committee and MDIFW chose this small workgroup approach out of respect for partners' limited time. We felt the most efficient approach was to first create draft actions to which the full partner group could modify as needed.

"Maine's landscape is diverse, from subtidal gravel beds to alpine tundra, and the issues facing these habitats are equally complex..."

4.3.2 DEVELOPMENT OF HABITAT CONSERVATION ACTIONS

Maine developed its habitat conservation actions as follows:

1. MDIFW, the Steering Committee, and several conservation partners attended an Open Standards introductory training led by a local CMP Conservation Coach in mid-February 2015.

2. MDIFW, MNAP, MCP, MDMR, and members of the Steering Committee assigned all habitat macrogroups to one of 14 'habitat groupings' (Table 4-15), based on similar ecology, spatial distribution, and/or stressors. Certain macrogroups (e.g., vernal pools, northeastern floodplain forests, central oak pine barrens) did not fit cleanly into habitat groupings due to their ecological uniqueness or nuances of stressors facing them; we pulled these macrogroups out separately into their own habitat grouping. We then assigned habitat groupings to one of three workgroups for discussion: 1) terrestrial/wetland habitats; 2) marine/coastal habitats; or 3) freshwater aquatic habitats.

Table 4-15. Habitat groupings addressed by conservation action workgroups.

Workgroup	Habitat Grouping	Habitats (Macrogroups)
Terrestrial/Freshwater Wetlands	Northern Forests and Swamps	boreal forested peatland; boreal upland forest; northern swamp, plantation and ruderal forest, northern hardwood and conifer; northern peatland and fens
	Rocky Summits-Outcrops-Mountaintops	alpine; cliff and talus; outcrop and summit scrub
	Floodplain Forests	northeastern floodplain forest
	Freshwater Marshes	wet meadow-shrub marsh; emergent marsh; modified-managed marsh; coastal plain pond
	Vernal Pools	vernal pools
	Grassland-shrubland-early Successional	agricultural; maintained grasses and mixed cover; ruderal shrubland and grassland
	South-Central Forests and Swamps	central hardwood swamp; glade, barren and savanna; northern hardwood and conifer; northern swamp; coastal plain peat swamp
	Pine Barrens	central oak pine
Marine/Coastal	Tidal Marsh	intertidal tidal marsh (peat forming)
	Intertidal	bedrock; gravel shore; mollusc reefs; mudflat; sandy shore; water column
	Subtidal	bedrock bottom; coarse gravel bottom; mollusc reefs; mud bottom; sand bottom; pelagic (water column)
	Rocky Coast	rocky coast/islands
	Coastal	coastal grasslands and shrublands
Freshwater Aquatics	Streams, Rivers, Lakes, and Ponds	dystrophic lakes and ponds; eutrophic lakes and ponds; mesotrophic or intermediate lakes and ponds; oligotrophic lakes and ponds; lakeshore beach; large, medium, and small rivers, headwaters and creeks

3. In late February 2015, MDIFW, MNAP, MCP, MDMR, the Steering Committee, and partners nominated by the Steering Committee participated in two full-day Open Standards work sessions to begin developing conservation actions for each habitat grouping. Each work session was led by a CMP Conservation Coach who also was a member of the Steering Committee or a conservation partner. As a group, we created a conceptual model for each habitat grouping, linking key stressors to actions using the following approach:

   a. **Conservation Targets:** For each habitat grouping, the workgroup identified conservation targets, such as maintaining the current distribution of the habitat or its ecological integrity.

   b. **Key Stressors:** We then identified the key stressors to the habitat grouping. We began this discussion by first looking at stressors assigned to habitat macrogroups within the grouping that were at least moderately actionable and moderately severe. If the workgroup felt this list of stressors sufficiently captured the major challenges facing the habitat grouping as a whole, we moved onto the next step. If not, we used our best professional judgement to decide whether we should address additional stressors with conservation actions.

      We recognize that certain activities identified as 'stressors' to certain habitats or SGCN can also have positive effects or no effects at all. For example, aquaculture activities like shellfish seeding and macroalgae can help improve water quality and help form substrate for important habitats like eelgrass. For this exercise, however, we limited our scope of conservation actions to address only the negative effects of stressors.

   c. **Contributing Factors:** For each stressor, the workgroup identified the contributing factors that exacerbated the stressor for a particular habitat grouping. For example, we identified Fire Suppression as a key stressor to central oak pine barrens. This stressor is exacerbated by the public's perception of fire and its lack of understanding of the role of fire in maintaining this habitat. These are key factors inhibiting the use of fire as a management tool, especially near developed areas.

Conservation partners used an Open Standards approach to develop habitat conservation actions. © Mark Stadler

   d. **Conservation Actions:** For each stressor, we developed conservation actions designed to alleviate or mitigate that stressor and its contributing factors. For each conservation action, we strived to create a clear link between the action, stressor, and the action's intended benefit to the habitat grouping. We diagrammed these

relationships based on Open Standards models. Figure 4-2 depicts a draft conceptual diagram linking stressors and actions for central oak pine barrens.

e. **Categorization:** For each conservation action, we assigned a rank for Biological Priority, Action Type, and Action Category using the criteria described in section 4.1.2.

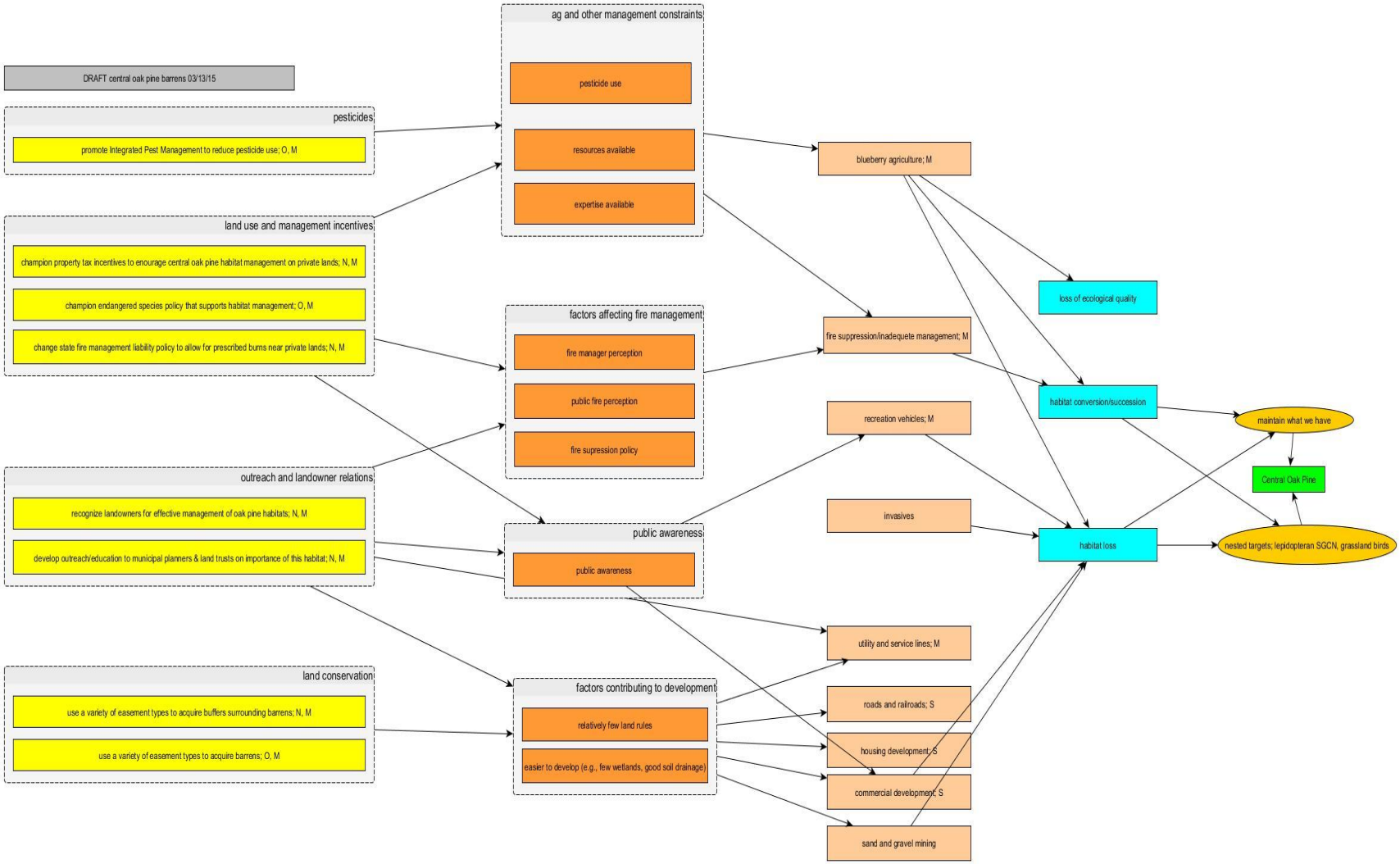
f. **Review:** Each workgroup reviewed and provided feedback on the conceptual diagrams for each habitat grouping in mid-March 2015.

4. We presented the draft list of habitat conservation actions to conservation partners at a meeting on June 16, 2015; we also distributed actions by email for review and feedback. We modified habitat conservation actions as appropriate, based upon partner review comments.

5. We posted the draft Wildlife Action Plan online on July 13, 2015 for a 30-day public comment period (see Elements 7/8 for more information). MDIFW and agency partners reviewed habitat action comments and modified conservation actions as appropriate, again, based on review comments.

Restoring habitat connectivity at road crossings is an important conservation action for many SGCN and often involves coordination among state and local transportation agencies, biologists, landowners, and other partners. © John Perry

Figure 4-2. Example Open Standards conceptual model diagram for the central oak pine barren habitat. Text boxes are as follows: yellow boxes (conservation actions); orange boxes (contributing factors); peach boxes (key stressors); blue boxes (specific issues caused by stressors; green box (target habitat) and yellow ovals (specific conservation targets). Arrows indicate relationships among elements in the model.



4.3.3 SUMMARY OF HABITAT CONSERVATION ACTIONS

We identified 322 habitat actions that address stressors in all habitat groupings, including 54 freshwater aquatic habitat actions, 165 marine and coastal habitat actions, and 103 terrestrial and freshwater wetland habitat actions (Table 4-16). In general, we classified most actions as habitat management, policy, or public outreach (Table 4-17), and more than half are already on-going (Table 4-18). While all actions included on our list are important, we viewed approximately 25% as critical to habitat conservation over the next ten years (Table 4-19).

Creation and management of early successional habitat is important for many SGCN. This restored New England Cottontail (*Sylvilagus transitionalis*, SGCN Priority 1) habitat at Camp Ketcha in Scarborough, Maine, was made possible by partnerships among landowners, agencies, and biologists. © U.S. Fish and Wildlife Service

Table 4-16. 2015 Maine Wildlife Action Plan Habitat Conservation Actions. Actions are sorted by Habitat Workgroup (FW=freshwater habitats, M=marine and coastal habitats, TW=terrestrial and freshwater wetland habitats), Habitat Grouping (see Table 4-15), Action Category, then by Biological Priority (C=critical, H=high, M=moderate). Themes are described in Table 4-20. The Action ID # will allow users to search the relational database (once it becomes publically available) for a specific action.

*Stressor names are from Level 2 of the IUCN Threat Classification Scheme; these are broad categories that may not capture all the nuances of stressor-SGCN-habitat interactions, including beneficial effects. Readers are urged to refer to species and habitat reports for more details on interactions among stressors, habitats, and SGCN.

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	82	Headwaters and Creeks	Public Outreach	H	new	Encourage improved road maintenance to reduce road gravel input and other pollutants into streams	F5			Roads and Railroads, Logging & Wood Harvesting
FW	83	Headwaters and Creeks	Public Outreach	H	new	Collaborate with partners to develop best management practices and provide technical assistance to landowners for riparian management in forest and agricultural lands	F4			Logging & Wood Harvesting, Agricultural and Forestry Effluents
FW	84	Headwaters and Creeks	Public Outreach	H	on-going	Provide outreach and education to forest landowners on the value of maintaining >60% tree cover in watersheds with high value SGCN habitats	F4	F1		Logging & Wood Harvesting
FW	85	Headwaters and Creeks	Public Outreach	H	on-going	Encourage wood addition as a management objective for riparian areas	F4			Logging & Wood Harvesting
FW	87	Headwaters and Creeks	Survey and Monitoring	M	new	Identify high value native Coldwater SGCN fish and other SGCN species habitats that may be vulnerable to watershed scale hydrology effects due to tree loss	F4	F1		Logging and Wood Harvesting
FW	121	Streams, Rivers, Lakes, and Ponds	Habitat Mgmt.	H	new	Identify and conserve coldwater resilient areas and waterbodies that are not amenable to the spread of invasive species	F3	F1		Invasive Non-native/Alien Species/Diseases

