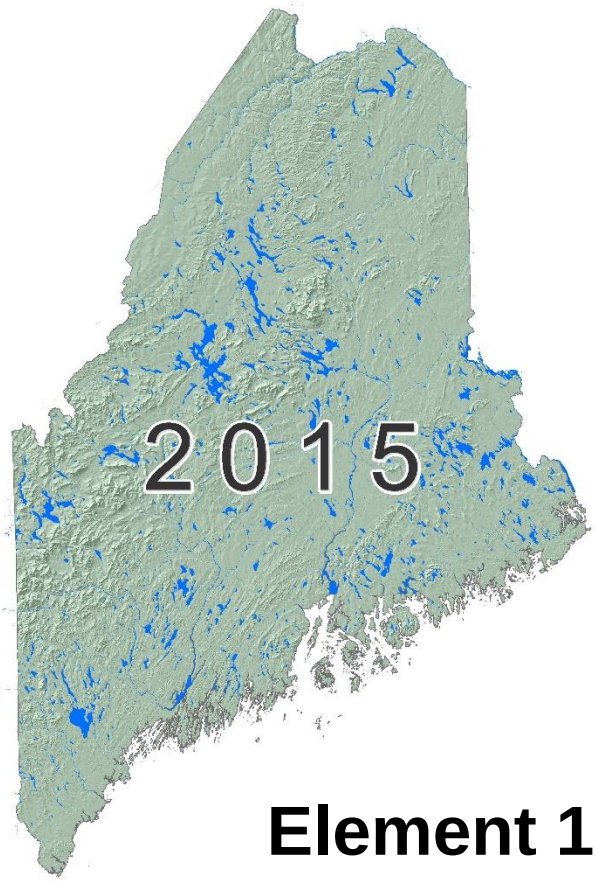

MAINE'S WILDLIFE ACTION PLAN

Element 1: Species of Greatest Conservation Need

Prepared by

Maine Department of Inland Fisheries and Wildlife

In collaboration with

Maine's Conservation Partners

September 2015

TABLE OF CONTENTS

Element 1: Species of Greatest Conservation Need

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

KEY TO ACRONYMS

ASMFC	Atlantic States Marine Fisheries Commission
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
EBTJV	Eastern Brook Trout Joint Venture
ECOS	Environmental Conservation Online System
ESA	U.S. Endangered Species Act
E/T	Endangered and/or Threatened
ETSC	Endangered, Threatened, and Special Concern
GIS	Geographic Information System
IUCN	International Union for the Conservation of Nature
MDACF	Maine Department of Agriculture, Conservation and Forestry
MDIFW	Maine Department of Inland Fisheries and Wildlife
MDMR	Maine Department of Marine Resources
MESA	Maine Endangered Species Act
MRSA	Maine Revised Statutes Annotated
NARSP	North Atlantic Regional Shorebird Plan
NAWCP	North American Waterbird Conservation Plan
NEFWDTC	Northeast Fish and Wildlife Diversity Technical Committee
NEPARC	Northeast Partners in Amphibian and Reptile Conservation
NMFS	National Marine Fisheries Service
RSGCN	Regional Species of Greatest Conservation Need
SC	Special Concern
SGCN	Species of Greatest Conservation Need
SoC	Species of Concern
SWAP	State Wildlife Action Plan
SWG	State Wildlife Grants
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USSCP	U.S. Shorebird Conservation Plan
WNS	White-nose syndrome

The Legislature finds that various species of fish and wildlife have been and are in danger of being rendered extinct within the state of Maine, and that these species are of esthetic, ecological, educational, historical, recreational and scientific value to the people of the State. The Legislature, therefore, declares that it is the policy of the State to conserve, by according such protection as is necessary to maintain and enhance their numbers, all species of fish or wildlife found in the State, as well as the ecosystems upon which they depend.

107th Maine Legislature, 1975: preface to Maine's Endangered Species Act (MESA)

1.0 ABSTRACT

A critical dilemma facing conservation biologists and managers worldwide is the need to allocate limited dollars, staff, and programmatic resources toward a growing list of conservation challenges. Foundational to this prioritization process in Maine's State Wildlife Action Plan is the development of a list of Species of Greatest Conservation Need (SGCN). Biologists from Maine Department of Inland Fisheries and Wildlife (MDIFW) and other state agencies, with cooperation from conservation partners and species experts, developed a suite of objective criteria for designating SGCN that is intended to be transparent and science-based, and recognizes that species conservation concerns can be identified at global, regional, and local scales. The primary themes for SGCN prioritization include risk of extirpation, population trend, endemicity, and regional conservation concerns. Secondary themes for SGCN prioritization include climate change vulnerability, survey knowledge, and indigenous cultural significance.

Maine's 2005 list of SGCN totaled 213 species grouped into two priority levels. To help further advance the challenge of species prioritization, Maine's 2015 list of 378 SGCN are assigned to three species priority levels: Priority 1 (Highest; 58 SGCN), Priority 2 (High; 131 SGCN), and Priority 3 (Moderate; 189 SGCN), all of which are eligible for State Wildlife Grant (SWG) assistance from the U.S. Fish and Wildlife Service. The 2015 process for reviewing and identifying Maine SGCN included both species deletions (33) and additions (198) to the 2005 list. The net increase in SGCN is driven primarily from a) additional conservation science designation criteria, b) scrutiny of more invertebrate taxa, c) significantly greater attention to marine fauna in the Gulf of Maine, and d) more explicit recognition of climate change vulnerability. It is our hope that identifying a relatively comprehensive, prioritized suite of SGCN will help MDIFW and conservation partners implement meaningful conservation actions for some of Maine's most vulnerable and valued wildlife resources over the coming decade.

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1.1 INTRODUCTION

Agencies and conservation partners have long faced the dilemma of allocating limited funds to address the critical needs of species designated as Endangered or Threatened (E/T). The much larger number of vulnerable species at risk of being listed as E/T is even more problematic. The Conservation and Reinvestment Act in the U.S. (2001) and a similar Species at Risk Act in Canada (2002) emphasize that need and established funding for states and provinces to address an array of biodiversity risks within their borders beyond a focus on E/T species. Conservation challenges solved at these local and regional scales are less likely to escalate into national or international crises. Additional benefits of working proactively with locally or regionally vulnerable species include a greater likelihood of success and minimal reliance on regulations.

An approved State Wildlife Action Plan is a requisite for receipt of federal SWG funding. The primary conservation targets of these plans are SGCN populations and habitats. Each state has considerable flexibility for SGCN designations and resulting SWG expenditures, though there is foundational guidance offered in the Wildlife Conservation and Restoration Act that SWG funds are intended "…for the benefit of a diverse array of wildlife and associated habitats, including species that are not hunted or fished, to fulfill unmet needs of wildlife within the States." Maine's 2015 Plan relies on objective criteria to identify and prioritize SGCN. Specifically, MDIFW and Plan partners emphasize the following five general concepts for SGCN eligibility:

1. **Acute Vulnerability**: State, federal or international agencies formally designate the risk of species extirpation. We also acknowledge those species experiencing recent, dramatic population declines and likely to be listed as E/T in the near future.
2. **Regional Conservation Priority**: One or more scientific partners have identified the species as a high regional concern in the Northeast. We include regional endemics and species with disproportionate range occurrences in the Northeast.
3. **Data Deficiency**: Some rare, understudied taxa require further survey and research to accurately determine conservation status.
4. **Climate Change Sensitivity**: Northeastern climate change projections indicate a suite of species will face significant risks in the near future.
5. **Cultural Significance**: Maine tribes identified some SGCN based on special values to tribal heritage in combination with emerging ecological vulnerabilities.

Some states develop Wildlife Action Plans that reflect the scope of the jurisdiction in the wildlife agency that legally administers SWG allocations to states. Maine's 2015 Plan includes other natural resource agencies. MDIFW is the lead agency for any terrestrial or freshwater wildlife species (including all birds). The Maine Department of Marine Resources (MDMR) has primary authority for all fauna (except birds) in coastal waters. The Maine Coastal Program in the state's Department of Agriculture, Conservation and Forestry (MDACF) also considers conservation issues in the Gulf of Maine. The Maine Natural Areas Program in MDACF has sole responsibility for rare plants. While flora are not directly eligible for SWG funds in Maine's 2015 Plan, Maine's Endangered and Threatened Plants (Appendix 1-1) are considered in the Plan's habitat-based conservation strategies. Finally, we acknowledge that participation by Maine's diverse alliance of conservation partners (private, public, and tribal) is essential to effective Plan implementation.

1.2 SIGNIFICANT CHANGES FROM MAINE'S 2005 PLAN

Maine and other states drafted their initial plans as a "Comprehensive Wildlife Conservation Strategy" (CWCS) for submission in 2005. The CWCS documents of that era were retitled (but not reformatted) as State Wildlife Action Plans (SWAP). Maine's 2005 CWCS still serves as a thorough, detailed account of the full scope of wildlife, habitats, threats, conservation actions, and monitoring programs in the State (http://www.maine.gov/ifw/wildlife/reports/wap.html). Key differences in Element 1 of the 2015 Action Plan are:

- Purpose: Maine's resource agencies and conservation partners strove to construct a document that better served as a statewide conservation plan rather than one focused on MDIFW perspectives.

- SGCN emphasis: A focus on SGCN rather than the full array of fish and wildlife resources significantly reduced the length of Element 1 and each subsequent chapter of the 2015 Action Plan.

- SWAP database: Similar to the review of habitats and stressors in subsequent parts of this Plan, Element 1 includes a tabulation of 378 SGCN (Table 1-3) that is hot-linked to database report summaries for each SGCN. This strategy streamlines the Plan itself and provides updateable information (in lieu of static tables) during its 10-year horizon.

- Expanded faunal reviews: Several taxa groups received much greater attention for SGCN eligibility in 2015: marine fauna in the Gulf of Maine and terrestrial/freshwater invertebrates. Plant conservation remains ineligible for SWG funding, but habitat-scale conservation actions from Maine's 2015 Plan will benefit vulnerable flora and important natural communities.

- Refinements to SGCN qualifying criteria: Whenever possible, we employ objective, published reviews of species vulnerability among faunal groups to identify SGCN.