Table 4-16. *continued: page 2 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	130	Streams, Rivers, Lakes, and Ponds	Habitat Mgmt.	H	on-going	Encourage implementation of the Standards for Placing Wood Into Stream Channels to Enhance Cold Water Fisheries Habitat, also known as the Chop and Drop Rule, to replace lost natural habitat structure in streams and lakes	F4			Logging & Wood Harvesting
FW	131	Streams, Rivers, Lakes, and Ponds	Habitat Mgmt.	H	on-going	Construct crossings to pass storm flows and ensure enduring aquatic SGCN organism passage	F2			Roads & Railroads
FW	104	Streams, Rivers, Lakes, and Ponds	Habitat Mgmt.	M	new	Encourage installation of constructed wetlands to buffer waterways from wastewater contamination	F5			Domestic and Urban Waste Water, Industrial and Military Effluents, Agricultural and Forestry Effluents
FW	122	Streams, Rivers, Lakes, and Ponds	Habitat Mgmt.	M	new	Use habitat modifications to reduce the vulnerability of habitats to species invasions, such as returning impoundments to free-flowing river conditions	F3	F2		Invasive Non-native/Alien Species/Diseases
FW	105	Streams, Rivers, Lakes, and Ponds	Policy	C	new	Provide incentives for landowners to maintain riparian buffers	F4			Domestic & Urban Waste Water, Agricultural and Forestry Effluents
FW	118	Streams, Rivers, Lakes, and Ponds	Policy	C	new	Encourage septic inspections when a house sells to ensure that it is functioning properly	F5			Domestic & Urban Waste Water
FW	124	Streams, Rivers, Lakes, and Ponds	Policy	C	on-going	Improve enforcement of existing laws related to the transport of invasive species by boats, anglers, and through the pet trade	F3			Invasive Non-native/Alien Species/Diseases
FW	125	Streams, Rivers, Lakes, and Ponds	Policy	C	on-going	Expand targeted inspections of boats and the pet trade in order to reduce the spread of invasives and raise awareness	F3			Invasive Non-native/Alien Species/Diseases

Table 4-16. *continued: page 3 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	135	Streams, Rivers, Lakes, and Ponds	Policy	C	on-going	Provide support for municipalities implementing road stream crossing improvements	F2			Roads & Railroads
FW	89	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Continue efforts to identify barriers to aquatic organism passage	F6	F1		Dams & Water Management/Use
FW	91	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Identify funding to construct passage structures at dams	F6			Dams & Water Management/Use
FW	92	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Provide outreach to practitioners on technologies that are effective at passing fish	F6			Dams & Water Management/Use
FW	93	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Collaborate with partners to develop monitoring standards for SGCN fish passage efficiency	F6			Dams & Water Management/Use
FW	97	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Apply state Streamflow standards to dams	F6			Dams & Water Management/Use
FW	106	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Collaborate with partners to develop incentives to encourage homeowners near lake/river shores to replace their old septic systems	F5			Domestic & Urban Waste Water
FW	132	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Collaborate with partners to develop standards for new/replacement road stream crossings	F2			Roads & Railroads

Table 4-16. *continued: page 4 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	133	Streams, Rivers, Lakes, and Ponds	Policy	H	new	Collaborate with partners to develop a state road stream crossing restoration program with dedicated staff	F2			Roads & Railroads
FW	136	Streams, Rivers, Lakes, and Ponds	Policy	H	on-going	Conduct statewide/watershed scale connectivity planning	F2			Roads & Railroads
FW	137	Streams, Rivers, Lakes, and Ponds	Policy	H	on-going	Enhance coordination of agencies and NGOs to facilitate road stream crossing improvements	F2			Roads & Railroads
FW	109	Streams, Rivers, Lakes, and Ponds	Policy	M	new	Encourage municipalities to increase the capacity of their treatment facilities	F5			Domestic and Urban Waste Water
FW	139	Streams, Rivers, Lakes, and Ponds	Public Outreach	C	on-going	Continue Stream Smart general and technical training	F2			Roads & Railroads
FW	46	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Provide outreach and education to horticulturalists and landscape architects on the importance of maintaining riparian vegetation during the course of their work	F4	F1		Domestic & Urban Waste Water
FW	47	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Provide outreach and education to town planning boards on the importance of maintaining riparian vegetation to prevent declines in water quality	F4	F1		Domestic & Urban Waste Water, Industrial and Military Effluents, Agricultural and Forestry Effluents
FW	95	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Provide outreach and education to dam operators on ways to facilitate SGCN fish passage at dams	F6			Dams & Water Management/Use

Table 4-16. *continued: page 5 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	112	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Provide outreach and education to residents living on lake or river shores on the importance of maintaining riparian buffers, including options that allow water views (i.e. unmowed grass, shrubs)	F4	F1		Domestic & Urban Waste Water
FW	113	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Provide outreach and education to code enforcement officers and town planners on wastewater discharge	F5	F1		Domestic & Urban Waste Water
FW	114	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Work with municipalities to increase treatment capacity of wastewater facilities to reduce wastewater impacts to aquatic habitats	F5			Domestic & Urban Waste Water
FW	138	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	new	Provide online tools to prioritize road crossing upgrades	F2	F1		Roads & Railroads
FW	140	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	on-going	Encourage the use of temporary and permanent bridges rather than culverts	F2			Roads & Railroads
FW	141	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	on-going	Encourage information exchange forums such as Fisheries Improvement Network (FIN) and Small Woodlot Owners Association of Maine (SWOAM)	F2			Roads & Railroads
FW	142	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	on-going	Encourage alternative road routes that do not interfere with streams or riparian areas	F2	F1		Roads & Railroads
FW	143	Streams, Rivers, Lakes, and Ponds	Public Outreach	H	on-going	Continue advanced aquatic SGCN organism passage training	F2			Roads & Railroads

Table 4-16. *continued: page 6 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	96	Streams, Rivers, Lakes, and Ponds	Public Outreach	M	on-going	Train new and existing engineers on proper ways to design fish passage structures through universities and training programs	F6			Dams and Water Management/Use
FW	115	Streams, Rivers, Lakes, and Ponds	Public Outreach	M	new	Collaborate with partners to develop best management practices for development near waterways	F4	F5		Domestic and Urban Waste Water
FW	116	Streams, Rivers, Lakes, and Ponds	Public Outreach	M	new	Find ways to support communities addressing sewer overflow (e.g., treat storm water differently than sewage where appropriate)	F5			Domestic and Urban Waste Water
FW	99	Streams, Rivers, Lakes, and Ponds	Research	H	on-going	Investigate alternative technologies to promote passage of aquatic organisms	F6	F2		Dams & Water Management/Use
FW	100	Streams, Rivers, Lakes, and Ponds	Research	H	on-going	Research fish behavior and movement to identify ways to improve the design of fish passage structures	F6			Dams & Water Management/Use
FW	120	Streams, Rivers, Lakes, and Ponds	Research	H	new	Solicit help from experts in septic system design to determine solutions to septic seepage into waterways	F5			Domestic & Urban Waste Water
FW	127	Streams, Rivers, Lakes, and Ponds	Research	H	on-going	Conduct research on the economic impact of invasive species, mitigation strategies, and containment strategies in aquatic ecosystems	F3			Invasive Non-native/Alien Species/Diseases
FW	144	Streams, Rivers, Lakes, and Ponds	Research	M	on-going	Increase understanding of climate change/infrastructure threats to freshwater aquatic ecosystems	F2			Roads and Railroads, Habitat Shifting and Alteration, Dams and Water Management/Use

Table 4-16. *continued: page 7 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
FW	128	Streams, Rivers, Lakes, and Ponds	Species Mgmt.	H	on-going	Expand efforts to suppress and control invasive species, including through reclamation of water bodies	F3			Invasive Non-native/Alien Species/Diseases
FW	129	Streams, Rivers, Lakes, and Ponds	Species Mgmt.	M	on-going	Promote native species abundance in aquatic SGCN habitats in order to foster competition that may reduce or slow the spread of invasives	F3			Invasive Non-native/Alien Species/Diseases
FW	102	Streams, Rivers, Lakes, and Ponds	Survey and Monitoring	H	new	Identify priority locations for ecological flow management in aquatic habitats	F6	F1		Dams & Water Management/Use
FW	145	Streams, Rivers, Lakes, and Ponds	Survey and Monitoring	H	on-going	Increase habitat surveys and models for road stream crossings	F2	F1		Roads & Railroads
FW	146	Streams, Rivers, Lakes, and Ponds	Survey and Monitoring	H	on-going	Complete a statewide inventory of the status and condition of road and railroad crossings, including on headwater streams	F2	F1		Roads & Railroads
FW	103	Streams, Rivers, Lakes, and Ponds	Survey and Monitoring	M	new	Develop better methods to map potential barriers in priority watersheds	F2	F6	F1	Dams and Water Management/Use, Roads and Railroads
FW	147	Streams, Rivers, Lakes, and Ponds	Survey and Monitoring	M	on-going	Track completed road stream crossing projects	F2			Roads and Railroads
M	170	Coastal	Habitat Mgmt.	C	on-going	Develop and implement best management practices or beach management agreements with municipalities and beach managers	M10	M5		Commercial & Industrial Areas , Housing & Urban Areas, Other Ecosystem Modifications, Roads & Railroads, Tourism & Recreational Areas

Table 4-16. *continued: page 8 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	171	Coastal	Habitat Mgmt.	C	on-going	Implement predator control programs near SGCN nesting areas in coastal and rocky coast habitats	M8			Commercial & Industrial Areas , Housing & Urban Areas, Other Ecosystem Modifications, Roads & Railroads, Tourism & Recreational Areas
M	168	Coastal	Habitat Mgmt.	H	on-going	Use voluntary agreements and incentives to conserve important coastal and rocky coast SGCN habitats	M10			Commercial & Industrial Areas , Housing & Urban Areas, Other Ecosystem Modifications, Roads & Railroads, Tourism & Recreational Areas
M	174	Coastal	Habitat Mgmt.	M	on-going	Assist municipalities in identifying areas that will allow coastal habitats to migrate inland as sea level rise occurs	M5	M3M4		Habitat Shifting or Alteration, Storms and Flooding, Temperature Extremes
M	173	Coastal	Public Outreach	C	on-going	Provide outreach to recreationalists regarding effects of human disturbance on beach nesting birds and roosting/feeding shorebirds	M8	M10		Recreational Activities
M	175	Coastal	Research	M	new	Research and identify management actions that may minimize impacts to coastal SGCN habitats from climate change	M3M4			Storms and Flooding, Temperature Extremes, Habitat Shifting or Alteration
M	167	Coastal	Survey and Monitoring	H	on-going	Work with municipalities to identify important SGCN nesting and migratory areas in rocky coast and coastal habitats during comprehensive planning	M1			Commercial & Industrial Areas , Housing & Urban Areas, Other Ecosystem Modifications, Roads & Railroads, Tourism & Recreational Areas
M	221	Intertidal	Habitat Mgmt.	C	on-going	Encourage partnership projects among transportation agencies, utility companies, etc. to facilitate fish passage and maintain connectivity in or near subtidal, intertidal, and tidal marsh habitats especially in cases where structures have different purposes for different users	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	257	Intertidal	Habitat Mgmt.	C	on-going	Decommission remnant or unused roads and dams in or near tidal marsh, intertidal, and subtidal habitats	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines

Table 4-16. *continued: page 9 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	262	Intertidal	Habitat Mgmt.	C	new	Use transportation bonds to provide funding for culvert replacement in or near intertidal, subtidal, and tidal marsh habitats using best management practices	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	209	Intertidal	Habitat Mgmt.	H	on-going	Promote voluntary baywide (or scale of ecological relevance) coordination of shared resources and education addressing the impacts of fishing and harvesting aquatic resources on SGCN intertidal and subtidal habitats	M9			Fishing & Harvesting of Aquatic Resources
M	225	Intertidal	Habitat Mgmt.	H	on-going	Restore and improve conservation management at state and municipal levels to reduce impacts of effluents and wastewater on intertidal and subtidal SGCN habitats	M3M4			Agricultural & Forestry Effluents, Domestic & Urban Waste Water, Industrial & Military Effluents
M	369	Intertidal	Habitat Mgmt.	H	on-going	Assess new aquaculture sites for potential positive, benign, or negative species interactions with the surrounding habitat and ecological systems	M1	M10		Marine & Freshwater Aquaculture
M	370	Intertidal	Habitat Mgmt.	H	on-going	Increase riparian and coastal buffer zones by limiting development in these areas to minimize damage to these properties due to flooding/waves and to maintain pervious surfaces for improved water management	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	249	Intertidal	Habitat Mgmt.	H	on-going	Mitigate coastal acidification of intertidal and subtidal habitats using strategies similar to those for reducing effects of effluents/wastewater	M2			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	261	Intertidal	Habitat Mgmt.	H	on-going	Use technology to reduce discharge of wastewater and effluents into intertidal and subtidal SGCN habitats	M2			Agricultural & Forestry Effluents, Domestic & Urban Waste Water, Industrial & Military Effluents
M	365	Intertidal	Habitat Mgmt.	H	on-going	Investigate the effects of commercial trawling within the intertidal zone	M2	M9	M10	Fishing & Harvesting of Aquatic Resources

Table 4-16. *continued: page 10 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	371	Intertidal	Habitat Mgmt.	M	new	Alter shipping lanes and dredging plans in intertidal and subtidal habitats to minimize biological and ecological impacts to SGCN	M1	M10		Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	219	Intertidal	Habitat Mgmt.	M	on-going	Conduct law enforcement training and workshops to support knowledge of SGCN and how existing regulations affect SGCN and their habitats	M6			Recreational Activities, Fishing and Harvesting
M	236	Intertidal	Habitat Mgmt.	M	on-going	Improve response plans for industrial spills (e.g., oil spills) in intertidal and subtidal habitats and support research on oil dispersants and short and long term effect of oil spills	M2			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	242	Intertidal	Habitat Mgmt.	M	new	Increase pH of mudflats (e.g., using harvested shell waste) to restore more favorable habitat conditions for intertidal and subtidal SGCN	M2			Fishing and Harvesting of Aquatic Resources
M	372	Intertidal	Policy	H	on-going	Increase capacity for enforcement of current laws and regulations regarding proper infrastructure (e.g., roads, dams, utility lines, shipping lanes) construction, maintenance, water quality, and fish passage in tidal marsh, intertidal, and subtidal SGCN habitats	M5	M6		Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	245	Intertidal	Policy	H	on-going	Increase enforcement for dumping/litter/gear abandonment in intertidal and subtidal habitats	M6			Garbage & Solid Waste
M	252	Intertidal	Policy	H	new	Provide incentives for building Stream Smart structures and road crossings in or near intertidal, subtidal, and tidal marsh habitats that allow for changing environmental conditions such as sea level rise and increased flooding	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	259	Intertidal	Policy	H	on-going	Increase awareness about invasive species and problems following the introduction of invasive species in the shipping, transportation, and other industries to prevent introductions and spread of invasive species in intertidal and subtidal habitats	M6	M7		Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases, Viral/Prion-induced Diseases