- Coordinated conservation in the Northeast: The Northeastern states and partner collaborations in USFWS Region 5 have focused on the regional scale of vulnerability. The Northeast Regional Conservation Needs program (http://rcngrants.org/) and North Atlantic Landscape Conservation Cooperative (http://northatlanticlcc.org/) are premiere examples.

- Vulnerable species in Canada: This Plan now extends SGCN eligibility for Maine fauna that are listed E/T by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; http://www.cosewic.gc.ca/eng/sct5/index_e.cfm) in the neighboring provinces of New Brunswick, Nova Scotia and Quebec.

- Global vulnerability: Maine's 2015 Plan newly recognizes fish and wildlife species occurring in Maine as SGCN if listed as "Critically Endangered" (CR), "Endangered" (EN), or "Vulnerable" (VU) on the IUCN Red List.

- Climate change vulnerability: Although many climate change projections escalate beyond the 10-year duration of the Plan, the revised SGCN list of 2015 now includes species with high vulnerability and high certainty for this stressor in Maine.

1.3 AN OVERVIEW OF MAINE'S FAUNA AND SGCN

The diversity and health of Maine's natural resources is a priority for both residents and visitors. Maine's varied landscape, rural character, and traditional resource-based economy heighten public familiarity and appreciation for fish and wildlife. Regular exposure to fauna in the every-day lives of many Maine citizens reinforces concern for the state's natural heritage generally, and species-at-risk in particular.

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The variety of wildlife is also key to the allure. Maine is a mixing zone of northern species allied with boreal systems prevalent in neighboring Canada that yield to southern species typical of Appalachian habitats that predominate further south in New England and beyond. Examples of northern fauna include Canada Lynx (*Lynx canadensis)*, Arctic Charr (*Salvelinus alpinus*), Mink Frog (*Lithobates septentrionalis*), and Atlantic Puffin (*Fratercula arctica*); all approach southernmost range limits in the state. Southern fauna that are near the northern edge of their range in Maine include New England Cottontail (*Sylvilagus transitionalis*), Roseate Tern (*Sterna dougalli*), Black Racer (*Coluber constrictor*), Loggerhead Sea Turtle (*Caretta caretta*), and Monarch Butterfly (*Danaus plexippus*).

The composition of Maine's animal and plant communities shifts considerably from south-to-north, in both terrestrial and aquatic habitats. Woodlands encompass nearly 85% of Maine's land area, but forests vary from deciduous and mixed forests prevalent in southern, western and central Maine to boreal conifers in northern and eastern regions and at higher elevations. Faunal associations shift accordingly as well. Surface waters cover almost 13% of the State and also offer diverse environments. Predominantly cool / cold lakes, rivers and streams yield to warmer waters in southwestern Maine. Maine's intricate coastline totals almost 3,500 miles, and the Gulf of Maine itself transitions into cooler waters along a west-to-east gradient due to tidal mixing with the North Atlantic's Labrador Current.

Not surprisingly, our knowledge of Maine fauna has limitations. For example, many invertebrate taxa are not yet considered, let alone proportionately represented among Maine's SGCN. Nevertheless, Maine's 2015 Plan identifies 378 SGCN spanning 44 orders of vertebrates and 28 orders of invertebrates. A compilation by major taxa groups (Table 1-1) reveals both the sheer number and diversity of SGCN at present in Maine.

Sixty (16%) SGCN in Maine are state-listed E/T species (Appendices 1-2 and 1-3). Only 18 SGCN (<5%) are federally-listed as E/T (Appendix 1-4). Thus, the vast majority of Maine's SGCN, while

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Table 1-1. Diversity of fauna, E/T listings, and SGCN in Maine by major taxa groups.

Taxa Groups lead state agency juridiction	# Species			
	Extant in Maine	Federal E/T (ESA)	State E/T (MESA)	SGCN in 2015 Plan
Invertebrates subtotal[1]	>33,000	0	20	168
freshwater / terrestrial (MDIFW)	>15,000	0	20	132
marine (MDMR)	>18,000	0	0	36
Vertebrates subtotal	840	18	40	210
Amphibians (MDIFW)	18	0	0	4
Birds (MDIFW)	423	3	20	130
Fish	291	3	3	43
freshwater (MDIFW)	39	0	2	15
marine / diadromous (MDMR)	252	3	1	28
Mammals	85	8	10	22
marine (MDMR)	24	6	5	7
terrestrial (MDIFW)	61	2	5	15
Reptiles	23	4	7	11
freshwater / terrestrial (MDIFW)	17	0	4	7
marine (MDMR)	6	4	3	4
MAINE FAUNA TOTALS	>33,840	18	60	378

[1]Total includes only described species; the actual number is much greater.

1.3.1 MAMMALS (NON-MARINE)

General Overview

Maine's 61 species of non-marine mammals may be best characterized as a diverse mixture of boreal and temperate species. Maine encompasses three ecoregional provinces (Warm Continental Mountains, Warm Continental Division, and the Hot Continental Division) and is near the Subarctic Division in Canada. Maine's proximity to the Subarctic Division enables species, such as the Canada Lynx, that are typically found in boreal forests of Canada, to thrive in the mixed coniferous forests of northern Maine. Similarly, the Hot Continental Division's climate helps make it possible for species such as the New England Cottontail to persist at the northern extent of their range in southern Maine. While Maine's proximity to boreal and temperate regions may contribute to the diversity of mammals found in the state, this same proximity also raises a number of challenges for species that live near the edge of their range. Species on the southern edge of their range, like American Marten (*Martes americana*) and Canada Lynx may compete for resources with species more common to the south, such as Fisher (*Martes pennanti*) and Bobcat (*Lynx rufus*). Although we cannot say for certain how

mammals in Maine will be affected by climate change, it will likely be the species at the edge of their range that will experience the greatest change.

Conservation Overview

The species comprising Maine's native mammals have remained fairly constant over the last 100 years, since extinction of the Sea Mink (*Mustela macrodon*) and Eastern Cougar (*Felis concolor*), and state extirpation of Caribou (*Rangifer tarandus*) and Gray Wolf (*Canis lupus*). Today, Maine's mammals receive greater protection through regulatory measures and the conservation efforts carried out by MDIFW and a host of dedicated conservation partners.

Notwithstanding these conservation efforts, Maine mammals face a variety of challenges and threats. A total of 15 species (25%) of Maine's nonmarine mammals are listed as SGCN in this Plan. Although Moose (*Alces alces*) and Muskrat (*Ondatra zibethicus*) are numerous in Maine, they were listed as SGCN because of their cultural significance to native tribes and recent changes in the populations of these species in the Northeast and elsewhere. The factors behind these changes are still under investigation.

Bats, as an order, perhaps face the most unified set of conservation threats. White-nose syndrome (WNS), a deadly fungal disease, has drastically reduced populations of *Myotis* spp. Because of this disease, Little Brown Bats (*Myotis lucifugus*) and Northern Long-eared Bats (*Myotis septentrionalis*) were state-listed as Endangered in 2015, and the Eastern Small-footed Bat (*Myotis leibii*) was newly state-listed as Threatened. These bat populations are not only threatened by WNS in Maine but throughout most of their U.S. range. Although WNS has primarily affected *Myotis* spp., Tri-colored Bats (*Perimyotis subflavus*) and Big Brown Bats (*Eptesicus fuscus*) are also affected. The impact of WNS on Maine's bat populations has heightened concerns over the effects of other mortality factors, such as wind turbines, and the vulnerability of maternity colonies to disturbance. Our lack of knowledge about the habits of bats in Maine also poses a significant threat to the species. It is difficult to undertake effective conservation actions if we do not understand many of the basic habits of bats. In addition to the three bat species that have recently been listed as E/T under MESA, Maine's five other species of bats are all considered species of Special Concern and/or SGCN.

Efforts underway in Maine and five other Northeast states were pivotal to a recent decision not to list the New England Cottontail (*Sylvilagus transitionalis*, SGCN Priority 1) as E/T under the federal ESA. © Tom Barnes

The availability and structure of forest seral stages in Maine is a major factor determining the abundance of Maine's mammals. In southern Maine, the loss of early successional habitat through forest maturation and development has resulted in a 75% to 80% decline of suitable habitat for New England Cottontail. In York County, only 3% of the landscape can be characterized as early successional forest habitat. The lack of shrublands and young forests in southern Maine threatnes not only the New England Cottontail, but also several SGCN birds associated with scrub-shrub habitat.

Conversely, in northern Maine, less than 3% of the landscape remains as ecologically mature forest that is suitable for deer wintering areas. This not only impacts Maine's White-tailed Deer (*Odocoileus virginianus*) but other mammals (e.g., American Marten, *Martes americana*) and birds that are dependent on mature interior forests. Unlike the interior boreal forests of Canada

and Alaska, where natural wildfires play a major role in determining the pace of forest succession, commercial logging operations and market forces are major factors influencing the composition and structure of Maine's northern forests.

1.3.2 BIRDS

General Overview
Birds enrich our lives and reflect the quality and health of our environment. North America provides habitat for over 900 species of birds. The Maine Bird Records Committee considers 423 bird species (nearly half of all North American birds) to be positively documented within the state of Maine. Maine's diverse mosaic of habitats supports 225 species of nesting birds. Nearly 200 others visit Maine as either fall / spring migrants or winter residents.

Maine's landscape is used by at least 29 inland species that reach the northern limits of their breeding distribution in Maine, and 28 species reside here at their southern limits. In addition, many of Maine's island-nesting seabirds reach their southern breeding terminus on Maine's coastal islands. Several other species have expanded their breeding ranges into Maine over the past century. New arrivals include the Sandhill Crane (*Grus canadensis*) and most recently, the Eastern Screech Owl (*Megascops asio*). Two species, the Peregrine Falcon (*Falco peregrinus*) and the Wild Turkey (*Meleagris gallopavo*) have been reintroduced into Maine following prolonged extirpation. Both are now carefully monitored and managed.

Maine is strategically located at a constriction point of the funnel in the Atlantic Flyway, a migratory path along eastern North America that tapers from a wide swath over the eastern Canadian arctic southward along the east coast. The Atlantic Ocean has a channeling effect on these migratory movements as birds fly south in late-summer and fall. In addition, Maine's vast coastline and more than 4,000 coastal islands provide important stopover areas for millions of migrating birds. This flyway includes some of the continent's most productive ecosystems and is home to about a third of the U.S. human population. Conserving birds and their habitats in Maine's portion of this important flyway is a monumental task.

Conservation Overview
All of Maine's bird guilds are represented on Maine's official E/T List or the List of Species of Special Concern (SC). The latter is an administrative list of species that could become E/T without attention. The challenges for future conservation and stewardship are many. At least five bird species are documented as extinct or extirpated from Maine, emphasizing the importance of preventing any more erosion of the state's avian biodiversity. Among 423 birds documented in Maine, 11 are listed as state Endangered, nine are listed as state Threatened, and 130 are listed SC and/or SGCN. Thus, conservation concerns exist for ~31% of the bird species known to inhabit Maine. Most attention is devoted to birds that breed, nest and raise their young in Maine. However two waterfowl, the Barrow's Goldeneye (*Bucephala islandica*) and Harlequin Duck (*Histrionicus histrionicus*), are state-listed as Threatened because they winter in significant numbers in coastal Maine. Since a large percentage of the North Atlantic populations of these waterfowl species winter here, Maine has a high regional management responsibility for them.

Threats to bird populations are many and conservation challenges are equally diverse. Managers are tasked with protecting small numbers of ground-nesting Least Terns (*Calidris minutilla*) and Piping Plovers (*Charadrius melodus*) that struggle to co-habit southern Maine's

sand beaches with tens of thousands of recreational users. Maine forest birds and many species of wetland birds may be faring well recently, but they too are threatened by cumulative impacts of development, habitat fragmentation, intensive forest practices, invasive species and various forest pests and diseases. While these species face numerous threats, vast areas of forest in Maine remain intact, presenting opportunities for large-scale conservation.

Songbirds are well represented in Maine given our diverse landscape. Because the state is so heavily forested, most forest-dwelling Passerines are doing well with only a few "vulnerable" exceptions for specialists such as Bicknell's Thrush (*Catharus bicknelli*). Abundance of some forest birds follows periodic boom and bust insect outbreaks. For example, Tennesee Warbler (*Oreothlypis peregrina*) and Evening Grosbeak (*Coccothraustes vespertinus*) peak during epidemics of Spruce Budworm (*Choristoneura fumiferana*). Overall, the health of Maine's forest songbirds is good, and their consideration as SGCN stems largely from disproportionate rangewide responsibility for them in Maine.

Grassland birds, in contrast, have struggled to maintain populations in Maine. Grasshopper Sparrows (*Ammodramus savannarum*) continue to occupy just a few sites in southern Maine, and Eastern Meadowlark (*Sturnella magna*) populations continue a long-term decline. Leading the declines however, are the aerial insectivores, mostly swallows, which by any measure are in rapid decline. Even populations of the widespread, locally abundant Tree Swallow (*Tachycineta bicolor*) have steadily declined over the last decade. Although causes remain speculative, most of these species are considered SGCN based on steep population declines.

In general, raptor populations have also fared well in Maine since the use of certain harmful pesticides was banned. Following years of intensive management to protect nests, Bald Eagles (*Haliaeetus leucocephalus*) were delisted in 2009, and populations continue to grow statewide. Changes in land use practices, population shifts, and some environmental toxins appear to be foremost influences at present. Habitat losses may result from natural (e.g., succession of grasslands to fwoodlands) or human impacts (including land development, fragmentation, etc.) that lead to both direct and indirect effects. Most raptor populations lack baseline indices or trend indicators. Limiting disturbance from recreation and development provides additional protection during critical nesting periods. Documenting continuing exposure of some persistent toxins such as lead, mercury, polychlorinated biphenyls, and polybrominated diphenyl ethers is a potential priority for some raptors.

Seabirds and salt marsh dependent birds face threats from pollution, over-fishing of important food items, and warming sea temperatures and rising sea levels caused by climate change. Rare seabirds and some colonial waterbird populations remain vulnerable as high percentages of their statewide nesting populations occur on a just a handful of managed sites. The maintenance and enhancement of populations of focal species will require careful monitoring of breeding populations and management that addresses threats that include: predations from gulls, habitat loss, changes in food availability in the Gulf of Maine, oil spills, incidental take during commercial fishing, and human disturbance near nests.

This regional endemic, the Saltmarsh Sparrow (*Ammodramus caudactus*, SGCN Priority 1) is a "vulnerable" species on the IUCN Red List. It lives in one of the most threatened habitats in the Northeast. © Patrick Leary

Maine's numerous wetlands and riparian areas are critical to a large percentage of Maine birds, including shorebirds, wading birds, and waterfowl. Poorly planned development that is too close to wetlands puts ecological functions at risk and leads to general habitat degradation, lower productivity, and eventual loss of birds. While the rate at which wetlands are lost has slowed since the 1980s, some of Maine's marsh birds (e.g., rails and bitterns) have become increasingly rare for unknown reasons. With rarity comes increased vulnerability to all stressors such as flooding associated with severe weather due to climate change; displacement of native vegetation by invasive species, human disturbance through recreation and development; and water regime changes at managed wetlands. Colonial wading birds such as Great Blue Herons (*Ardea herodias*) and Black-crowned Night Herons (*Nycticorax nycticorax*) have declined along the coast for unknown reasons; however disturbance, predators, and changes in food resources are all suspected. Continued surveys and monitoring are needed to shed light on the complex interspecific interactions as well as how species respond to changes in their local environment.

And finally, shorebirds that rely on coastal habitats for feeding and roosting during migration are negatively influenced by declining food resources and human disturbance. Recent data suggest that several Atlantic Flyway shorebird species have experienced declines of between 50% and 90% within the last three decades. Shorebird experts throughout the U.S. and Canada agree that the primary reason for shorebird declines is habitat loss from coastal development and human related disturbances. Thirty-eight shorebird species spend some portion of their annual life cycle in Maine including the federally listed Piping Plover and Red Knot (*Calidris canutus rufa*). Shorebirds are an important group for management consideration because large numbers of these birds concentrate in discrete areas of coastal habitat where they are highly susceptible to disturbance, habitat loss, and environmental contaminants. Conservation requires attention to these cumulative impacts.

Semipalmated Sandpipers (*Calidris pusilla*, SGCN Priority 2) & 13 other SGCN shorebirds stage along the Maine coast in annual, long-distance migrations from the Arctic to South America. © Lindsay Tudor

Maine's diverse and abundant bird resource face many natural challenges including starvation, predation, and severe weather. But the major threat for Maine birds remains habitat loss. Well-designed biological monitoring of Maine's bird resource is required to guide conservation strategies for priority birds. Conserving high value habitats and directing disturbance activities away from the most sensitive habitats will go a long way in ensuring a viable future for Maine birds and the people of Maine who enjoy watching them.

1.3.3 REPTILES AND AMPHIBIANS

General Overview

By eastern U.S. standards, Maine is a large and climatically diverse state. Thus, while North American reptiles and amphibians (herpetofauna) are richest at southern latitudes, Maine's relatively moderate southern and coastal climate permits a large number of species, especially snakes and turtles, to reach their northeastern range limit in the state. Only one species, the Mink Frog (*Rana septentrionalis*), reaches the southern edge of its range in Maine (and northern New Hampshire and Vermont). There are 36 species of herpetofauna known from Maine, including 18 amphibians and 18 reptiles, one of which is considered extirpated (Timber Rattlesnake, *Crotalus horridus*). Two others are introduced: a salamander (Mudpuppy, *Necturus maculosus*) and a turtle (Red-eared Slider, *Trachemys scripta elegans*). While Maine has a lower diversity of reptiles and amphibians than most eastern states, it provides some of the most extensive and intact remaining habitat for the species it hosts. Several are of regional and national conservation concern.

Conservation Overview

Reptiles and amphibians are two of the most imperiled vertebrate taxa worldwide, and this pattern of endangerment is also reflected in the status of Maine's fauna where a relatively large proportion of native reptile and amphibian species (33%) are listed as state Endangered or Threatened (four species), Special Concern (six species), Extirpated (one species), and/or SGCN (one additional species). This is in part due to the biogeography described above, whereby the area of greatest diversity, southern and coastal Maine, is also the most densely human populated with associated high rates of development, habitat loss and fragmentation, road mortality, predation, pollution, and illegal collection. The effect of climate change on the status of Maine's herpetofauna is uncertain, but given the group's limited dispersal capability and sensitivity to temperature and humidity gradients it is safe to expect significant changes in local distribution and abundance.

Reptiles (Snakes and Turtles)

Among Maine's vertebrates, reptiles are arguably the most imperiled, with eight of the state's native 17 species (47%) listed as Endangered, Threatened, Special Concern, Extirpated, and/or SGCN. The rarity of many of the state's snakes and turtles is partially attributed to the fact that nearly all reach or approach the northern edge of their range in Maine, but population viability for several species is further stressed by anthropogenic factors including most notably habitat loss, road kill, nest and hatchling loss to human-subsidized predators, and illegal collection. The globally rare and declining Wood Turtle (*Glyptemys insculpta*) is patchily distributed throughout the state, but the fate of Maine's other imperiled reptiles will likely be determined in just a few southern counties where the challenge is to conserve remaining high quality occurrences in a relatively densely human populated landscape.

Northern Black Racers (*Coluber constrictor*, SGCN Priority 1), Maine's rarest snake, persist only in barren and dry woodland habitats of York County, at their northernmost range limit. © Jonathan Mays

Spring Salamanders (*Gyrinophilus porphyriticus*, SGCN Priority 2), one of Maine's rarest amphibians, are a specialist of headwater streams in central and western regions of the state. © Jonathan Mays

Amphibians (Frogs, Toads and Salamanders)
Four of Maine's 18 amphibian species are listed as Special Concern and/or SGCN. As a group, Maine's amphibians are relatively secure compared to its reptiles, likely because of their greater fecundity, higher densities, lower sensitivity to adult mortality factors, and generally wider range distribution across the state. Two of Maine's salamanders are listed as SGCN largely because of their close breeding association with a specialized aquatic habitat that is vulnerable to loss and degradation – headwater streams (Spring Salamander; *Gyrinophilus porphyriticus*) and vernal pools (Blue-spotted Salamander; *Ambystoma laterale*).