Table 4-16. *continued: page 11 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	223	Intertidal	Policy	M	on-going	Expand existing education and incentive programs for lawn care companies, homeowners, and municipalities to reduce wastewater and effluent inputs and effects on intertidal and subtidal SGCN habitats	M2			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	224	Intertidal	Policy	M	new	Explore value of utilizing conservation leases to limit uses/stresses in intertidal and subtidal habitats	M9			Fishing and Harvesting of Aquatic Resources
M	234	Intertidal	Policy	M	on-going	Increase capacity for municipal planning for siting of new or retrofit developments (i.e., Smart Growth)to reduce wastewater and effluent effects on intertidal and subtidal SGCN habitats while also accounting for future environmental change	M3M4			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	239	Intertidal	Policy	M	on-going	Provide incentives for and education on using green infrastructure for preventing erosion and loss/damage of property near intertidal habitats	M2			Commercial and Industrial Areas , Housing and Urban Areas, Livestock Farming and Ranching
M	373	Intertidal	Policy	M	new	Update permit requirements for new and retrofitted developments in, near, or adjacent to intertidal habitats with up-to-date data/models of climate predictions	M3M4			Commercial and Industrial Areas , Housing and Urban Areas, Livestock Farming and Ranching
M	256	Intertidal	Policy	M	on-going	Retrofit existing effluent and wastewater treatment infrastructure and plan for sea level rise by providing economic incentives and education	M3M4			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	258	Intertidal	Policy	M	on-going	Provide stewardship/conservation incentives to harvesters working in intertidal and subtidal SGCN habitats	M9			Fishing and Harvesting of Aquatic Resources
M	211	Intertidal	Public Outreach	H	on-going	Continue/expand litter reduction programs/public education in intertidal and subtidal habitats	M2			Garbage & Solid Waste

Table 4-16. *continued: page 12 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	212	Intertidal	Public Outreach	H	on-going	Continue/expand marine debris recovery programs in intertidal and subtidal habitats and education to fishermen	M2			Garbage & Solid Waste
M	218	Intertidal	Public Outreach	H	on-going	Provide education and outreach through local meetings and trainings (e.g., Stream Smart) on techniques, problems and ecological effects of dams, roads, shipping lanes, and utility corridors on intertidal, subtidal, and tidal marsh habitats and publicize completed projects	M5	M3M4		Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	231	Intertidal	Public Outreach	H	new	Improve knowledge of effects of renewable energy on intertidal and subtidal SGCN habitats and convey this information to the public	M2			Renewable Energy
M	240	Intertidal	Public Outreach	H	on-going	Increase outreach and education on preventing the spread of invasive/problematic species and diseases in intertidal, subtidal, and tidal marsh habitats	M7			Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases, Viral/Prion-induced Diseases
M	244	Intertidal	Public Outreach	H	on-going	Increase capacity for local engagement in data collection, surveys, and management of intertidal and subtidal SGCN and their habitats that fosters partnerships among harvesters, citizens, scientists, and managers	M9			Fishing & Harvesting of Aquatic Resources
M	246	Intertidal	Public Outreach	H	on-going	Increase leadership opportunities and education regarding climate change mitigation and adaptation in intertidal and subtidal habitats	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	208	Intertidal	Public Outreach	M	on-going	At popular sites, increase education and outreach on the effects of recreation on sensitive intertidal ecosystems, spread of invasive species, etc.	M1	M7		Recreational Activities
M	215	Intertidal	Public Outreach	M	new	Develop best management practices for maintaining energy facilities in intertidal and subtidal habitats	M2			Renewable Energy

Table 4-16. *continued: page 13 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	222	Intertidal	Public Outreach	M	new	Expand existing education and research at the management level to improve understanding and management ability to reduce wastewater and effluent inputs and effects into intertidal and subtidal SGCN habitats	M2			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	251	Intertidal	Public Outreach	M	on-going	Post signs describing specific usage constraints (e.g. avoid certain areas during breeding seasons, pick up dog waste, don't disturb flora and fauna) to minimize impacts of recreational activities on intertidal SGCN habitats	M8			Recreational Activities
M	260	Intertidal	Public Outreach	M	on-going	Promote use of more targeted fishing techniques in intertidal and subtidal habitats (e.g., bycatch reduction and not disturbing habitat) by encouraging discussions between harvesters, ecologists, and managers	M9			Fishing and Harvesting of Aquatic Resources
M	210	Intertidal	Research	C	new	Create a coastal acidification budget to determine which factors (i.e. point, non-point source pollution, atmospheric CO2, etc.) are most important in driving acidification nearshore in intertidal and subtidal habitats	M2			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	226	Intertidal	Research	C	new	Identify local intertidal and subtidal ocean acidification and sea surface temperature refuges and resilient species	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	214	Intertidal	Research	H	on-going	Develop better understanding of climate change effects on intertidal and subtidal SGCN and ecosystem interactions	M3M4			Lack of knowledge
M	220	Intertidal	Research	H	new	Encourage installation of lower cost SGCN-friendly infrastructure in and near subtidal, intertidal, and tidal marsh habitats through technology development and transfer of technology	M2			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	228	Intertidal	Research	H	on-going	Improve understanding of distribution, biology, and ecology of non-commercially harvested intertidal and subtidal SGCN	M1			Lack of knowledge

Table 4-16. *continued: page 14 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	230	Intertidal	Research	H	on-going	Improve knowledge of intertidal and subtidal SGCN habitat use and migration patterns to better inform renewable energy project siting	M1	M10		Renewable Energy
M	233	Intertidal	Research	H	on-going	Improve modeling (at local and Gulf of Maine scales) of sea level rise effects on intertidal and subtidal SGCN habitats and incorporate into planning	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	235	Intertidal	Research	H	on-going	Improve mapping of intertidal and subtidal habitats and include information on SGCN movements	M1	M10		Renewable Energy
M	255	Intertidal	Research	H	on-going	Research the feasibility of diversifying Maine's marine fisheries of SGCN in response to changing environmental variables	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	366	Intertidal	Research	H	on-going	Monitor coastal streams, rivers, and sediments for excessive nutrients and chemical therapeutants	M2			Agricultural & Forestry Effluents, Domestic & Urban Waste Water, Industrial & Military Effluents, Storms & Flooding
M	213	Intertidal	Research	M	on-going	Determine accuracy of commercial harvester- and dealer-reported landings and recreational fishing reports and surveys for target intertidal and subtidal SGCN and bycatch	M9			Fishing and Harvesting of Aquatic Resources
M	227	Intertidal	Research	M	on-going	Improve understanding of effects of energy development on bird and other SGCN use of migration corridors in intertidal and subtidal habitats	M1	M2		Renewable Energy
M	229	Intertidal	Research	M	on-going	Improve understanding of intertidal and subtidal SGCN distributions especially in regards to ecosystem interactions and predator prey relationships	M1			Lack of knowledge

Table 4-16. *continued: page 15 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	238	Intertidal	Research	M	on-going	Continue to work with industry to minimize escape of aquaculture-raised individuals	M7			Marine and Freshwater Aquaculture
M	247	Intertidal	Research	M	on-going	Investigate the effects of various harvesting practices on intertidal and subtidal SGCN habitats and on trophic and ecological processes	M9			Fishing and Harvesting of Aquatic Resources
M	217	Intertidal	Survey and Monitoring	H	on-going	Develop monitoring systems and rapid response plans to prevent the colonization of invasive/problematic species and diseases in intertidal, subtidal, and tidal marsh habitats	M7			Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases, Viral/Prion-induced Diseases
M	107	Intertidal	Survey and Monitoring	H	new	Develop coastal focus areas encompassing marine habitats with high concentrations of SGCN using improved species occurrence maps	M1			Lack of knowledge
M	367	Intertidal	Survey and Monitoring	H	on-going	Continue underwater surveillance of potential and active aquaculture lease sites with a focus on SGCN and important habitats	M2			Fishing & Harvesting of Aquatic Resources
M	248	Intertidal	Survey and Monitoring	M	on-going	More frequently update intertidal and subtidal SGCN habitat maps and compare to historical maps to monitor changes in distribution over time	M1			Fishing and Harvesting of Aquatic Resources
M	161	Rocky Coast	Habitat Mgmt.	C	on-going	Implement predator control programs near SGCN nesting areas in coastal and rocky coast habitats	M8			Commercial & Industrial Areas , Housing & Urban Areas
M	152	Rocky Coast	Habitat Mgmt.	H	on-going	Minimize disturbances around rocky coast SGCN nesting and roosting habitat through voluntary agreements	M10	M8		Fishing & Harvesting of Aquatic Resources, Recreational Activities

Table 4-16. *continued: page 16 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	153	Rocky Coast	Habitat Mgmt.	H	on-going	Limit disturbance of shorebird roosting areas and seabird nesting islands through signage, closure to foot traffic, and other effective means	M8			Fishing & Harvesting of Aquatic Resources, Recreational Activities
M	163	Rocky Coast	Habitat Mgmt.	M	on-going	Implement invasive species eradication programs where appropriate (e.g., not in areas where invasive plants provide cover for SGCN and reestablishment of native plants is unlikely), and encourage growth of native species	M7			Invasive Non-native/Alien Species/Diseases
M	164	Rocky Coast	Habitat Mgmt.	M	on-going	Identify conservation and restoration opportunities that allow for rocky coast habitat migration to higher elevations	M3M4	M1		Habitat Shifting or Alteration, Storms and Flooding
M	165	Rocky Coast	Habitat Mgmt.	M	on-going	Identify conservation and restoration opportunities at historic but currently unused nesting sites in rocky coast habitats	M1	M8		Habitat Shifting or Alteration, Storms and Flooding
M	166	Rocky Coast	Habitat Mgmt.	M	on-going	Deploy armoring structures on state-owned lands at high value nesting areas along the rocky coast where migration of nesting habitat is not possible	M3M4			Habitat Shifting or Alteration, Storms and Flooding
M	150	Rocky Coast	Policy	H	on-going	Seasonally close rocky coast SGCN nesting and roosting areas to foot traffic on state-owned lands	M8			Recreational Activities
M	154	Rocky Coast	Policy	H	on-going	Encourage safe operational procedures and spill clean-up and rehabilitation of oiled birds	M1	M6	M10	Industrial & Military Effluents, Shipping Lanes
M	156	Rocky Coast	Policy	H	on-going	Enhance oil spill contingency planning and response efforts in rocky coast habitats including purchasing survey and hazing equipment	M10			Industrial & Military Effluents, Shipping Lanes

Table 4-16. *continued: page 17 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	159	Rocky Coast	Policy	H	on-going	Use voluntary agreements, conservation easements, and tax abatements and incentives to conserve important coastal and rocky coast SGCN habitats	M3M4	M10	M8	Commercial & Industrial Areas , Housing & Urban Areas
M	149	Rocky Coast	Public Outreach	H	on-going	Erect signage at important nesting and roosting areas in rocky coast habitats to discourage destructive effects of human recreation	M8			Recreational Activities
M	148	Rocky Coast	Public Outreach	M	on-going	Provide outreach to recreationalists regarding effects of human disturbance on nesting colonies and roosting shorebirds	M8			Recreational Activities
M	157	Rocky Coast	Survey and Monitoring	H	on-going	Identify and prioritize significant nesting, migratory, and wintering areas in rocky coast habitats for contingency planning	M10			Industrial & Military Effluents, Shipping Lanes
M	158	Rocky Coast	Survey and Monitoring	H	on-going	Work with municipalities to identify important SGCN nesting and migratory areas in rocky coast and coastal habitats during comprehensive planning	M10	M1		Commercial & Industrial Areas , Housing & Urban Areas
M	162	Rocky Coast	Survey and Monitoring	M	on-going	Identify invasive plant hot spots in rocky coast habitats	M7			Invasive Non-native/Alien Species/Diseases
M	279	Subtidal	Habitat Mgmt.	C	on-going	Encourage partnership projects among transportation agencies, utility companies, etc. to facilitate fish passage and maintain connectivity in or near subtidal, intertidal, and tidal marsh habitats especially in cases where structures have different purposes for different users	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	314	Subtidal	Habitat Mgmt.	C	on-going	Decommission remnant or unused roads and dams in or near tidal marsh, intertidal, and subtidal habitats	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines

Table 4-16. *continued: page 18 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	321	Subtidal	Habitat Mgmt.	C	new	Find ways to support culvert replacement in or near intertidal, subtidal, and tidal marsh habitats using best management practices	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	264	Subtidal	Habitat Mgmt.	H	on-going	Promote voluntary baywide (or scale of ecological relevance) coordination of shared resources and education addressing the impacts of fishing and harvesting aquatic resources on SGCN intertidal and subtidal habitats	M9			Fishing & Harvesting of Aquatic Resources
M	285	Subtidal	Habitat Mgmt.	H	on-going	Restore and improve conservation management at state and municipal levels to reduce impacts of effluents and wastewater on intertidal and subtidal SGCN habitats	M3M4			Agricultural & Forestry Effluents, Domestic & Urban Waste Water, Industrial & Military Effluents
M	374	Subtidal	Habitat Mgmt.	H	on-going	Assess new aquaculture sites for potential positive, benign, or negative species interactions with the surrounding habitat and ecological systems	M1	M10		Marine & Freshwater Aquaculture
M	308	Subtidal	Habitat Mgmt.	H	on-going	Mitigate coastal acidification of intertidal and subtidal habitats using strategies similar to those for reducing effects of effluents/wastewater	M2			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	309	Subtidal	Habitat Mgmt.	H	on-going	Model effects of sea level rise and other climate change factors on subtidal SGCN patterns including physiology, migration patterns, and trophic changes	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	320	Subtidal	Habitat Mgmt.	H	on-going	Use technology to reduce discharge of wastewater and effluents into intertidal and subtidal SGCN habitats	M2			Agricultural & Forestry Effluents, Domestic & Urban Waste Water, Industrial & Military Effluents
M	375	Subtidal	Habitat Mgmt.	M	new	Alter shipping lanes and dredging plans in intertidal and subtidal habitats to minimize biological and ecological impacts to SGCN	M1	M10		Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents

Table 4-16. *continued: page 19 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	277	Subtidal	Habitat Mgmt.	M	on-going	Conduct law enforcement training and workshops to support knowledge of SGCN and how existing regulations affect SGCN and their habitats	M6			Recreational Activities, Fishing and Harvesting
M	296	Subtidal	Habitat Mgmt.	M	on-going	Improve response plans for industrial spills (e.g., oil spills) in intertidal and subtidal habitats and support research on oil dispersants and short and long term effect of oil spills	M2			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	376	Subtidal	Policy	H	on-going	Increase capacity for enforcement of current laws and regulations regarding proper infrastructure (e.g., roads, dams, utility lines, shipping lanes) construction, maintenance, water quality, and fish passage in tidal marsh, intertidal, and subtidal SGCN habitats	M5	M6		Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	310	Subtidal	Policy	H	new	Provide incentives for building Stream Smart structures and road crossings in or near intertidal, subtidal, and tidal marsh habitats that allow for changing environmental conditions such as sea level rise and increased flooding	M5			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines
M	317	Subtidal	Policy	H	on-going	Increase awareness about invasive species regulations and problems following the introduction of invasive species in the shipping, transportation, and other industries to prevent introductions and spread of invasive species in intertidal and subtidal habitats	M6	M7		Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases, Viral/Prion-induced Diseases
M	377	Subtidal	Policy	H	on-going	Time dredging projects in subtidal and tidal marsh habitats to minimize harm to SGCN based on migration and spawning cycles	M1	M10		Mining & Quarrying, Shipping Lanes
M	282	Subtidal	Policy	M	on-going	Expand existing education and incentive programs for lawn care companies, homeowners, and municipalities to reduce wastewater and effluent inputs and effects on intertidal and subtidal SGCN habitats	M2			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	284	Subtidal	Policy	M	new	Explore value of utilizing conservation leases to limit uses/stresses in intertidal and subtidal habitats	M9			Fishing and Harvesting of Aquatic Resources

Table 4-16. *continued: page 20 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	294	Subtidal	Policy	M	on-going	Increase capacity for municipal planning for siting of new or retrofit developments (i.e., Smart Growth)to reduce wastewater and effluent effects on intertidal and subtidal SGCN habitats while also accounting for future environmental change	M3M4			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	302	Subtidal	Policy	M	on-going	Increase enforcement for dumping/litter/gear abandonment in intertidal and subtidal habitats	M6			Garbage and Solid Waste
M	313	Subtidal	Policy	M	on-going	Retrofit existing effluent and wastewater treatment infrastructure and plan for sea level rise by providing economic incentives and education	M3M4			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	378	Subtidal	Policy	M	on-going	Site shipping lanes and dredging projects to minimize negative impacts to intertidal and subtidal SGCN and their habitats	M1	M10		Mining and Quarrying, Shipping Lanes
M	316	Subtidal	Policy	M	on-going	Provide stewardship/conservation incentives to harvesters working in intertidal and subtidal SGCN habitats	M9			Fishing and Harvesting of Aquatic Resources
M	267	Subtidal	Public Outreach	C	on-going	Continue/expand litter reduction programs/public education in intertidal and subtidal habitats	M2			Garbage & Solid Waste
M	268	Subtidal	Public Outreach	H	on-going	Continue/expand marine debris recovery programs in intertidal and subtidal habitats and education to fishermen	M2			Garbage & Solid Waste
M	275	Subtidal	Public Outreach	H	on-going	Provide education and outreach through local meetings and trainings (e.g., Stream Smart) on techniques, problems and ecological effects of dams, roads, shipping lanes, and utility corridors on intertidal, subtidal, and tidal marsh habitats and publicize completed projects	M5	M3M4		Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines

Table 4-16. *continued: page 21 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	291	Subtidal	Public Outreach	H	new	Improve knowledge of effects of renewable energy on intertidal and subtidal SGCN habitats and convey this information to the public	M2			Renewable Energy
M	299	Subtidal	Public Outreach	H	on-going	Increase outreach and education on preventing the spread of invasive/problematic species and diseases in intertidal, subtidal, and tidal marsh habitats	M7			Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases, Viral/Prion-induced Diseases
M	303	Subtidal	Public Outreach	H	on-going	Increase leadership opportunities and education regarding climate change mitigation and adaptation in intertidal and subtidal habitats	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	304	Subtidal	Public Outreach	H	on-going	Increase capacity for local engagement in data collection, surveys, and management of intertidal and subtidal SGCN and their habitats that fosters partnerships among harvesters, citizens, scientists, and managers	M9			Fishing & Harvesting of Aquatic Resources
M	271	Subtidal	Public Outreach	M	new	Develop best management practices for maintaining energy facilities in intertidal and subtidal habitats	M2			Renewable Energy
M	274	Subtidal	Public Outreach	M	on-going	Continue partnerships between anglers, guides, scientists, and managers to collect biological information and catch data to use in population assessments and identifying species habitat use and behavior	M9			Recreational Activities
M	276	Subtidal	Public Outreach	M	on-going	Provide outreach and education to recreational marine harvesters on proper catch and release methods to minimize trauma (including barotrauma)	M9			Recreational Activities
M	280	Subtidal	Public Outreach	M	on-going	Continue to work with recreational marine charter captains to collect accurate data that can be used to assess SGCN populations	M9			Recreational Activities

Table 4-16. *continued: page 22 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	281	Subtidal	Public Outreach	M	new	Expand existing education and research at the management level to improve understanding and management ability to reduce wastewater and effluent inputs and effects into intertidal and subtidal SGCN habitats	M2			Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents
M	319	Subtidal	Public Outreach	M	on-going	Promote use of more targeted fishing techniques in intertidal and subtidal habitats (e.g., bycatch reduction and not disturbing habitat) by encouraging discussions between harvesters, ecologists, and managers	M9			Fishing and Harvesting of Aquatic Resources
M	265	Subtidal	Research	C	new	Create a coastal acidification budget to determine which factors (i.e. point, non-point source pollution, atmospheric CO2, etc.) are most important in driving acidification nearshore in intertidal and subtidal habitats	M2			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	286	Subtidal	Research	C	new	Identify local intertidal and subtidal ocean acidification and sea surface temperature refuges and resilient species	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	295	Subtidal	Research	C	on-going	Improve mapping of intertidal and subtidal habitats and include information on SGCN movements and mortality due to turbines	M1	M10		Renewable Energy
M	305	Subtidal	Research	C	new	Investigate offshore changes in circulation patterns, plankton distribution and abundance, and other bio-chemical and physical processes	M2			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	270	Subtidal	Research	H	on-going	Develop better understanding of climate change effects on intertidal and subtidal SGCN and ecosystem interactions	M3M4			Lack of knowledge
M	278	Subtidal	Research	H	new	Encourage installation of lower cost SGCN-friendly infrastructure in and near subtidal, intertidal, and tidal marsh habitats through technology development and transfer of technology	M2			Dams & Water Management/Use, Roads & Railroads, Shipping Lanes, Utility & Service Lines

Table 4-16. *continued: page 23 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	289	Subtidal	Research	H	on-going	Improve understanding of distribution, biology, and ecology of non-commercially harvested intertidal and subtidal SGCN	M1			Lack of knowledge
M	290	Subtidal	Research	H	on-going	Improve knowledge of intertidal and subtidal SGCN habitat use and migration patterns to better inform renewable energy project siting	M3M4			Renewable Energy
M	293	Subtidal	Research	H	on-going	Improve modeling (at local and Gulf of Maine scales) of sea level rise effects on intertidal and subtidal SGCN habitats and incorporate into planning	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	312	Subtidal	Research	H	on-going	Research the feasibility of diversifying Maine's marine fisheries of SGCN in response to changing environmental variables	M3M4			Habitat Shifting or Alteration, Storms & Flooding, Temperature Extremes
M	269	Subtidal	Research	M	on-going	Determine accuracy of commercial harvester- and dealer-reported landings and recreational fishing reports and surveys for target intertidal and subtidal SGCN and bycatch	M9			Fishing and Harvesting of Aquatic Resources
M	287	Subtidal	Research	M	on-going	Improve understanding of intertidal and subtidal SGCN distributions especially in regards to ecosystem interactions and predator prey relationships	M1			Lack of knowledge
M	288	Subtidal	Research	M	on-going	Improve understanding of effects of energy development on bird and other SGCN use of migration corridors in intertidal and subtidal habitats	M1	M2		Renewable Energy
M	298	Subtidal	Research	M	on-going	Continue to work with industry to minimize escape of aquaculture-raised individuals	M7			Marine and Freshwater Aquaculture

Table 4-16. *continued: page 24 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	301	Subtidal	Research	M	new	Expand research and pilot studies to test the efficacy of increasing pH of mudflats (e.g., using harvested shell waste) to restore more favorable habitat conditions for intertidal and subtidal SGCN	M2			Fishing and Harvesting of Aquatic Resources
M	306	Subtidal	Research	M	on-going	Investigate the effects of various harvesting practices on intertidal and subtidal SGCN habitats and on trophic and ecological processes	M9			Fishing and Harvesting of Aquatic Resources
M	272	Subtidal	Survey and Monitoring	M	on-going	Develop coastal focus areas encompassing marine habitats with high concentrations of SGCN using improved species occurrence maps	M1			Lack of knowledge
M	273	Subtidal	Survey and Monitoring	H	on-going	Develop monitoring systems and rapid response plans to prevent the colonization of invasive/problematic species and diseases in intertidal, subtidal, and tidal marsh habitats	M7			Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases, Viral/Prion-induced Diseases
M	368	Subtidal	Survey and Monitoring	H	on-going	Continue underwater surveillance of potential and active aquaculture lease sites with a focus on SGCN and important habitats	M2			Fishing & Harvesting of Aquatic Resources
M	266	Subtidal	Survey and Monitoring	M	on-going	Continue to improve rapid response for oil and gas spills in intertidal and subtidal habitats, including state agencies efforts to have most up-to-date species maps, rapid response protocols in place, and regular scenario training	M1	M10		Mining and Quarrying, Shipping Lanes
M	283	Subtidal	Survey and Monitoring	M	on-going	Expand surveys of recreational fishing efforts to include SGCN that are not targeted in current survey efforts	M9			Recreational Activities
M	307	Subtidal	Survey and Monitoring	M	on-going	More frequently update intertidal and subtidal SGCN habitat maps and compare to historical maps to monitor changes in distribution over time	M1			Fishing and Harvesting of Aquatic Resources

Table 4-16. *continued: page 25 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	180	Tidal Marsh	Habitat Mgmt.	C	on-going	Work with land conservation organizations and private landowners to conserve tidal marshes, adjacent uplands, and marsh migration corridors	M3M4			Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Livestock Farming & Ranching, Utility & Service Lines
M	183	Tidal Marsh	Habitat Mgmt.	C	on-going	Conserve lands that are upland and inland of marshes to allow for marsh migration and maintain habitat connectivity	M3M4			Habitat Shifting or Alteration
M	194	Tidal Marsh	Habitat Mgmt.	C	new	Use transportation bonds to provide funding for culvert replacement in or near intertidal, subtidal, and tidal marsh habitats using best management practices	M5			Dams & Water Management/Use, Roads & Railroads
M	196	Tidal Marsh	Habitat Mgmt.	C	on-going	Decommission remnant or unused roads and dams in or near tidal marsh, intertidal, and subtidal habitats	M5			Dams & Water Management/Use, Roads & Railroads
M	198	Tidal Marsh	Habitat Mgmt.	H	on-going	Encourage installation of lower cost SGCN-friendly infrastructure in and near subtidal, intertidal, and tidal marsh habitats through technology development and transfer of technology	M2			Dams & Water Management/Use, Roads & Railroads
M	379	Tidal Marsh	Habitat Mgmt.	H	on-going	Time dredging projects in subtidal and tidal marsh habitats to minimize harm to SGCN based on migration and spawning cycles	M10	M1		Shipping Lanes
M	179	Tidal Marsh	Habitat Mgmt.	M	on-going	Maintain or create corridors between tidal marshes and other habitats used by tidal marsh SGCN	M3M4			Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Livestock Farming and Ranching, Utility and Service Lines
M	182	Tidal Marsh	Habitat Mgmt.	M	new	Employ technology to reduce nutrient discharge adjacent to tidal marshes, e.g. storm water remediation measures including SmartSponge, infiltration chambers, and storm water settling areas	M2	M10		Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents, Storms and Flooding