1.3.4 FRESHWATER (NON-DIADROMOUS) FISH

General Overview
Maine's freshwaters host a variety of fishes including 39 native freshwater obligate species (live their entire lives in freshwater habitats) and 12 diadromous species that live part of their lives in freshwaters. A significant proportion of the fish fauna (diadromous or obligate freshwater) that occur in Maine's inland waters is non-native: 19 species (27%). We include two whose exact status needs to be confirmed: Banded Sunfish (*Enneacanthus obesus*) and Emerald Shiner (*Notropis atherinoides*). As with other fauna, Maine sits at a biogeographic transition zone with some native fishes occurring at the northernmost extent of their natural distribution such as Redfin Pickerel (*Esox americanus americanus*), Swamp Darter (*Etheostoma fusiforme*) and American Brook Lamprey (*Lethenteron appendix*). Others are at the southern end of their range, like Brook Stickleback (*Culaea inconstans*), Lake Whitefish (*Coregonus clupeaformis*) and Lake Trout (*Salvelinus namaycush*). In addition, Maine maintains the only remaining U.S. populations of a regional endemic freshwater fish, a landlocked subspecies of Arctic Charr (*Salvelinus alpinus oquassa*).

Conservation Overview
Freshwater and diadromous fishes of North America are among the most threatened taxonomic groups. The American Fisheries Society reports that approximately 39% of all described species are considered imperiled (Jelks et al. 2008). Five Maine species are E/T listed under either state (MESA) or federal law (ESA). Moreover, 51% (26/51) of Maine's native freshwater and diadromous fishes are listed as SGCN. Most fish require clean, clear waters and all are naturally restricted to movements within aquatic habitats. Hence their survival, reproduction, movement and dispersal capabilities are compromised by natural landscape features (ex. waterfalls, watershed divides) as well as anthropogenic infrastructure (e.g., dams, road/stream crossings, developed shorelines). In addition, Maine's native freshwater fishes are adapted to relative depauperate fish community conditions. Hence, many of Maine's native fishes compete poorly with the on-going invasions of non-native species whose presence can have potentially strong effects on local distribution and abundance.

Inland Coldwater Fishes (Salmon, Trout, Charr, Smelt and Whitefishes)
By physiological limitations, Maine's native salmonid fishes are at or near their southerly range extent and all seven native species have some level of conservation concern. Atlantic Salmon (*Salmo salar*) are federally listed as Endangered in Maine. Arctic Charr, Lake Whitefish, and anadromous populations of Brook Trout (*Salvelinus fontinalis*) are designated as Special Concern and all, including Lake Trout, Round Whitefish (*Prosopium cylindraceum*) and anadromous Rainbow Smelt (*Osmerus mordax*) are SGCN. In addition to threats associated with water quality and impediments to dispersal and migration, coldwater fishes are likely to be significantly affected by climate change in Maine.

Brook Trout (*Salvelinus fontinalis*, SGCN Priority 3), are a "Maine Heritage Fish." Although occurring statewide and in a diversity of habitats, their range is retracting due to multiple stressors including interactions with non-native species, land use conversion, fish passage constraints and climate change. © Merry Gallagher

Rare Native Fishes (Minnows and others)
Redfin Pickerel and Swamp Darter are state-listed as Endangered and Threatened respectively. Both species occur at the northern extent of their natural range in Maine where they have highly restricted distributions and are subject to water quality degradation and habitat loss. Most other rare native fishes in Maine are listed as SGCN (10 species) because of a general lack of knowledge regarding their current abundance, population trend and distribution. Their habitat and ecological requirements are diverse. However identifying true threats is difficult at this time without a better understanding of their current status.

1.3.5 INLAND AND FRESHWATER INVERTEBRATES

As is true globally, invertebrates dominate Maine's biota, both in terms of richness and biomass. Based on available data, Gawler et al. (1996) conservatively estimated that Maine hosts a total of 15,000 non-marine invertebrate species, representing nearly 98% of the state's animal species diversity. Like most other states, Maine's legal definition of "wildlife" (any species of the animal kingdom) includes invertebrates, thus challenging MDIFW and cooperators with a tremendous breadth and volume of species to protect and manage (McCollough 1997). One of the ways MDIFW triages its limited staff and program resources toward the conservation and management of invertebrates is to focus on those species and groups that are better-studied and which have well documented declines or imperilment.

The best-studied phyla in Maine, as in most states, are the Mollusca (e.g., snails and mussels: ~200 species) and Arthropoda (e.g., insects, crustaceans, spiders: ~7,950 species). These two groups include all of the non-marine invertebrate species considered in this Plan. Within these phyla, the state of knowledge on distribution, status, and life history is strongest for just three orders: the Unionoida (freshwater mussels), Odonata (damselflies and dragonflies), and Lepidoptera (butterflies and moths), or what some have referred to as the "charismatic microfauna." Accordingly, a large proportion (66%) of the priority invertebrate species determined to be SGCN are represented by members of these same groups (Unionoida – 6 species; Odonata – 36 species; and Lepidoptera – 47 species). Other invertebrate taxa also

considered in the SWAP because of partial, but growing, knowledge include Gastropoda (snails; 8 species), Plecoptera (stoneflies; 3 species), Trichoptera (caddisflies; 4 species), Ephemeroptera (mayflies; 15 species), Hymenoptera (bumble bees; 10 species), Coleoptera (beetles; 4 species), and Decapoda (crayfish; 1 species).

Conservation Overview

Maine was one of the last states in New England to officially include invertebrates among its state-listed E/T species in 1997, but there have since been considerable efforts to improve our knowledge of the targeted groups highlighted above. As such, Maine has now assigned official conservation status to a total of 134 invertebrate species, including 20 species as E/T, 78 species as SC, and 36 additional fauna as SGCN. Still, the list of Maine invertebrates of conservation concern remains very low as a proportion of the state's estimated non-marine species richness (<0.01%). It should be noted this is primarily because of a lack of knowledge, and not because invertebrates as a group are inherently more abundant or secure in Maine, as illustrated by the fact that over half (8 of 15 species) of all documented state wildlife extinctions and extirpations are comprised of invertebrates (Coleoptera and Lepidoptera). Undoubtedly, many more invertebrate losses remain undocumented. The conservation knowledge gap for Maine's invertebrates is significant compared to plants and vertebrates, and thus their representation on Maine's SGCN and other conservation status lists will inevitably grow as further knowledge is obtained on the population status, distribution, and trends of various at-risk taxa.

The following is a brief review of the conservation status and imperilment patterns for select groups of Maine invertebrate taxa that host most of the state's SGCN.

Snails (subclass: Pulmonata and Prosobranchia, class: Gastropoda, phylum: Mollusca)

According to Martin (1999, 2000), there are 76 species of terrestrial snails, and 45 species of freshwater snails, reported from Maine. At least five species are introduced, and the taxonomic status of several others is questionable. While a number of individual investigations of Maine's snails exist *(*Gleich and Gilbert 1976, Hotopp and Smith 1994, Martin 1999, Martin 2000, systematic surveys targeting terrestrial (Nekola 2008) and aquatic (Hotopp 2012) species of potential conservation concern have only recently been initiated. Most Maine SGCN snails fall in the Stagnicola (aquatic) and Vertigo (terrestrial) genera and are thought to be limited by requirements for high water quality and/or extreme habitat specialization.

Freshwater Mussels (order: Unionoida, class: Bivalvia, phylum: Bivalvia)

Freshwater mussels are one of the few invertebrate taxa that have been a focus of intensive statewide survey efforts in Maine. From 1992 to present, MDIFW biologists systematically surveyed over 1,700 sites on the state's rivers, streams, lakes and ponds to document the distribution and status of mussels in Maine. Ten species are documented in Maine, all native, with the greatest diversity in the Kennebec and Penobscot River drainages, where all 10 species are often present in the same stretch of river (Nedeau et al. 2000). To date, the invasive zebra mussel (*Dreissena polymorpha*) has not been reported in Maine, but it occurs in Vermont and Massachusetts. If introduced, this species could have substantial impacts on native mussels and other aquatic biota. While freshwater mussel diversity is relatively low in Maine, their levels of imperilment are high with 6 of 10 species assigned Threatened and/or SGCN status, a trend mirrored nationally where over 3/4 of U.S. species are considered imperiled by various states in their range. The group shares several life history characteristics (long-lived, benthic, sedentary, filter feeding) that increase their exposure to a suite of anthropogenic stressors including water pollution, eutrophication, sedimentation, dams, and the degradation of riparian integrity along forested rivers and streams.

Mayflies (order: Ephemeroptera), Stoneflies (order: Plecoptera), and Caddisflies (order: Trichoptera) = all class: Insecta, phylum: Arthropoda
At least 162 species of mayflies are reported from Maine (Burian and Gibbs 1991, S. Burian, pers. communication). While this group is relatively well studied compared to many other insects, comprehensive surveys have never been conducted in Maine, and information on mayfly diversity and status is incomplete. Maine has two species of regionally endemic mayflies listed as state Threatened and 13 additional species listed as Special Concern and/or SGCN. Most of Maine's mayflies of conservation concern have narrow geographic distributions and occupy riverine habitats, with many of these specialized to small, cold, headwater settings.

At least 94 species of stoneflies, representing all nine North American families, are reported from Maine (Mingo 1983; S. Burian, pers. Communication). Typically inhabiting cold, fast-flowing streams and rivers, stoneflies are likely more diverse than what is currently documented for Maine. Two of Maine's three SGCN stoneflies are globally rare species with only historic occurrence data, emphasizing the need for further survey effort.

The species richness of caddisflies is higher in Maine than in most regions of North America (Huryn and Harris 2000) with recent collections suggesting a total that exceeds 300 species (Huryn and Harris 2000). At least an additional 50 species of the lesser-known "micro caddisflies" in the family Hydroptilidae are also reported from the state (Blickle and Morse 1966, Huryn and Harris 2000). All of Maine's four SGCN species are considered globally rare, with two species having only been described and documented (to date) in Maine.

Bees, Wasps, and Ants (order: Hymenoptera, class: Insecta, phylum: Arthropoda)
At least 52 families and 855 species of bees, wasps, and ants have been reported from Maine (Dearborn et al. 1983; Stubbs et al. 1995). These numbers are most certainly conservative estimates, as surveys specifically designed to assess species diversity for the Hymenoptera have never been conducted (Stubbs et al. 1995). With the help of NatureServe, MDIFW recently acquired sufficient information to begin assessing the conservation status of Maine's bumble bees (*Bombus spp*), one of the state's most valuable pollinators of wild plants and cultivated crops. Of the 17 species of bumble bees documented from Maine, 10 are considered SGCN due to the lack of modern records or range-wide declines. Habitat loss, introduced diseases and parasites, pesticides, and intensive agricultural practices are all believed to have played a role in bumble bee declines in Maine and across North America. A recently launched citizen-science atlasing effort (http://mainebumblebeeatlas.umf.maine.edu/) is designed to increase our knowledge of bumble bee distribution and status in Maine.

Significant declines of the globally rare Rusty-patched Bumble Bee (*Bombus affinis,* SGCN Priority 1) are increasingly evident in many different pollinators. Monitoring programs are critical to better understand distribution, status and conservation strategies. © Rich Hatfield

Beetles (order: Coleoptera, class: Insecta, phylum: Arthropoda)
There are at least 96 families and 2,871 species of beetles reported from Maine (Majka et al. 2011). Generally recognized as the largest order of insects, the Coleoptera have not been

systematically surveyed in Maine and there are likely hundreds of state species records yet to be discovered (D. Dearborn, pers. communication). The best studied group of beetles in Maine, and probably North America, is the tiger beetles (family Carabidae, subfamily Cicindelinae). Three of Maine's four SGCN beetles are Cicindelids, including a newly discovered state species record, the Cobblestone Tiger Beetle (*Cicindela marginipennis*) known from only one riverine population in the western foothills. The federally-endangered American Burying Beetle (*Nicrophorus americanus*) is known historically from southwestern and central Maine, but is now believed to be state extirpated.

Butterflies and Moths (order: Lepidoptera, class: Insecta, phylum: Arthropoda)
Colorful, conspicuous, and ecologically important, butterflies are among the few insect groups that have benefited from considerable attention by early Maine naturalists (collections exist from as far back as 1870) and recent citizen scientist efforts through the Maine Butterfly Survey (http://mbs.umf.maine.edu/). There are 123 documented species of butterflies and skippers representing five families in Maine (Webster and deMaynadier 2005). Of special note is the relatively high proportion (20%) of Maine butterflies that are listed as Extirpated (five species), Endangered or Threatened (eight species), or Special Concern and/or SGCN (12 species): a result consistent with global trends elsewhere for the group (Stein et al. 2000, Thomas et al. 2004). Primary threats to Maine's butterflies include habitat loss and degradation to development, succession, and aerial pesticides. Most of Maine's rarest butterflies are associated with three habitat types: swamps, peatlands, and dry barrens, with the latter especially vulnerable to multiple threats in southern Maine.

Crowberry Blue (*Plebejus idas empetri,* SGCN Priority 2) is one of Maine's few regional endemics. The global range of this butterfly is restricted to a narrow band of coastal crowberry bogs in Maine and Canada's Maritime Provinces. © Bryan Pfeiffer

There are at least 17 families and 1,152 species of moths (macro) reported from Maine (Brower 1974). An additional 41 families and 1,720 species of "micro-moths" are also documented to occur in the state (Brower 1983, 1984, D. Dearborn, pers. communication). Much of this information is based on historic collections and the focused efforts of a few individual researchers. Comprehensive statewide surveys and species assessments have never been done for this taxon with especially pronounced knowledge gaps for the micro Lepidoptera. Much of what we know about the conservation status of moths in Maine comes from NatureServe, which tracks 108 species from the state, of which 18 are ranked as globally rare. Currently Maine lists two species of moth as Threatened and 24 species as SC and/or SGCN, with several more likely to be extirpated (D. Schweitzer, pers. communication). Like the butterflies, several of Maine's rarest moths are associated with pitch pine-scrub oak barrens and peatlands and are especially sensitive to any threats to these habitats.

Dragonflies and Damselflies (order: Odonata, class: Insecta, phylum: Arthropoda)
Like butterflies, dragonflies and damselflies are a popular and conspicuous insect group that have attracted significant attention from both scientists and the general public. Much of what is currently known about Maine's Odonates is the result of an assessment of historic records, MDIFW targeted surveys, and the recently completed Maine Dragonfly and Damselfly Survey (MDDS) (http://mdds.umf.maine.edu/). These efforts have led to a list of 158 species of dragonflies and damselflies known from Maine and considerable knowledge on distribution, habitat relationships, and conservation status of most species (Brunelle and deMaynadier 2005). Three of Maine's Odonata are listed as E/T and 25 species as Special Concern and/or SGCN. A recent assessment of high priority Odonata for conservation action in the Northeast identified 21 species in Maine because of high regional responsibility (narrow geographic ranges centered in the Northeast) and/or moderate to high imperilment due to habitat vulnerabilities and potential population declines (White et al. 2014). Most of Maine's most vulnerable Odonata are associated with northern peatlands, lakes, and moderate to large forested rivers.

1.3.6 MARINE FAUNA (EXCEPT BIRDS)

General Overview
There are approximately 1,800 known marine animal species in the Gulf of Maine, but it is estimated that far more are still undiscovered, especially in the invertebrate and chordate groups (Census of Marine Life 2015). Maine state waters (<3 nautical miles offshore) host a wide array of species including invertebrates, diadromous fishes, groundfish, marine mammals, sea birds, pelagic finfishes, and more. The diversity of habitat within coastal and marine waters, the geographic location between the Artic and Temperate zones, as well as complex coastal circulation patterns all provide Maine with unique and delicately balanced species assemblages.

Maine is the southern extent for some marine fauna. Polar Lebbeid Shrimp (*Lebbeus polaris*), Sea Strawberry (*Gersemia rubiformis*), and Atlantic Great Piddock (*Zirfaea crispata*) are SGCN from 3 different invertebrate classes that are restricted to waters from Maine northward. Conversely, others are at the northernmost range limits in Maine. The Horseshoe Crab (*Limulus polyphemus*) and Leatherback Sea Turtle (*Dermochelys coriacea*) are SGCN with distributions that range southward from the Gulf of Maine.

Some marine fauna have undergone severe population reductions in recent years. Maine waters host some of the last remaining, sizeable populations in the U.S. Notable SGCN examples include Atlantic Salmon and Rainbow Smelt. Several marine SGCN have large oceanic ranges or are highly migratory as adults: Atlantic Bluefin Tuna (*Thunnus thynnus*), Atlantic Salmon, all whales, and all sea turtles. The majority of marine species have highly dispersive juvenile stages. Taken together, these attributes contribute to a unique balance of species assemblages, with each species relying on the suite of others for prey, prey buffering, habitat (e.g., mollusk reefs), and nutrients transfer.

Conservation Overview
Aside from the Sea Mink (Section 1.2.1), only one marine species is known to be extinct in the Gulf of Maine: the Eelgrass Limpet (*Lottia alveus*). The Eelgrass Limpet, a marine gastropod, was estimated to have become extinct in the 1930s due to massive die-offs of eelgrass, which served as its primary habitat (Carlton et al. 1991).

A small number of marine species are protected via federal listing as E/T: three diadromous fish, six whales and four sea turtles. Eleven of these are also state-listed under MESA. The National Marine Fisheries Service (NMFS) designates some fauna as Species of Concern (SoC): three diadromous fishes, three groundfish and two elasmobranchs. However, numerous other species warrant conservation attention. State-listing of marine fauna under MESA is limited by statute to those federally listed as E/T.

While many marine species are subject to commercial and recreational fisheries, or being caught indirectly as bycatch, some of these species warrant conservation measures beyond fisheries management plans. The 2015 Maine Wildlife Action Plan lists 71 SGCN: nine diadromous fish, six groundfish, a pelagic fish (Bluefin Tuna,*Thunnus thynnus*), one ammodyte (American Sand Lance, *Ammodytes americanus*), five sharks, four skates, four sea turtles, six whales, one porpoise, and 34 invertebrates (= eight bivalves, one brachipod, two Cnidaria, 11 echinoderms, seven gastropods, and five arthropods).

The following is a brief review of the conservation status and imperilment patterns for select groups of marine taxa that host significant numbers of the state's SGCN.

Marine Invertebrates

Although a large proportion of the known marine animal species in the Gulf of Maine are invertebrates (~80%), less than half of the marine SGCN are invertebrates (34 species, 48% of SGCN). This is primarily due to a lack of knowledge about the status, distribution, or abundance of these species. Marine invertebrates face many of the same research challenges as terrestrial and freshwater invertebrates, including their small size, and small niches/habitats. Additionally, financial and logistical challenges specific to working in the marine environment compound these issues. Since 24% of the marine SGCN are commercially or recreationally harvested, some may have existing monitoring programs in place. However, there is a need for increased knowledge about population trends and reasons for decline for many of the invertebrate SGCN.

Sea Cucumbers (*Thyonidium drummondii*, SGCN Priority 2) and several other invertebrates are an important foundation of the marine ecosystem that may face additional risks from warming waters and acidification in the Gulf of Maine. © Maggie Hunter

Marine invertebrates vary in life history and are thus subject to a variety of stresses. Most juvenile invertebrates are found in the water column as zooplankton, and some species are sessile during at least part of their life cycle. Sessile organisms can be slow to recolonize an area after an event that reduces their abundance. Many invertebrates can be sensitive to changes in water quality including non-point source pollution and thermal changes. Calcareous invertebrates may be susceptible to changes in water pH resulting from increased dissolved carbon dioxide in the water. SGCN vulnerable to ocean acidification include Softshell Clam (*Mya arenaria*) and Gaper Clam (*Mya truncata*). With recent and sometimes rapid changes in coastal development, increases in sea surface temperature, and decreases in ocean pH, understanding if and

how these species are adapting and how their ranges and habitats are affected is imperative for developing successful conservation strategies.

Finfish: Diadromous, Groundfish, and Ocean Migratory Fish

There are over 50 commonly found finfish species in Maine waters, most of which have experienced population declines in the past 10-50 years. A total of 16 finfish species have been identified as SGCN for Maine, and 11 of those species have experienced recent, significant declines in abundance. Overfishing has been attributed to the decline of many of these species, including Atlantic Cod (*Gadus morhua*) and Haddock (*Melanogrammus aeglefinus*).