Table 4-16. *continued: page 26 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	192	Tidal Marsh	Habitat Mgmt.	M	on-going	Re-route existing trails and/or boardwalks around tidal marshes to minimize foot traffic and disturbance to SGCN habitats	M10			Recreational Activities
M	195	Tidal Marsh	Policy	C	new	Provide incentives for building Stream Smart structures and road crossings in or near intertidal, subtidal, and tidal marsh habitats that allow for changing environmental conditions such as sea level rise and increased flooding	M5			Dams & Water Management/Use, Roads & Railroads
M	197	Tidal Marsh	Policy	H	new	Implement through voluntary or regulatory means best standards for road/stream crossings in or near tidal marshes	M5			Dams & Water Management/Use, Roads & Railroads
M	380	Tidal Marsh	Policy	H	on-going	Increase capacity for enforcement of current laws and regulations regarding proper infrastructure (e.g., roads, dams, utility lines, shipping lanes) construction, maintenance, water quality, and fish passage in tidal marsh, intertidal, and subtidal SGCN habitats	M5	M6		Dams & Water Management/Use, Roads & Railroads
M	381	Tidal Marsh	Policy	H	new	Site shipping lanes and dredging projects to minimize negative impacts to intertidal and subtidal SGCN and their habitats	M1	M10		Shipping Lanes
M	204	Tidal Marsh	Policy	H	on-going	Continue to improve rapid response for oil and gas spills in intertidal and subtidal habitats, including state agencies efforts to have most up-to-date species maps, rapid response protocols in place, and regular scenario training	M1	M10		Shipping Lanes
M	188	Tidal Marsh	Policy	M	on-going	Increase awareness about invasive species regulations and problems following the introduction of invasive species in the shipping, transportation, and other industries to prevent introductions and spread of invasive species in intertidal and subtidal habitats	M6	M7		Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases
M	201	Tidal Marsh	Policy	M	on-going	Develop and provide model best practice maintenance and operating procedures (e.g., maintenance frequency, replacement schedules) for municipal, state, and private managers of infrastructure in tidal marshes	M5	M3M4		Dams and Water Management/Use, Roads and Railroads

Table 4-16. *continued: page 27 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	181	Tidal Marsh	Public Outreach	H	on-going	Encourage partnership projects among transportation agencies, utility companies, etc. to facilitate fish passage and maintain connectivity in or near subtidal, intertidal, and tidal marsh habitats especially in cases where structures have different purposes for different users	M5			Dams & Water Management/Use, Roads & Railroads
M	200	Tidal Marsh	Public Outreach	H	on-going	Provide education and outreach through local meetings and trainings (e.g., Stream Smart) on techniques, problems and ecological effects of dams, roads, shipping lanes, and utility corridors on intertidal, subtidal, and tidal marsh habitats and publicize completed projects	M5	M3M4		Dams & Water Management/Use, Roads & Railroads
M	176	Tidal Marsh	Public Outreach	M	on-going	Provide outreach and education to homeowners and businesses to reduce their wastewater and storm water inputs into and effects on tidal marshes, including increased buffers and minimal fertilizer use	M1	M10		Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents, Storms and Flooding
M	178	Tidal Marsh	Public Outreach	M	new	Research the efficacy of tidal marsh conversion	M3M4			Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Livestock Farming and Ranching, Utility and Service Lines
M	186	Tidal Marsh	Public Outreach	M	new	Provide outreach and education to planners, developers, and homeowners about best management practices for site design, property maintenance, and landscaping adjacent to tidal marshes and their buffers	M1	M10		Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Livestock Farming and Ranching, Utility and Service Lines
M	187	Tidal Marsh	Public Outreach	M	on-going	Provide outreach and education to homeowners and municipalities regarding proper installation, maintenance, and removal of septic systems	M10	M1		Agricultural and Forestry Effluents, Domestic and Urban Waste Water, Industrial and Military Effluents, Storms and Flooding
M	189	Tidal Marsh	Public Outreach	M	on-going	Increase outreach and education on preventing the spread of invasive/problematic species and diseases in intertidal, subtidal, and tidal marsh habitats	M7			Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases
M	190	Tidal Marsh	Public Outreach	M	new	Provide incentives for converting land into tidal marsh or protecting existing tidal marsh	M7			Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Livestock Farming and Ranching, Utility and Service Lines

Table 4-16. *continued: page 28 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
M	193	Tidal Marsh	Public Outreach	M	on-going	Deploy signage to notify recreationalists to the sensitivity of tidal marsh habitat	M10			Recreational Activities
M	184	Tidal Marsh	Research	M	on-going	Research and model marsh migration scenarios resulting from sea level rise	M10			Habitat Shifting or Alteration
M	177	Tidal Marsh	Survey and Monitoring	H	on-going	Build upon and coordinate with existing monitoring efforts to establish a long term tidal marsh monitoring program, with emphasis on assessing sediment dynamics in the context of sea level rise	M3M4			Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Livestock Farming & Ranching, Utility & Service Lines
M	191	Tidal Marsh	Survey and Monitoring	H	on-going	Develop monitoring systems and rapid response plans to prevent the colonization of invasive/problematic species and diseases in intertidal, subtidal, and tidal marsh habitats	M5	M3M4		Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases
M	185	Tidal Marsh	Survey and Monitoring	M	on-going	Continue and expand monitoring programs that track tidal marsh changes over time	M3M4			Habitat Shifting or Alteration
TW	322	Floodplain Forests	Habitat Mgmt.	H	new	Encourage conservation owners to address floodplain forests in management plans	TW9			Dams & Water Management/Use, Invasive Non-native/Alien Species/Diseases, Logging & Wood Harvesting
TW	327	Floodplain Forests	Habitat Mgmt.	H	on-going	Conserve at-risk high value floodplain forests using a variety of voluntary approaches	TW8			Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	323	Floodplain Forests	Habitat Mgmt.	M	New	Work collaboratively with the Maine Forest Service and other partners to review current Maine Forestry Best Management Practices to determine if floodplain forest SGCN are adequately considered and revise, if needed	TW10			Logging and Wood Harvesting

Table 4-16. *continued: page 29 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	324	Floodplain Forests	Habitat Mgmt.	M	New	Work collaboratively with the Maine Forest Service and other partners to develop logging and wood harvesting Habitat Management Guidelines for sensitive floodplain forest SGCN, if needed	TW10			Logging and Wood Harvesting
TW	325	Floodplain Forests	Habitat Mgmt.	M	new	Work with forest landowners to implement revised Habitat Management Guidelines in floodplain forests	TW10	TW1		Logging and Wood Harvesting
TW	328	Floodplain Forests	Habitat Mgmt.	M	new	Support floodplain forest management in forest certification program	TW10			Logging and Wood Harvesting
TW	339	Floodplain Forests	Habitat Mgmt.	M	new	Support efforts to restore hydrologic connections to floodplain forests isolated by roads	TW8	TW2	TW5	Roads and Railroads
TW	341	Floodplain Forests	Habitat Mgmt.	M	new	Support statewide invasive species monitoring and education programs in floodplain forests	TW6			Invasive Non-native/Alien Species/Diseases
TW	333	Floodplain Forests	Policy	H	on-going	Support incentives that discourage conversion of floodplain forests to other uses	TW2			Annual & Perennial Non-timber crops, Logging & Wood Harvesting
TW	334	Floodplain Forests	Policy	H	on-going	Improve non-federal match ratio for floodplain forest conservation projects	TW2			Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Logging & Wood Harvesting
TW	335	Floodplain Forests	Policy	H	on-going	Support habitat incentive programs by providing additional technical assistance for SGCN habitat management in floodplain forests	TW2			Annual & Perennial Non-timber crops, Logging & Wood Harvesting

Table 4-16. *continued: page 30 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	337	Floodplain Forests	Policy	H	on-going	Collaborate with partners to develop state landowner incentive programs for floodplain forests	TW2			Annual & Perennial Non-timber crops, Housing & Urban Areas, Logging & Wood Harvesting
TW	338	Floodplain Forests	Policy	M	new	Consider buffers to floodplain forests in prioritizing conservation opportunities	TW8	TW2		Agricultural and Forestry Effluents, Annual and Perennial Non-timber crops
TW	340	Floodplain Forests	Policy	M	new	Find sources of non-federal match for federal programs offering riparian easements (e.g., USDA-Conservation Reserve Enhancement Program) especially for floodplain forests	TW2	TW8		Agricultural and Forestry Effluents, Annual and Perennial Non-timber crops, Logging and Wood Harvesting
TW	343	Floodplain Forests	Policy	M	new	Account for deer impacts to SGCN habitats in southern Maine floodplains during deer management planning process	TW7			Problematic Native Species/Diseases
TW	331	Floodplain Forests	Public Outreach	H	new	Provide high value floodplain location information to municipalities and land trusts	TW1			Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Domestic & Urban Waste Water, Housing & Urban Areas, Industrial & Military Effluents, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	329	Floodplain Forests	Public Outreach	M	new	Consider mapping SGCN habitats within floodplains	TW1			Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Logging and Wood Harvesting, Roads and Railroads, Utility and Service Lines
TW	332	Floodplain Forests	Public Outreach	M	new	Develop outreach materials focused on community benefits derived from floodplain forests	TW1			Commercial and Industrial Areas, Housing and Urban Areas

Table 4-16. *continued: page 31 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	342	Floodplain Forests	Survey and Monitoring	M	new	Identify aggressive invasives in floodplain forests and pre-treat to prevent spread	TW6			Invasive Non-native/Alien Species/Diseases
TW	62	Freshwater Marshes	Habitat Mgmt.	H	on-going	Conserve freshwater marsh buffers using a variety of voluntary approaches	TW8	TW5		Agricultural & Forestry Effluents, Commercial & Industrial Areas , Domestic & Urban Waste Water, Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	59	Freshwater Marshes	Habitat Mgmt.	M	new	Target invasive species control at high value wetlands	TW6			Invasive Non-native/Alien Species/Diseases
TW	64	Freshwater Marshes	Habitat Mgmt.	M	on-going	Encourage conservation of freshwater marshes and other high value SGCN wetland habitats using a variety of approaches	TW8			Commercial and Industrial Areas , Housing and Urban Areas, Roads and Railroads, Utility and Service Lines
TW	66	Freshwater Marshes	Habitat Mgmt.	M	new	Work collaboratively with partners to develop water control level standards for freshwater marshes in wildlife management areas	TW9	TW10		Annual and Perennial Non-timber crops, Habitat Shifting or Alteration, Livestock Farming and Ranching
TW	68	Freshwater Marshes	Policy	M	on-going	Support incentives for agricultural practices that benefit freshwater marshes	TW2			Annual and Perennial Non-timber crops, Livestock Farming and Ranching
TW	61	Freshwater Marshes	Public Outreach	H	on-going	Provide information to municipalities and land trusts on high priority freshwater wetlands near or bisected by roads	TW1	TW5		Agricultural & Forestry Effluents, Commercial & Industrial Areas , Domestic & Urban Waste Water, Livestock Farming & Ranching, Roads & Railroads, Utility & Service Lines
TW	60	Freshwater Marshes	Survey and Monitoring	C	new	Identify high priority road segments/culverts for organism passage among freshwater wetlands	TW1	TW5		Roads & Railroads

Table 4-16. *continued: page 32 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	345	Grassland-shrubland-early Successional	Habitat Mgmt.	C	on-going	Promote management of grasslands, shrublands, and early successional SGCN habitats on conservation lands, wildlife management areas, etc.	TW9	TW3	TW4	Annual & Perennial Non-timber crops, Other Ecosystem Modifications
TW	346	Grassland-shrubland-early Successional	Habitat Mgmt.	H	new	Focus conservation of grassland, shrub, and early successional SGCN habitat in areas not in conflict with landowner economics and are compatible with existing management practices	TW3	TW2	TW4	Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas
TW	351	Grassland-shrubland-early Successional	Habitat Mgmt.	H	on-going	Encourage conservation of grass/shrub habitats using a variety of voluntary approaches	TW8	TW3	TW2	Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Utility & Service Lines
TW	344	Grassland-shrubland-early Successional	Habitat Mgmt.	M	on-going	Promote Integrated Pest Management to reduce pesticide use in blueberry barrens	TW7	TW6	TW3	Annual and Perennial Non-timber crops
TW	349	Grassland-shrubland-early Successional	Habitat Mgmt.	M	on-going	Work collaboratively with partners to develop best management practices for retaining a shrub component around agricultural fields	TW3	TW10		Annual and Perennial Non-timber crops
TW	350	Grassland-shrubland-early Successional	Policy	H	new	Research the practicality and feasibility of term easements for grassland, shrub, and early-successional SGCN habitats	TW8	TW3	TW2	Annual & Perennial Non-timber crops, Housing & Urban Areas, Utility & Service Lines
TW	352	Grassland-shrubland-early Successional	Policy	H	new	Establish formal assurance agreements for landowners managing for SGCN (e.g., Safe Harbor Agreements) in grassland, shrub, and early successional habitats	TW2	TW3	TW4	Annual & Perennial Non-timber crops, Housing & Urban Areas, Utility & Service Lines
TW	353	Grassland-shrubland-early Successional	Policy	H	on-going	Support habitat incentive programs by providing additional technical assistance for SGCN habitat management in grasslands, shrublands, and early-successional habitats	TW2	TW3	TW4	Annual & Perennial Non-timber crops, Housing & Urban Areas, Utility & Service Lines

Table 4-16. *continued: page 33 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	354	Grassland-shrubland-early Successional	Policy	M	on-going	Provide better forgone income incentives (e.g., deferred harvest of hay, deferred grazing of portions of pasture, harvest trees earlier than usual) to encourage grassland, shrub, and early successional habitat management practices beneficial to SGCN	TW2	TW3	TW4	Annual and Perennial Non-timber crops
TW	361	Grassland-shrubland-early Successional	Policy	M	new	Work with municipalities/towns to reduce conflicts that impede needed habitat management in grasslands, shrublands, and early successional SGCN habitat	TW3	TW2	TW4	Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Utility and Service Lines
TW	357	Grassland-shrubland-early Successional	Public Outreach	M	on-going	Promote community and land trust stewardship of grassland, shrub, and early-successional SGCN habitats through outreach programs	TW1	TW3	TW9	Commercial and Industrial Areas , Housing and Urban Areas
TW	358	Grassland-shrubland-early Successional	Public Outreach	M	on-going	Target outreach to Soil Water Conservation Districts, Maine Farmland Trust, landowners, and others on the importance of grasslands, shrublands, and early successional SGCN habitats	TW3	TW1	TW10	Annual and Perennial Non-timber crops, Housing and Urban Areas
TW	359	Grassland-shrubland-early Successional	Public Outreach	M	on-going	Incorporate more public outreach information on multiple species (e.g., not just New England Cottontail) that are declining due to lack of suitable grassland, shrub, or early successional habitat	TW3	TW1	TW10	Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Roads and Railroads, Utility and Service Lines
TW	360	Grassland-shrubland-early Successional	Public Outreach	M	new	Reinforce and acknowledge good management practices by utility companies along utility corridors that contain grasslands, shrublands, and early successional SGCN habitats	TW3	TW4		Utility and Service Lines
TW	362	Grassland-shrubland-early Successional	Public Outreach	M	on-going	Deploy improved signage promoting conservation of grassland, shrub, early successional habitats, and their associated SGCN	TW3	TW1		Annual and Perennial Non-timber crops, Housing and Urban Areas
TW	363	Grassland-shrubland-early Successional	Public Outreach	M	on-going	Promote better communication tools and training on grassland/shrub habitat conservation	TW3			Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Roads and Railroads, Utility and Service Lines