Some SGCN declines may be due to environmental changes and habitat alterations: e.g., Atlantic Wolfish (*Anarhichas lupus*) and Spotted Wolffish (*Anarhichas minor*). Fish populations can be slow to rebound after marked declines, even after fishing pressure has been reduced. This may be due to populations having been reduced below a critical threshold, combined with changes in habitat including increasing water temperature, reduction of bottom structure following trawling, and changes in predator-prey abundances. Key to the conservation of these species are efforts to identify spawning locations, migration patterns, habitat use, impacts of changing water chemistry and temperature, as well as how changing species assemblages will affect predator-prey relationships.

Diadromous fishes face a unique set of threats as they migrate between marine and freshwater. Obstructions in rivers and streams, alterations in water flow, and water runoff contamination and high nutrient inputs have all led to the reduction of species' populations. While some of these species respond well to existing management strategies, like improving fish passage and seed-stocking (e.g., Alewives, *Alosa pseudoharengus*), others continue to maintain only small populations despite conservation efforts (e.g., Atlantic Salmon). Continuing to improve fish passage and water quality is necessary to recover these species. Additionally, recent research has shown the importance of interspecific relationships. For example, the timing of spawning and migration patterns may provide prey-buffering for species of reduced numbers – e.g., schools of river herring may reduce predation of Atlantic Salmon smolts.

Alewives (SGCN Priority 2) are among the eight diadromous fish recognized as SGCN in this Plan. Most Maine rivers once supported major spawning runs, but many runs are currently less than half of their estimated potential. © Sharon Fiedler

Whales and Sea Turtles

There are at least 22 species of marine mammals and turtles that are known to frequent the waters of the northern Gulf of Maine. Many are SGCN, including six species of large whales federally-listed as Endangered since 1970: North Atlantic Right (*Eubalaena glacialis*), Humpback (*Megaptera novaeangliae*), Finback (*Balaenoptera physalus*), Sei (*Balaenoptera borealis*), Sperm (*Physeter macrocephalus*), and Blue (*Balaenaoptera musculus*). There are four species of federally-listed sea turtles: Kemp's Ridley (*Lepidochelys kempii*), Leatherback (*Dermochelys coriacea*), Green (*Chelonia mydas*), and the Northwest Atlantic Ocean distinct population segment of Loggerhead Turtles. All range widely in international waters with some presence in state jurisdiction in the Gulf of Maine.

The North Atlantic Right Whale, with a population now estimated over 400 is considered one of the most endangered of the large whales. For decades, since the end of commercial whaling, the Right Whale has shown slow recovery. The lack of Right Whale recovery has been linked to collisions with ships, entanglement in specific fishing gear, habitat degradation, and disturbance from vessels. Additionally, the Maine gillnet and lobster fisheries are documented as causing serious injury and mortality to this SGCN, as well as to other bycatch. Consequently MDMR, in collaboration with Maine's commercial fishing industries, developed a Comprehensive Marine "Wildlife Conservation Strategy for Large Whales and Sea Turtles" to reduce the risk posed by these fisheries to North Atlantic Right Whales and other protected resources. MDMR has a strategic role to balance commercial lobster and gillnet fisheries within State waters and impacts to large whales and sea turtles. The State of Maine is fully committed to the protection of Atlantic large whales and sea turtles, while at the same time protecting the economic and operational realities of the State's fisheries.

1.4 DISTRIBUTION OF MAINE'S SGCN AND ASSOCIATED HABITATS

Best management practices for State Wildlife Action Plan updates (AFWA 2012) recommend compiling information on the distribution of each SGCN and its associated habitats to help prioritize areas within the state for conservation actions. Range, distribution, and observations all describe geographic arrangements of elements (species and habitats) across a landscape. However, these terms have different meanings. Range is the broadest geographic extent across which an element could be found. The distribution of an element is the spatial pattern of its occurrence within its range and may be scattered, random, clustered, or regular depending on the population/community dynamics of the element and the heterogeneity of the landscape. Further, individual observations of an element may or may not be evidence of a viable or persistent population.

The sampling unit used for a spatial analysis should be appropriate to the scale and resolution of the input data and the needs it is intended to meet. We chose Maine's municipal township boundaries (for non-aquatic SGCN) and United States Geological Survey (USGS) HUC12 sub-watersheds (for aquatic SGCN) as the sampling units for this analysis. Both are familiar to the Maine conservation community and the general public and can easily be generalized to broader scales (e.g., counties, watersheds, or ecoregions).

We used our best available information to develop "species conservation range maps" for SGCNs in Maine. These maps are intended to identify within Maine the broadest geographic extent across which conservation actions might benefit each SGCN. These maps are not meant to convey the ecological ranges or distributions of these species. Because we used habitat to qualify these maps, however, for some species the maps may approximate their ecological distribution subject to 1) accuracy and resolution of the habitat mapping, 2) generalization of observation data to the sub-watershed/township scale, and 3) the existence of undocumented areas occupied by the species.

1.4.1 METHODOLOGY FOR MAPPING ELEMENT 1 – SGCN DISTRIBUTIONS

Our primary source of observation data was MDIFW's "Endangered, Threatened, and Special Concern" (ETSC) database, which includes observations on some, but not all of Maine's SGCNs. We supplemented MDIFW's ETSC data with SGCN observations from the following:

- Maine Damselfly and Dragonfly Atlas; (http://www.maine.gov/ifw/wildlife/species/invertebrates/damselfly_dragonfly.html)
- Maine Butterfly Survey; (http://www.maine.gov/ifw/wildlife/species/invertebrates/butterfly_survey.html)
- Maine Mussel Survey; (http://www.maine.gov/ifw/wildlife/species/invertebrates/freshwater_mussels.html)
- Maine Amphibian and Reptile Atlas Project; (http://www.maine.gov/ifw/wildlife/species/reptiles/atlasing_project.html)
- North American Breeding Bird Survey; (https://www.pwrc.usgs.gov/bbs/)
- Essential Wildlife Habitats mapped under Maine's Endangered Species Act
- MDIFW radio-telemetry locations and track surveys for Canada Lynx
- Shorebird Areas mapped under Maine's Natural Resources Protection Act
- MDIFW vernal pool locations with Blue-spotted Salamander observations
- MDIFW fish data sets
- eBird
- Maine Bumble Bee Atlas; (http://mainebumblebeeatlas.umf.maine.edu/)
- Maine Mayfly Database (http://www.maine.gov/ifw/wildlife/species/invertebrates/rare_mayflies.html)

These data sets varied greatly in data format. Some data sets were geospatial (i.e., GIS files), whereas others stored only attributes but included geographic coordinates that we used to generate geospatial representations. Most were point data, but some linked observations to unmapped sites along survey transects and others mapped observations as polygons. Thus, our first step in generating SGCN distributions was to standardize and assimilate these data sets. We then used all of these observations to determine in which Maine townships and sub-watersheds each SGCN occurred. We did not attempt to count observations of an SGCN within a township or sub-watershed or to estimate densities because sampling effort varied geographically and among data sets. Some observations also may have been duplicated across data sets. Although an observation from any of the data sets could indicate presence of the SGCN in a particular township or sub-watershed, we presented the data sets as separate GIS layers so users could compare the data sources or view them collectively for an SGCN.

1.4.2 METHODOLOGY FOR MAPPING ELEMENT 2 – HABITATS

We used a modified version of the Northeast Ecological Systems, 2014 Update (Ferree and Anderson 2013, http://northatlanticlcc.org/data/regional-spatial-data/terrestrial/tnc-terrestrial-habitat/ne-terrestrial-habitat-map) mapped by the North Atlantic Landscape Conservation Cooperative (NALCC), the Northeast Association of Fish and Wildlife Agencies, and The Nature Conservancy to map habitats for each SGCN. We updated their map for habitat classes for which we had and/or required more accurate/higher resolution spatial data including:

- Rivers and streams classified by MDIFW to small, medium, or large river or headwater/creek
- Lakes and ponds classified by MDIFW to oligotrophic, eutrophic, mesotrophic/intermediate, or dystrophic
- Tidal flats classified by substrate type by the National Wetlands Inventory
- Tidal marshes as mapped/classified by the Maine Natural Areas Program
- Lake and river shores classified by the National Wetlands Inventory
- Intertidal and subtidal habitats as mapped/classified by the Maine Department of Marine Resources

Using the resulting habitats, species specialists from MDIFW, with input from conservation partners, associated each SGCN with each ecological system and habitat macrogroup it was believed to use. We then identified the townships and sub-watersheds where these associated habitats occurred for each SGCN. Part of our goal was to identify unoccupied habitats or areas of undocumented SGCN presence. Some habitats, however, extended beyond the range of an SGCN and therefore presented an unrealistic estimate of its potential distribution. As part of our 2005 SWAP conservation actions, Maine divided the state into ecoregions and surveyed them for a variety of species including many SGCN. This work was the source for many of the SGCN observations in MDIFW's ETSC database. The species specialists associated each SGCN with each ecoregion where it was believed to occur and we then used those ecoregional associations to constrain the habitat mapping to more realistic extents.

The Maine GAP Analysis project (Krohn et al. 1998) used a similar process (i.e., combining observation data with habitat maps) to estimate distributions for vertebrate species in Maine. We included the GAP data in our species conservation range maps, calling it "potential habitat." Despite having fewer observations to work with and a much simpler habitat data set, the GAP distributions are quite similar to our updated distributions for many SGCNs.