Table 4-16. *continued: page 34 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	364	Grassland-shrubland-early Successional	Public Outreach	M	new	Establish and promote demonstration areas highlighting habitat management for grassland, shrub, and early successional SGCN	TW3			Annual and Perennial Non-timber crops, Commercial and Industrial Areas , Housing and Urban Areas, Utility and Service Lines
TW	347	Grassland-shrubland-early Successional	Survey and Monitoring	C	new	Research and identify explicit areas and amounts of grassland, shrub, and early successional habitats needed to conserve target SGCN	TW1	TW3	TW4	Housing & Urban Areas, Utility & Service Lines, Annual & Perennial Non-timber crops, Commercial & Industrial Areas
TW	348	Grassland-shrubland-early Successional	Survey and Monitoring	H	on-going	Assist municipal efforts to identify key grassland, shrub, and early successional SGCN habitats	TW1	TW3	TW4	Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Utility & Service Lines
TW	355	Grassland-shrubland-early Successional	Survey and Monitoring	H	new	Map and distribute information on existing ruderal habitats likely to be high value for SGCN	TW1	TW3	TW4	Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	356	Grassland-shrubland-early Successional	Survey and Monitoring	H	new	Map potential ruderal habitats likely to be high value for SGCN	TW1	TW3	TW4	Annual & Perennial Non-timber crops, Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	35	Northern Forests and Swamps	Habitat Mgmt.	C	on-going	Encourage conservation of northern forest and swamp habitats, including late successional forests, using a variety of approaches such as easements and leases	TW8			Commercial & Industrial Areas , Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Tourism & Recreational Areas, Utility & Service Lines
TW	36	Northern Forests and Swamps	Habitat Mgmt.	C	new	Provide support for landowner incentives for SGCN habitat management in northern forests and swamps and south-central forests and swamps	TW2			Commercial & Industrial Areas , Logging & Wood Harvesting, Roads & Railroads, Tourism & Recreational Areas, Utility & Service Lines
TW	42	Northern Forests and Swamps	Habitat Mgmt.	C	on-going	Offer collaboration and technical expertise to forest certification systems for a subset of applicable SGCN and their forest habitats	TW10	TW2		Logging & Wood Harvesting

Table 4-16. *continued: page 35 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	43	Northern Forests and Swamps	Habitat Mgmt.	C	new	Collaborate with forest landowners and managers to discuss options for voluntary integration of SGCN habitat conservation actions into outcome-based forestry practices	TW10	TW2		Logging & Wood Harvesting
TW	33	Northern Forests and Swamps	Habitat Mgmt.	H	on-going	Consider alternate chemicals or techniques to control invasive species and diseases in northern forests and swamps (especially spruce budworm) and south-central forests and swamps	TW7	TW6		Problematic Native Species/Diseases, Invasive Non-native/Alien Species/Diseases
TW	40	Northern Forests and Swamps	Policy	C	new	Provide support for existing tree growth tax law to discourage conversion of northern forest and swamp SGCN habitats to other non-forested land types	TW2	TW5		Commercial & Industrial Areas , Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	26	Northern Forests and Swamps	Public Outreach	C	new	Provide outreach to landowners and the public on the effects of roads on northern forest and swamp SGCN habitats	TW1			Roads & Railroads
TW	44	Northern Forests and Swamps	Public Outreach	C	on-going	Provide outreach and education to the general public on the importance of societal consumption of forest products for providing SGCN habitat through forest habitat management	TW1			Logging & Wood Harvesting
TW	21	Northern Forests and Swamps	Public Outreach	M	on-going	Increase outreach and education to the public and landowners on the role of fire in maintaining northern forest and swamp SGCN habitats	TW4	TW1		Fire and Fire Suppression, Habitat Shifting or Alteration
TW	45	Northern Forests and Swamps	Public Outreach	M	on-going	Provide outreach and education to recreationalists on reducing impacts to northern forest and swamp SGCN habitats	TW1			Recreational Activities, Tourism and Recreational Areas
TW	20	Northern Forests and Swamps	Research	C	new	Continue research to better understand and mitigate impacts of climate change on northern forest and swamp SGCN habitats	TW11	TW5		Habitat Shifting or Alteration

Table 4-16. *continued: page 36 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	31	Northern Forests and Swamps	Survey and Monitoring	C	new	Assess conserved lands, especially northern forests and swamps and rocky summits/outcrops/mountaintops, for climate change resiliency and use this information to guide future conservation efforts	TW5			Habitat Shifting or Alteration
TW	32	Northern Forests and Swamps	Survey and Monitoring	C	new	Identify and conserve through a variety of voluntary approaches boreal forest refugia associated with SGCN	TW5			Habitat Shifting or Alteration
TW	30	Northern Forests and Swamps	Survey and Monitoring	H	on-going	Continue stewardship/habitat monitoring on conserved northern forest and swamp lands	TW9	TW11		Recreational Activities
TW	34	Northern Forests and Swamps	Survey and Monitoring	H	on-going	Continue monitoring for invasive and problematic species and diseases, especially forest insect pests, in northern forest and swamps and south-central forests and swamps	TW6	TW7		Invasive Non-native/Alien Species/Diseases, Problematic Native Species/Diseases
TW	38	Northern Forests and Swamps	Survey and Monitoring	H	on-going	Continue long-term monitoring of SGCN habitat condition and forest structure in northern forests and swamps through programs such as the annual Forest Inventory and Analysis	TW11	TW4		Commercial & Industrial Areas , Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	48	Pine Barrens	Habitat Mgmt.	H	on-going	Encourage conservation of pine barrens through a variety of voluntary approaches	TW8	TW5		Annual & Perennial Non-timber crops, Recreational Activities
TW	49	Pine Barrens	Habitat Mgmt.	M	new	Provide support for property tax incentives to encourage pine barren habitat management on private land	TW2	TW5		Annual and Perennial Non-timber crops, Recreational Activities
TW	56	Pine Barrens	Habitat Mgmt.	M	new	Recognize pine barren landowners for effective habitat management	TW2	TW5	TW1	Fire and Fire Suppression, Invasive Non-native/Alien Species/Diseases, Recreational Activities

Table 4-16. *continued: page 37 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	58	Pine Barrens	Habitat Mgmt.	M	new	Use a variety of incentives to conserve or buffers surrounding pine barrens	TW8	TW5		Commercial and Industrial Areas , Housing and Urban Areas, Mining and Quarrying, Roads and Railroads, Utility and Service Lines
TW	52	Pine Barrens	Policy	C	new	Secure stable funding for fire management in pine barrens	TW2			Fire & Fire Suppression
TW	53	Pine Barrens	Policy	C	new	Provide cost-share for mechanical treatments where fire management is not practical in pine barrens	TW9	TW2		Fire & Fire Suppression
TW	54	Pine Barrens	Policy	C	new	Use agreements (e.g., MOU's) and partnerships to increase fire management capacity in pine barrens	TW9	TW2		Fire & Fire Suppression
TW	55	Pine Barrens	Policy	C	new	Promote inter-agency prescribed fire training and assistance in pine barrens	TW9	TW2		Fire & Fire Suppression
TW	57	Pine Barrens	Public Outreach	M	new	Develop outreach/education to municipal planners and land trusts on the importance of pine barrens and the positive effects of fire and mechanical management on biodiversity	TW1	TW5		Fire and Fire Suppression, Invasive Non-native/Alien Species/Diseases, Recreational Activities, Utility and Service Lines
TW	17	Rocky Summits-Outcrops-Mountaintops	Public Outreach	H	on-going	Provide outreach and education to recreationalists on reducing impacts to rocky summits, outcrops, and mountaintop SGCN habitats	TW1	TW8		Recreational Activities
TW	16	Rocky Summits-Outcrops-Mountaintops	Research	C	new	Continue research to better understand and mitigate impacts of climate change on rocky summits, outcrops, and mountaintop SGCN habitats	TW11	TW5		Habitat Shifting or Alteration

Table 4-16. *continued: page 38 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	15	Rocky Summits-Outcrops-Mountaintops	Survey and Monitoring	C	new	Assess conserved lands, especially northern forests and swamps and rocky summits/outcrops/mountaintops, for climate change resiliency and use this information to guide future conservation efforts	TW5			Habitat Shifting or Alteration
TW	18	Rocky Summits-Outcrops-Mountaintops	Survey and Monitoring	H	on-going	Continue habitat/recreational monitoring stewardship on conserved rocky summit, outcrop, and mountaintop SGCN habitats	TW11			Recreational Activities
TW	65	South-Central Forests and Swamps	Habitat Mgmt.	C	new	Provide landowner incentives for SGCN habitat management in northern forests and swamps and south-central forests and swamps	TW2			Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	67	South-Central Forests and Swamps	Habitat Mgmt.	H	on-going	Identify, map, and provide information to the public on SGCN habitats in south-central forests and swamps	TW1			Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	69	South-Central Forests and Swamps	Habitat Mgmt.	H	new	Work collaboratively with partners to develop and distribute habitat management guidelines for south-central forests and swamp SGCN habitats	TW1	TW10		Commercial & Industrial Areas , Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	63	South-Central Forests and Swamps	Habitat Mgmt.	M	on-going	Encourage conservation of south-central forest and swamp habitats using a variety of approaches such as easements and leases	TW8			Commercial and Industrial Areas , Housing and Urban Areas, Recreational Activities, Roads and Railroads, Utility and Service Lines
TW	80	South-Central Forests and Swamps	Habitat Mgmt.	M	on-going	Collaborate with on-going invasive species eradication/early identification efforts in south central forest and swamp SGCN habitats	TW6			Invasive Non-native/Alien Species/Diseases
TW	70	South-Central Forests and Swamps	Public Outreach	C	on-going	Increase outreach and education to landowners, municipal staff, town council/selectman, and other members of the public on the effects of development (e.g., housing, roads, utility lines) on south-central forest and swamp SGCN habitats	TW1			Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines

Table 4-16. *continued: page 39 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	72	South-Central Forests and Swamps	Public Outreach	H	on-going	Develop outreach and location information on SGCN habitats in south-central forests and swamps for land trusts, municipalities, and landowners	TW1			Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	77	South-Central Forests and Swamps	Public Outreach	H	on-going	Increase outreach and education to the public, landowners, and hunters and trappers on the effects of over-abundant native species (e.g., deer, beaver) on south-central forest and swamp SGCN habitats	TW7	TW1		Problematic Native Species/Diseases of Unknown Origin
TW	76	South-Central Forests and Swamps	Public Outreach	M	new	Provide spatial information on invasive species to landowners, towns, land trusts, etc., especially for south-central forest and swamp SGCN habitats	TW6	TW1		Invasive Non-native/Alien Species/Diseases
TW	73	South-Central Forests and Swamps	Research	H	on-going	Consider alternate chemicals or techniques to control invasive species and diseases in northern forests and swamps (especially for spruce budworm) and south-central forests and swamps	TW6			Invasive Non-native/Alien Species/Diseases
TW	78	South-Central Forests and Swamps	Species Mgmt.	C	on-going	Increase deer hunting/beaver trapping opportunity to reduce impacts of these species on south-central forest and swamp SGCN habitats	TW7			Problematic Native Species/Diseases
TW	79	South-Central Forests and Swamps	Species Mgmt.	H	on-going	Account for deer/beaver impacts to SGCN habitats in south-central forests and swamps during species management planning process	TW7			Problematic Native Species/Diseases
TW	71	South-Central Forests and Swamps	Survey and Monitoring	H	on-going	Undertake long-term monitoring of SGCN and their habitats in south-central forests and swamps	TW11			Commercial & Industrial Areas , Housing & Urban Areas, Roads & Railroads, Utility & Service Lines
TW	74	South-Central Forests and Swamps	Survey and Monitoring	H	on-going	Continue monitoring for invasive and problematic species and diseases, especially forest insect pests, in northern forests and swamps and south-central forests and swamps	TW6	TW7	TW11	Invasive Non-native/Alien Species/Diseases, Problematic Native Species

Table 4-16. *continued: page 40 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	75	South-Central Forests and Swamps	Survey and Monitoring	M	new	Partner with state and local agencies to identify invasive plant "hotspots" along roads and bridges, especially in south-central forests and swamps	TW6			Invasive Non-native/Alien Species/Diseases
TW	9	Vernal Pools	Habitat Mgmt.	C	on-going	Encourage conservation of high value vernal pool complexes using a variety of voluntary approaches	TW8	TW5		Commercial & Industrial Areas , Habitat Shifting or Alteration, Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	2	Vernal Pools	Habitat Mgmt.	M	new	Identify on-going opportunities/partnerships for invasive plant species management in vernal pools	TW6			Invasive Non-native/Alien Species/Diseases
TW	14	Vernal Pools	Habitat Mgmt.	M	on-going	Continue work with forestry community on vernal pool Habitat Management Guidelines	TW1	TW10		Logging and Wood Harvesting
TW	4	Vernal Pools	Policy	H	new	Develop vernal pool organism passage recommendations for new and existing road crossing structures	TW5	TW8		Roads & Railroads
TW	7	Vernal Pools	Public Outreach	M	on-going	Update statewide roads and riparian connectivity layer and include models specific to SGCN	TW1			Commercial and Industrial Areas , Habitat Shifting or Alteration, Housing and Urban Areas, Roads and Railroads, Utility and Service Lines
TW	12	Vernal Pools	Public Outreach	M	on-going	Use event-specific (e.g., big night, turtle nesting) outreach to draw greater public attention to vernal pools	TW1			Housing and Urban Areas, Roads and Railroads
TW	13	Vernal Pools	Public Outreach	M	new	Integrate the positive impacts of vernal pools (e.g., economic benefits and relation to game species) into vernal pool outreach messaging	TW1			Commercial and Industrial Areas , Housing and Urban Areas, Roads and Railroads, Utility and Service Lines

Table 4-16. *continued: page 41 of 41.*

Habitat Workgroup	Action ID#	Habitat Group	Action Category	Biol. Priority	Action Type	Description	Theme 1	Theme 2	Theme 3	Stressors Addressed*
TW	6	Vernal Pools	Research	C	new	Identify connectivity hotspots among developable high value vernal pools, pool complexes, and non-breeding habitat	TW1			Commercial & Industrial Areas , Habitat Shifting or Alteration, Logging & Wood Harvesting, Roads & Railroads
TW	8	Vernal Pools	Research	H	new	Research vernal pool remote sensing techniques and field verify on public lands	TW1			Commercial & Industrial Areas , Habitat Shifting or Alteration, Housing & Urban Areas, Logging & Wood Harvesting, Roads & Railroads, Utility & Service Lines
TW	10	Vernal Pools	Research	H	on-going	Identify and implement research opportunities exploring ecosystem requirements of specialized vernal pool taxa	TW11			Commercial & Industrial Areas , Droughts, Habitat Shifting or Alteration, Housing & Urban Areas, Roads & Railroads, Storms & Flooding, Temperature Extremes, Utility & Service Lines
TW	1	Vernal Pools	Research	M	new	Research and identify likely climate change impacts to high value vernal pools	TW5	TW8	TW10	Droughts, Habitat Shifting or Alteration, Storms and Flooding, Temperature Extremes
TW	3	Vernal Pools	Research	M	new	Identify and implement research opportunities investigating effects of invasive species on vernal pool organisms and hydrology	TW6	TW11		Invasive Non-native/Alien Species/Diseases, Roads and Railroads

Table 4-17. Habitat conservation actions by Action Category.

Habitat Category	Habitat Management	Policy	Public Outreach	Research	Species Management	Survey and Monitoring	Total
Freshwater	5	16	19	5	2	7	**54**
Marine / Coastal	47	33	37	32	0	16	**165**
Terrestrial / Freshwater Wetlands	34	19	24	8	2	16	**103**
Total	**86**	**68**	**80**	**45**	**4**	**39**	**322**

Table 4-18. Habitat conservation actions by Type.

Habitat Category	New	On-going	Total
Freshwater	30	24	**54**
Marine / Coastal	33	132	**165**
Terrestrial / Freshwater Wetlands	54	49	**103**
Total	**117**	**205**	**322**

Table 4-19. Habitat conservation actions by Biological Priority.

Habitat Category	Critical	High	Moderate	Total
Freshwater	6	37	11	**54**
Marine / Coastal	22	73	70	**165**
Terrestrial / Freshwater Wetlands	24	35	44	**103**
Total	**52**	**145**	**125**	**322**

4.3.4 DEVELOPMENT OF HABITAT THEMES

Given the volume of habitat conservation actions identified in the 2015 Wildlife Action Plan, habitat workgroups developed several themes to organize these actions into discrete packages of related actions that address common stressors or use similar techniques (Table 4-20). Actions within a theme are often complementary, and thus, simultaneously undertaking multiple actions within a theme may be the most effective and efficient use of limited conservation dollars. We assigned each habitat action to as many as three themes within its respective habitat workgroup (i.e., marine/coastal, terrestrial/freshwater wetlands, or freshwater aquatic habitats) with up to 36 actions per theme.

In order to better illustrate the connection between habitat actions and SGCN, we quantified the minimum number of SGCN likely to benefit from a given theme (Table 4-20). We use the term 'minimum' because we assume that habitat actions benefit most, if not all, SGCN associated with a given habitat; however, some species may derive greater benefit than others. We used the approach below to determine the minimum number of SGCN likely to benefit from each theme:

"Given the volume of habitat conservation actions identified in the 2015 Action Plan, habitat workgroups developed several themes to organize these actions into discrete packages of related actions that address common stressors or use similar techniques."

1. We identified all habitat macrogroups associated with a theme.

2. We identified the SGCN (by priority level) associated with each macrogroup. We counted SGCN associated with multiple macrogroups only once.

3. For Priority 1 and 2 SGCN, we identified species with stressors common to those addressed by the habitat theme.

    a. If we ranked the common stressor as moderate or high severity for the SGCN, we assumed the species would likely benefit from a habitat action addressing that stressor. We tallied these species in columns 'P1' and 'P2' of Table 4-20.

        i. For example, we identified Housing and Urban Areas as a severe stressor for Spotted Turtles (Priority 1 SGCN). A theme that includes actions addressing Housing and Urban Areas at the habitat scale would also benefit Spotted Turtles.

    b. If we ranked the common stressor as low severity for the SGCN, we assumed the species may benefit from a habitat theme addressing that stressor, but the link may not be as direct. We tallied these species in the column 'Total SGCN' of Table 4-20. In many cases, we did not assign low severity stressors to SGCN because they are unlikely to be priorities in the next ten years.

    c. We did not assign stressors to Priority 3 SGCN, but these species would likely benefit from habitat actions undertaken in their habitats. We tallied these species in the column 'Total SGCN' of Table 4-20.

Table 4-20. Habitat conservation action themes.

Code	Theme Description (Total No. Conservation Actions per Theme)	Habitat Groups Directly Addressed by Theme	Min. No. of SGCN Likely to Benefit from a Theme		
			P1[1]	P2[1]	Total SGCN[2]
Freshwater Aquatic Themes					
F1 Mapping and Outreach[3]	Map the distribution of SGCN, their habitats, and their stressors, and provide this information to landowners, land trusts, municipal governments, and conservation partners to aid in spatial planning (14)	Streams; Rivers; Lakes; Ponds	20	27	72
F2 Connectivity[3]	Maintain and improve (where practicable) connectivity for SGCN and their habitats through mapping, outreach, and town/municipal collaboration while considering impacts of climate change and invasive species (19)	Streams; Rivers; Lakes; Ponds	20	27	72
F3 Invasive Species[3]	Monitor, contain, and control the spread of invasive species that negatively impact SGCN or their habitats through surveys, research, public outreach, habitat management, and reclamation (7)	Streams; Rivers; Lakes; Ponds	0	0	72
F4	Maintain and restore (where practicable) riparian habitats used by SGCN by providing technical assistance and education to municipalities and natural resource professionals, providing technical assistance and incentives to landowners, and collaborating with interested parties to develop BMPs, in order to mitigate climate change and land-use effects (10)	Streams; Rivers; Lakes; Ponds	20	27	72
F5	Reduce pollution and degradation of important SGCN habitats by working with landowners and municipalities to improve wastewater treatment and reduce impacts from development near lake and river shores (10)	Streams; Rivers; Lakes; Ponds	20	27	72
F6	Improve passage of fish SGCN at dams by providing outreach and technical assistance to dam owners and operators, researching fish behavior and alternative technologies, and conducting a statewide inventory of dams (11)	Streams; Rivers; Lakes; Ponds	20	27	72
Marine Themes					
M1 Mapping and Outreach[3]	Map and provide outreach/technical assistance for SGCN occurrence and habitat location information for marine spatial planning and other uses (32)	Intertidal; Subtidal; Tidal marsh; Rocky coast; Coastal	25	62	108
M2	Research, implement, and provide outreach/technical assistance for new and underutilized technologies designed to reduce impacts to SGCN habitats including, but not limited to, litter reduction, ghost gear removal, bycatch reduction, pollution mitigation, climate change and ocean acidification, alternative energies, and aquaculture (34)	Intertidal; Subtidal; Tidal marsh	25	62	104
M3M4	Research the effects of climate change on SGCN and their habitats and incorporate this information and other climate change concepts (e.g., buffering for marsh migration and extreme storms) into coastal development and infrastructure planning, spatial modeling, fishable stock management, habitat restoration, and other efforts to reduce impacts of climate change to SGCN, SGCN habitats, and coastal communities (36)	Intertidal; Subtidal; Tidal marsh; Rocky coast; Coastal	25	62	108

Table 4-20. *continued: page 2 of 4.*

Code	Theme Description (Total No. Conservation Actions per Theme)	Habitat Groups Directly Addressed by Theme	Min. No. of SGCN Likely to Benefit from a Theme		
			P1[1]	P2[1]	Total SGCN[2]
Marine Themes (continued)					
M5 Connectivity[3]	Maintain and improve habitat connectivity while also considering impacts of climate change for SGCN aquatic organisms through mapping, outreach, town/municipal collaboration, and voluntary habitat conservation (23)	Intertidal; Subtidal; Tidal marsh; Coastal	18	48	107
M6	Conduct law enforcement training and workshops to support knowledge of SGCN and their habitats (11)	Intertidal; Subtidal; Tidal marsh; Rocky coast	23	54	105
M7 Invasive Species[3]	Monitor, contain, and control the spread of invasive species that are negatively affecting SGCN habitats through research, management, public outreach, and enforcement of existing policies and regulations (14)	Intertidal; Subtidal; Tidal marsh; Rocky coast	25	62	105
M8	Minimize impacts to SGCN waterbird feeding, roosting and nesting habitats from activities including but not limited to fishing and recreation (11)	Intertidal; Rocky coast; Coastal	14	26	66
M9	Evaluate and implement new and existing methods to monitor and manage commercial and recreational harvest of SGCN to ensure ecological sustainability (including ecosystem or bay scale management) (19)	Intertidal; Subtidal	23	54	93
M10	Minimize loss of marine SGCN habitats due to development (e.g., structures, dwellings, docks, piers, aquaculture facilities, and marinas) and mitigate for associated impacts such as contaminants (e.g., oil, gas, and chemical spills) and disturbance associated with human activity (30)	Intertidal; Subtidal; Tidal marsh; Coastal; Rocky coast	25	62	108
Terrestrial/Freshwater Wetland Themes					
TW1 Mapping and Outreach[3]	Identify, map, distribute information, and provide technical assistance and outreach to landowners, towns, land trusts, etc. on the location and management of selected high-value, at-risk habitats important to the conservation of SGCN (33)	Vernal pools; South-central forests and swamps; Grassland, shrubland, early successional; Pine barrens; Freshwater marshes; Floodplain forest	23	64	139
TW2	Identify potential additions or improvements to existing financial and non-financial incentives to encourage landowner participation in the restoration, retention, and management of habitats important to SGCN, analyze these ideas for effectiveness, and encourage implementation of those with the greatest potential for use and benefit (26)	Northern forests and swamps; South-central forests and swamps; Grassland, shrubland, early successional; Pine barrens; Freshwater marshes; Floodplain forest	22	60	147
TW3	Identify opportunities for expansion of ruderal habitat in southern Maine, which includes determining the amount needed for SGCN conservation, identifying where habitat expansion could most practically occur, and collaborating with conservation partners to develop habitat management guidelines (21)	Grassland, shrubland, early successional	11	25	57

Table 4-20. *continued: page 3 of 4.*

Code	Theme Description (Total No. Conservation Actions per Theme)	Habitat Groups Directly Addressed by Theme	Min. No. of SGCN Likely to Benefit from a Theme		
			P1[1]	P2[1]	Total SGCN[2]
Terrestrial/Freshwater Wetland Themes (continued)					
TW4	Identify opportunities for expansion of early successional forest habitats in southern Maine and ecologically mature forests in northern Maine needed by SGCN dependent on those habitats, which includes determining the amount needed, and collaborating with conservation partners to develop habitat management guidelines (13)	Northern forests and swamps; Grassland, shrubland, early successional	19	51	108
TW5 Connectivity[3]	Facilitate the persistence and range expansion of SGCN in Maine in the face of a changing climate by ensuring landscape connectivity (both terrestrial and aquatic) through reducing habitat fragmentation and promoting the voluntary conservation of diverse and resilient landscapes and watersheds (18)	Northern forests and swamps; Pine barrens; Freshwater marshes; Rocky summits, outcrops; Vernal pools	22	64	130
TW6 Invasive Species[3]	Monitor, prevent, contain, and control invasive species (plant and animal) and diseases with potential for significant detrimental impact on SGCN and their primary habitats (13)	Vernal pools; Northern forests and swamps; South-central forests and swamps; Freshwater marshes; Floodplain forests; Grasslands, shrublands, early successional	3	3	143
TW7	Monitor and manage the impact of problematic native species and diseases on SGCN and their habitats (8)	Northern forests and swamps; South-central forests and swamps; Floodplain forest; Grasslands, shrublands, early successional	0	0	130
TW8	Minimize habitat loss and fragmentation by guiding detrimental land-use activities away from the most sensitive and limited SGCN habitats and by conserving lands and buffers surrounding sensitive SGCN habitats (16)	Freshwater marshes; Grasslands, shrublands, early successional; Northern forests and swamps; Pine barrens, South-central forests and swamps; Vernal pools; Floodplain forests	25	68	147
TW9	Promote voluntary SGCN habitat management on both private and public lands, especially habitats that are limited and hard to manage economically, such as ruderal habitats, grasslands, pine barrens, floodplains, early and late successional forest habitats (8)	Pine barrens; Rocky summits, outcrops; Grasslands, shrublands, early successional; Northern forests and swamps; Freshwater marshes; Floodplain forest	11	29	144
TW10	Collaborate with conservation partners to develop habitat management guidelines for SGCN and encourage their voluntary incorporation into forest certification systems and outcome-based forestry (13)	Vernal pools; Northern forests and swamps; Floodplain forest; South-central forests and swamps	14	40	76