1.4.3 SPECIES CONSERVATION RANGE MAPS

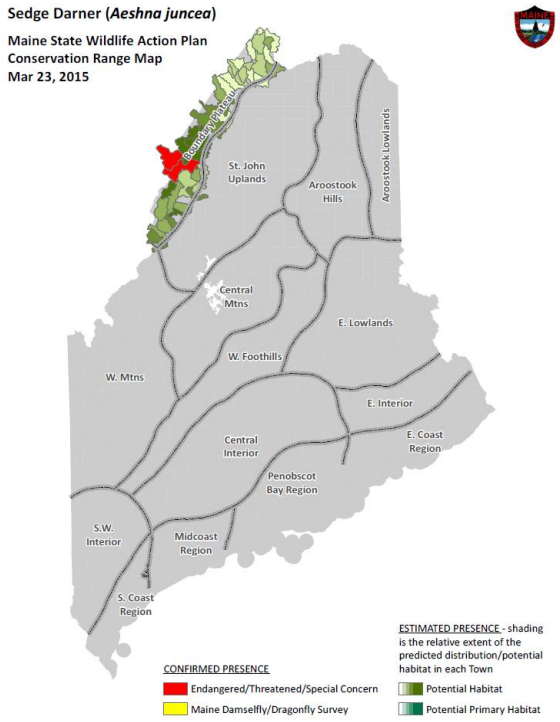
Our large number of SGCN, observation data sets, and habitat associations precluded mapping by hand. Instead, we used our SWAP database and a series of custom Python programs to automate map production. This approach will allow maps to be updated with relative ease for additional SGCNs as new observation data becomes available, our understanding of habitat relationships improve, or if the habitat map changes. The process generates a series of data tables linking SGCNs to townships and sub-watersheds based on observations of the SGCN and mapping of its associated habitats. Data for each SGCN then is used to update a map template that produces a PDF document in which the various input data sets can be toggled on or off according to user preference.

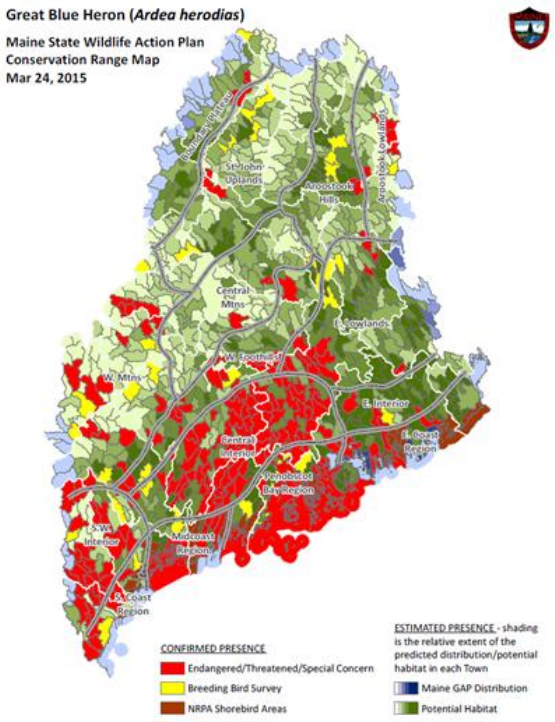
All of the SGCN species conservation range maps will be served to conservation partners and the public as digital files and/or via a web mapping service. Figure 1-1 illustrates some static images of a few SGCN example maps illustrating some of the variation in distribution patterns such as edge-of-range, rare but scattered, concentrated (e.g., coastal, mountainous), and ubiquitous.

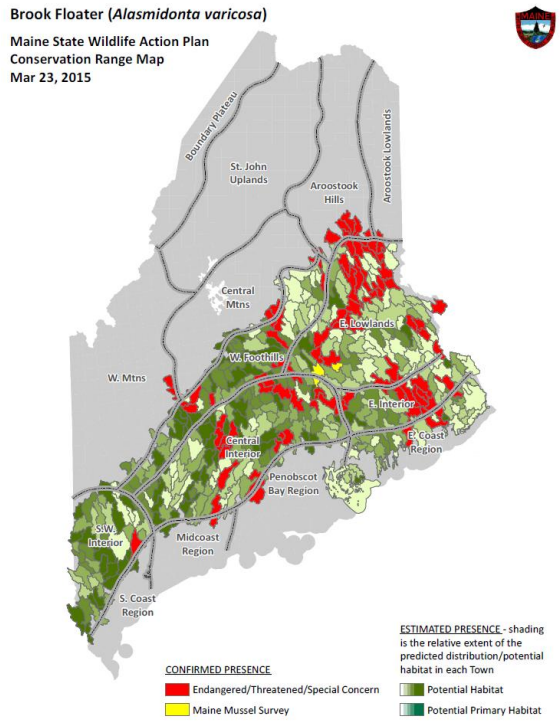
1.4.4 SGCN DISTRIBUTION SYNTHESIS

Summarizing SGCN patterns statewide was a primary goal of mapping species conservation ranges to determine where conservation actions might be best applied to benefit the most species. One summary method is by taxonomic class—for example, all birds. This approach benefits conservation partners interested in working with certain groups of SGCN. Other groups might be interested in SGCN associated with particular habitats (e.g., emergent marshes), especially when a specific conservation action is tied to a habitat type (e.g., improved riparian buffer conservation). As with the species conservation ranges, we based our SGCN summaries on USGS subwatersheds for aquatic SGCN classes and habitats and on Maine townships for non-aquatic SGCN classes and habitats. Our goal is to present these summaries in an interactive map format where users can select which SGCN classes, habitats, and landscape units to use. For purposes of this static document, we have included a few possible examples (Figure 1-2).

Figure 1-1. Examples of conservation range maps by USGS sub-watersheds for aquatic SGCNs and by Maine townships for terrestrial SGCNs. Red/yellow shaded areas indicate an SGCN's presence based on observation data; green/blue indicates presence of potential habitats associated with the SGCN.







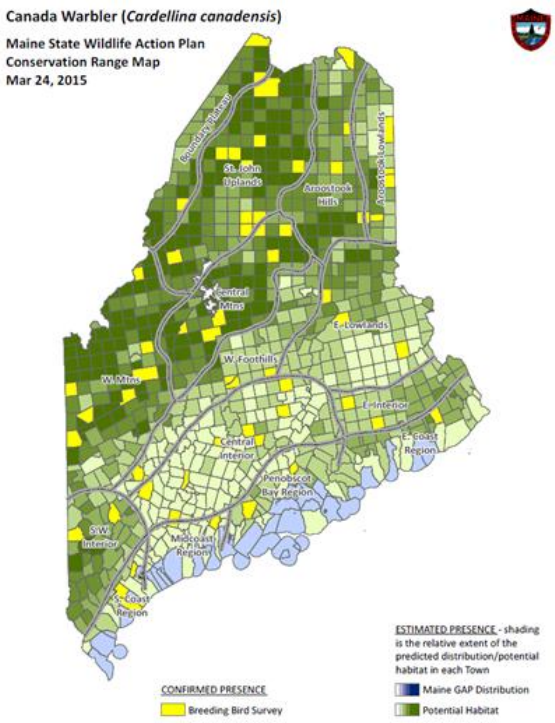
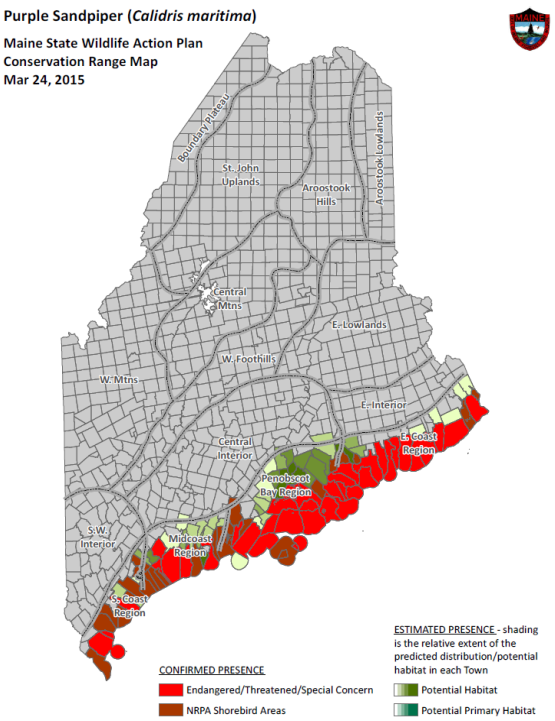
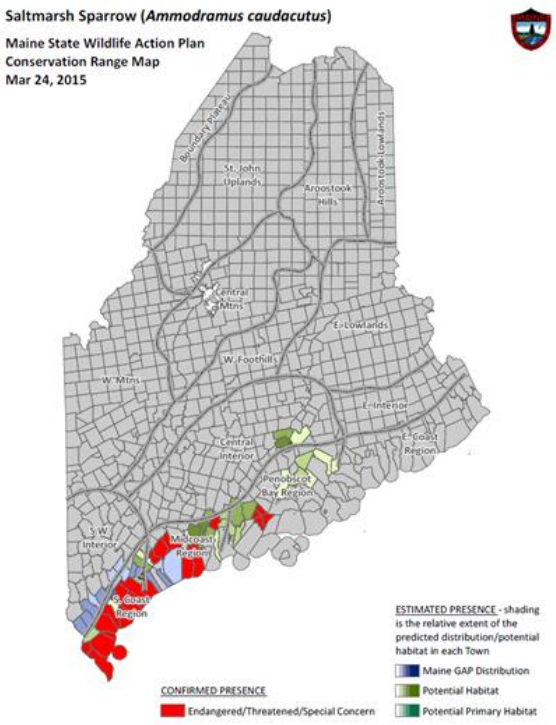
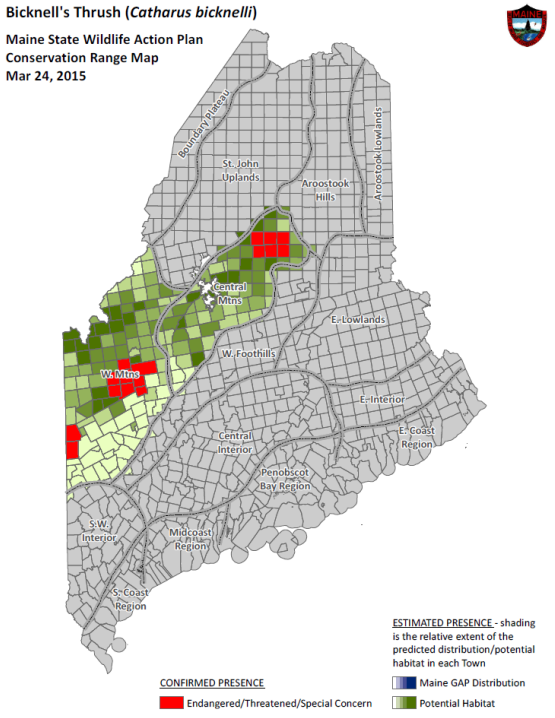