Table 4-20. *continued: page 4 of 4.*

Code	Theme Description (Total No. Conservation Actions per Theme)	Habitat Groups Directly Addressed by Theme	Min. No. of SGCN Likely to Benefit from a Theme		
			P1[1]	P2[1]	Total SGCN[2]
Terrestrial/Freshwater Wetland Themes (continued)					
TW11	Conduct biological monitoring as required to guide the conservation of SGCN and their habitats especially for habitats requiring active management (e.g., grasslands, shrublands, early successional habitats) or are vulnerable to adjacent activities (9)	Grasslands, shrublands, early successional; vernal pools, Northern forests and swamps; South-central forests and swamps; Rocky summits, outcrops	22	60	134

[1]SGCN included in this tally are most likely to benefit from a theme because actions within that theme address habitat stressors that also were identified as 'moderate' or 'severe' stressors at the species scale; SGCN for which a stressor was determined to be of 'slight' severity are not included in this tally.
[2]This is the total number of SGCN that occur in habitats addressed by a theme.
[3]Cell shading indicates a cross-cutting theme common among the three habitat categories; these cross-cutting themes are abbreviated as: 1) Mapping and Outreach, 2) Connectivity, and 3) Invasive Species

While the number of SGCN likely to benefit from themes can help readers assess the relative breadth of themes, these tallies should not be used to evaluate the relative merits of themes. For example, Terrestrial/Wetland Theme 8 (TW8) is broad (minimizing habitat loss and fragmentation by guiding detrimental land-use activities away from the most sensitive and limited SGCN habitats) and encompasses 16 actions, seven habitat groupings, and likely benefits a minimum of 25, 68, and 147 Priority 1, Priority 2, and total SGCN, respectively. In contrast, Terrestrial/Wetland Theme 7 (TW7) has a narrower scope (monitoring and managing impacts of problematic native species) in four terrestrial/wetland habitats. This theme likely benefits at least 160 SGCN associated with these habitats, but using our approach outlined above, does not link directly with any Priority 1 or Priority 2 SGCN. In this case, we identified Problematic Native Species as a moderate stressor in some habitats but ranked it as a low severity stressor (or not ranked at all) for SGCN associated with these habitats.

Three 'super-themes' emerged across habitat groups; actions included in these themes will likely benefit from coordinated efforts across habitats. The themes are:

1. **Connectivity:** This super-theme addresses habitat connectivity with a focus on facilitating the persistence and range expansion of SGCN and their habitats in the face of climate change. While Habitat Shifting and Alteration related to climate change was not a priority stressor for most SGCN, it is the second most common stressor assigned to habitat macrogroups. This super-theme also addresses other common causes of habitat fragmentation.

2. **Invasive Species:** Actions in this super-theme consist of monitoring, containment, and control of invasive species. We assigned the Invasive Non-native/Alien Species/Diseases stressor to the largest number of habitat macrogroups and it has the potential to affect nearly every habitat in Maine. This stressor also affects many SGCN.

Monitoring, containment, and control of invasive species, such as the Asiatic bittersweet (*Celastrus orbiculata*) pictured here, were identified as important conservation actions across SGCN habitats. © Maine Natural Areas Program.

3. **Mapping and Outreach:** Actions in this super-theme address mapping and outreach needs for SGCN and habitats. We identified Lack of Knowledge as a priority stressor for SGCN. For example, many marine SGCN distributions and habitats are largely unknown and therefore unmapped. Many negative effects of stressors can be minimized or avoided by simply knowing where SGCN and habitats are located and conveying this information to local decision makers, landowners, and conservation stewards.

4.4 PROGRAMMATIC CONSERVATION ACTIONS

MDIFW and the Steering Committee identified 11 programmatic actions to guide implementation and tracking of the 2015 Wildlife Action Plan (Table 4-21). Target start dates for each programmatic action (short-term: within the first few years of Plan implementation; mid-term: within the first half of Plan implementation; long-term: within the second half of Plan implementation) are given. We categorized programmatic actions as follows:

1. **Outreach and Engagement (Programmatic Actions 1-3):** Actions to inform and engage the public and partners on Action Plan accomplishments and opportunities for involvement. We describe these actions in Elements 7-8.

2. **Funding and Tracking (Programmatic Actions 4-8):** Actions to bolster funding, capacity, and tracking of SGCN-related projects. We discuss Programs 4 and 6 briefly below, Program 5 in Elements 7-8, and Programs 7 and 8 in Elements 5-6.

   a. **Program 4:** This action supports efforts to establish stable state and federal funding sources for SGCN and habitat conservation. At the state level, MDIFW and partners will continue to investigate stable funding sources for SGCN conservation.
   b. At the federal level, groups of conservation partners, such as Maine's Teaming with Wildlife Coalition (http://www.teaming.com/state-tribal-wildlife-grants-swg-program), may continue to seek sources of federal funding for SGCN conservation.
   c. **Program 6:** This action focuses on increasing long-term agency support for Wildlife Action Plan implementation. While many staff in MDIFW work on projects related to SGCN conservation, there currently are no dedicated SWAP staff or programs to coordinate Plan administration, tracking, or outreach.

> *"MDIFW and the Steering Committee identified 11 programmatic actions to help guide implementation and tracking of the 2015 Wildlife Action Plan."*

3. **Action Development (Programmatic Action 9):** This action relates to creating SMART (Specific, Measurable, Achievable, Results-oriented, and Time-bound) objectives for high priority SGCN and habitat conservation actions. We discuss this action in Elements 5-6.

4. **Regional Partnerships (Programmatic Actions 10-11):** These actions address continued MDIFW and partner involvement in existing conservation efforts.

   a. **Program 10:** This action supports efforts to identify new and update existing SGCN Conservation Opportunity Areas (COAs). One such effort is already underway. MDIFW, MNAP, MCP, MDMR and other partners are reviewing and revising Maine's Focus Areas of Statewide Ecological Significance. Focus Areas are 140 natural areas of statewide ecological significance that contain unusually rich concentrations of at-risk species and habitats (http://beginningwithhabitat.org/about_bwh/focusareas.html). These areas support rare plants, animals, and natural communities, high-quality common natural communities, significant wildlife habitats, and their intersections with large blocks of undeveloped habitat. We delineate Focus Area boundaries based on the species

and natural communities that occur within them and the supporting landscape conditions that contribute to the long-term viability of the species, habitats, and community types. MDIFW and partners are revising existing Focus Areas with 2015 SGCN distribution and habitat information and are exploring ways to incorporate resilient landscapes and connectivity among Focus Areas. We expect this revision to be completed within the first few years of this Plan's implementation. We also expect to create a framework that will guide and standardize periodic updates to Focus Areas.

MDIFW and conservation partners also are engaged in several on-going efforts to adapt broad-scale climate change resiliency information to local and regional scales. For example, MDIFW, MNAP, The Nature Conservancy (TNC), and the 10 partners of Mount Agamenticus to the Sea Conservation Initiative (MTA2C) are assessing the resilience of the MTA2C Focus Area using climate change resilience data and revised SGCN distribution information (http://www.osiny.org/site/DocServer/Catalyst_GranteesToDate_All.pdf?docID=14401). They will use the results of this project to inform local landscape planning and to serve as a model for other communities wishing to incorporate climate change information into their planning efforts. A similar effort also is underway in several Downeast Maine communities.

b. **Program 11:** This action supports MDIFW and partner participation in the Northeast Regional Conservation Needs (RCN) Grant Program. The RCN Grant Program addresses critical landscape-scale wildlife conservation needs by combining multi-state resources, leveraging funds, and regionally prioritizing SWAP conservation actions; http://rcngrants.org/content/northeast-regional-conservation-needs-grant-program). RCN grants funded several products (e.g., the Northeast Terrestrial Habitat Classification System [Anderson et al. 2013]) used in Maine's 2015 Wildlife Action Plan. MDIFW will work with the Implementation Committee to evaluate, at least annually, continued participation in and endorsement of the RCN program.

Table 4-21. 2015 Maine Wildlife Action Plan Programmatic Actions.

Program Type	Program Code	Program Description	Target Start Timeframe		
			Short Term	Mid Term	Long Term
Outreach and Engagement	Program 1	Establish a Wildlife Action Plan Implementation Committee comprised of conservation partners and agency staff to help guide implementation of the Plan	X		
	Program 2	Devise and implement outreach strategies, including periodic meetings, to inform and engage conservation partners and the general public on 2015 Wildlife Action Plan information, accomplishments, and opportunities for involvement		X	
	Program 3	Develop a public survey of SWAP and non-game species awareness, concerns, and priorities	X		X
Funding and Tracking	Program 4	Secure stable and additional sources of federal and state funding for SGCN and habitat conservation		X	
	Program 5	Consider establishing a competitive small grants program to make a portion of SWG funds available to partners implementing priority actions identified in the 2015 Wildlife Action Plan		X	
	Program 6	Support MDIFW and DMR nongame fish and wildlife staff to help with SGCN conservation action implementation			X
	Program 7	Annually compile agency and partner expenditures and seek additional match opportunities to maximize efficiency and impact of 2015 Wildlife Action Plan implementation	X		
	Program 8	Track SWAP conservation action implementation accomplishments by agencies and partners	X		
Action Development	Program 9	Develop SMART (Specific, Measurable, Achievable, Results-oriented, and Time-bound) style objectives for high priority habitat-scale and SGCN conservation actions		X	
Regional Partnerships	Program 10	Identify new and review/update existing SGCN Conservation Opportunity Areas, including Focus Areas of Statewide Significance, using SGCN distribution data, resilient landscapes analyses, and landscape planning concepts	X		
	Program 11	Participate in the Northeast Regional Conservation Needs (RCN) Grant Program following annual endorsements from Maine's Wildlife Action Plan implementation committee (*tentative*)		X	

4.5 AN APPROACH TO PRIORITIZING CONSERVATION EFFORTS

4.5.1 USES FOR PRIORITIZATION CONSIDERATIONS

Maine's 2015 Wildlife Action Plan needs to be a tightly prioritized plan because State Wildlife Grant (SWG) funds are limited and the number of SGCN is large. As discussed in 4.1.2, we have already prioritized in a number of important ways:

1. We assigned SGCN to three priority levels.

2. We ranked stressors and did not comprehensively develop conservation proposals for any stressors that we ranked less than high or medium-high.

3. We also ranked conservation actions on behalf of SGCN and habitats by biological priority (e.g., Critical, High, Moderate).

With regard to the approximately 30 habitat conservation themes (Section 4.3.4), rather than prioritizing among these per se, we have provided information for each on the number and priority level of the SGCN and habitats they are designed to address. We hope this will help partners evaluate the nature and scope of these themes.

In the sections below, we propose a suite of criteria for conservation partners to use in focusing their conservation resources toward selected conservation actions during implementation of the Wildlife Action Plan. These criteria could also form the basis for MDIFW to select proposals for SWG funding, although for proposals competing for SWG funding, there are likely to be additional criteria and considerations, such as whether the proposal has clear and measurable objectives and the amount of non-federal, non-MDIFW funds offered.

4.5.2 POTENTIAL CRITERIA FOR PRIORITIZING CONSERVATION ACTIONS

1. **Biological Impact Considerations**
   The overarching concept is that, all other things being equal, actions that benefit Priority 1 SGCN (i.e., those at most immediate risk of extirpation from Maine) should be higher priority than those for Priority 2 and Priority 3. Actions that benefit multiple SGCN should have priority over those that benefit only a single species. Actions that impact a larger geographic scale should have priority over those that impact only a small area.

   a. **Degree of Impact:** Will the proposed action or suite of actions significantly affect the conservation status of the SGCN(s) and/or its habitat (e.g., improved distribution, abundance, or viability essential to avoiding extirpation)?

   b. **Scope of Impact:** Will the proposed action or suite of actions significantly affect the conservation status of multiple SGCN or multiple habitats or facilitate multiple actions for multiple SGCN and their habitats at a state-wide level?

c. **Endurance of Impact:** Will the proposed actions likely have lasting impact (e.g., even in the face of significant sea level rise or other impacts of a changing climate)?

d. **Regional/National Collaboration:** Are the proposed actions recommended through an established regional or national conservation initiative, such that the certainty of impact is greater through increased peer review of approach, experience in implementation or evidence of success, as well as amplification of impact through regional networking?

2. **Feasibility Considerations**

a. **Partnership:** Does the proposal enhance opportunities for conservation partner collaboration, and are partners willing and able to participate?

b. **Public Support:** Does the proposal conserve SGCN of high economic, social, or cultural value such that it is likely to have strong support from relevant sectors and/or the general public?

c. **Capacity:** Does MDIFW and/or conservation partners have the necessary expertise, staff capacity and resources to successfully complete the proposal?

d. **Value (Cost-Benefit Ratio)**: How do the proposal's likely costs compare to its likely impact? (Figure 4-3).

Figure 4-3. Cost-benefit matrix of conservation proposals.

COST	BENEFIT		
	HIGH – long lasting, very high improvement in viability for multiple highly ranked SGCN	**MEDIUM**	**LOW**
Low	Worth the effort	Likely worth the effort	Proposal needs revision, or consider other actions
Medium	Likely worth the effort	Find ways to increase benefit and reduce cost	Proposal needs revision, or consider other actions
High	Find funds to do it	Proposal needs revision, or consider other actions	Likely not worth the effort

4.6 LITERATURE CITED

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