Figure 1-1. *continued: page 2 of 2.*







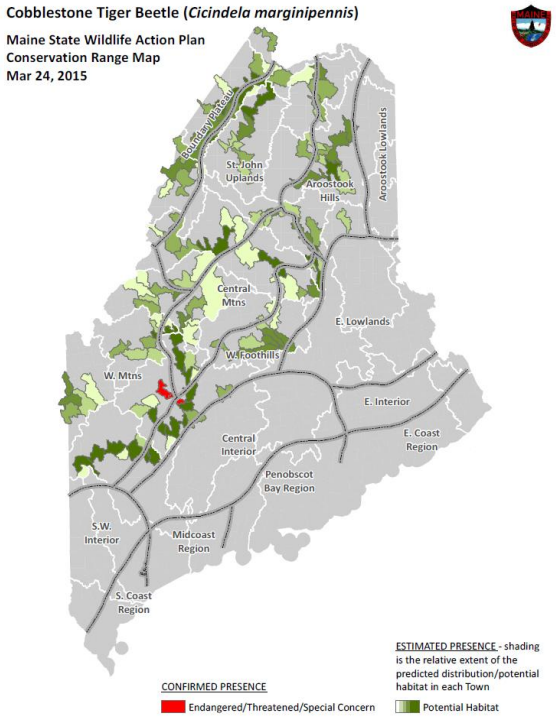
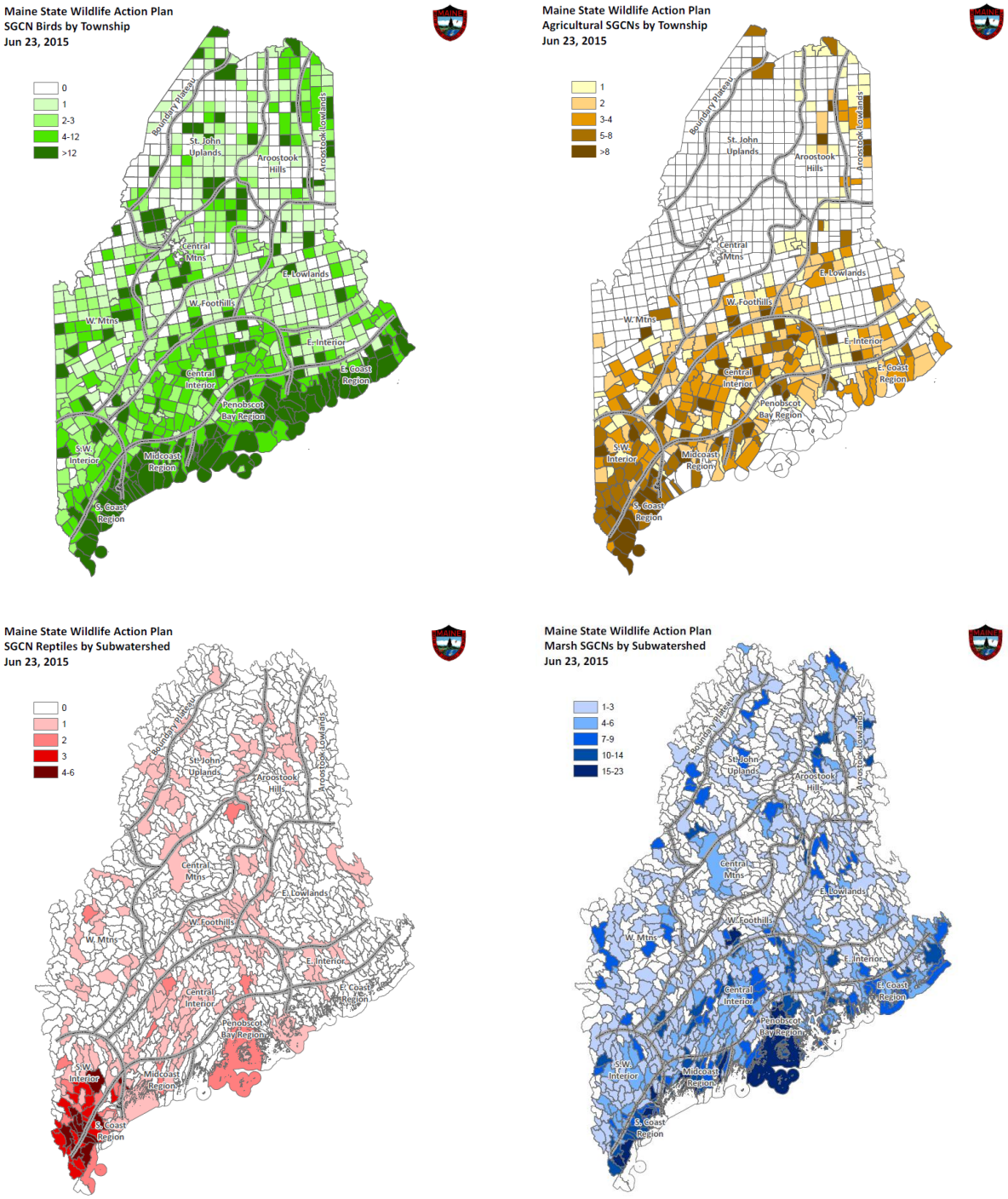


Figure 1-2. Examples of SGCN summaries by taxa class and habitat associations for USGS sub-watersheds and Maine townships.



1.5 DESIGNATION CRITERIA FOR MAINE'S SGCN - 2015

MDIFW biologists, with review and cooperation from conservation partners and species experts, offer the following criteria (and subcriteria) for designating Maine's eligible Species of Greatest Conservation Need (SGCN). The criteria and process for selecting SGCN are intended to be comprehensive, transparent, and based on best available science for prioritizing species of conservation concern at local, regional, and global scales. As proposed, fish and wildlife species (and subspecies) designated as priority 1 or 2 or 3 qualify as SGCN, and are thus eligible for State Wildlife Grant funding. The primary themes for SGCN prioritization include risk of extirpation, population trend, endemicity, and regional conservation responsibility. Secondary themes for SGCN prioritization include climate change vulnerability, survey knowledge, and cultural significance to Maine tribes (Table 1-2). Finally, only Maine extant species were considered for designation as SGCN in 2015.

"The criteria and process for selecting SGCN are intended to be comprehensive, transparent, and based on best available science for prioritizing species of conservation concern at local, regional, and global scales."

1.5.1 PRIORITY 1 (HIGHEST PRIORITY) SGCN

Generally, Priority 1 species include those that meet <u>two or more</u> of the following criteria:

1. **Risk of Extirpation** – Have current (or proposed) state or federal E/T status, or global endangerment status (International Union for the Conservation of Nature [IUCN])

2. **Recent Significant Declines** – A species currently (within 15 years) undergoing steep population decline statewide or regionally, which has already led to, or if unchecked is likely to lead to, local extinction and/or significant range contraction.

3. **Regional Endemic** – A species whose global geographic range is at least 90% contained within the area defined by USFWS Region 5, the Canadian Maritime Provinces, and southeastern Quebec (south of the St. Lawrence River).

4. **High Regional Conservation Priority** -- Identified as a high regional or global species of conservation concern by <u>one</u> of the following species assessment authorities (see Table 1-2 for Priority 1 subcriteria):

    a. Northeast Endangered Species and Wildlife Diversity Technical Committee [NESWDTC] (all vertebrates and freshwater mussels) – Therres 1999
    b. Northeast Regional Synthesis [RSGCN] (all vertebrates, freshwater mussels, and tiger beetles) – Terwilliger 2013
    c. NatureServe (all taxa) – NatureServe 2014
    d. Partners in Flight (land birds). Partners In Flight Science Committee 2012 Species Assessment Database, version 2012.
    e. North American Waterbird Conservation Plan [NAWCP] (all waterbirds) – Kushlan et al. 2002 and 2006 (marsh birds)
    f. North Atlantic Regional Shorebird Plan [NARSP] (shorebirds) – Clark and Niles 2000

g. U.S. Shorebird Conservation Plan [USSCP] (shorebirds) – U.S. Shorebird Conservation Plan 2004
h. Birds of Conservation Concern (all birds) – USFWS 2008
i. Northeast Partners In Amphibian and Reptile Conservation [NEPARC] (herpetofauna) – NEPARC 2010
j. American Fisheries Society (freshwater & diadromous fish) – Jelks et al. 2008
k. Atlantic States Marine Fisheries Commission Stock Assessments [ASMFC] - ASMFSC 2012
l. Eastern Brook Trout Joint Venture [EBTJV] - EBTJV 2011
m. Northeast Odonate Assessment (damselflies & dragonflies) – White et al. 2014

Note: Priority 1 designation is not intended for:

- species that have expanded their range into Maine within the past 50 years, OR
- species with only historic documentation (generally prior to mid-1970s)

1.5.2 PRIORITY 2 (HIGH PRIORITY) SGCN

Generally, Priority 2 species include:

- all other current State (Endangered, Threatened, or Proposed), Federal (Endangered, Threatened, Candidate, or Proposed) or Global (IUCN Critically Endangered or Threatened) risk of extirpation species, OR
- those that meet at least two of the following criteria:

1. **Global Vulnerability** – A species designated as Vulnerable by the International Union for the Conservation of Nature (IUCN).

2. **State Special Concern** – Listed as a current or proposed species of Special Concern in Maine.

3. **Recent Significant Declines** – A species currently (within 30 years) undergoing steep population decline statewide or regionally, which has already led to, or if unchecked is likely to lead to, local extinction and/or significant range contraction.

4. **Regional Endemic** – A species whose global geographic range is at least 90% contained within the area defined by USFWS Region 5, the Canadian Maritime Provinces, and southeastern Quebec (south of the St. Lawrence River).

5. **High Climate Change Vulnerability** – A species identified as highly vulnerable by Whitman et al. 2013 or Galbraith et al. 2014 (or other published source).

6. **Historical** -- Species currently listed as state (SH) or global (GH) Historical (by MDIFW or NatureServe) that have a reasonable probability of population rediscovery with further survey.

7. **High Regional Conservation Priority** -- Identified as a high regional or global species of conservation concern by one of the following authorities (see Table 1-2 for Priority 2 subcriteria):

a. Northeast Endangered Species and Wildlife Diversity Technical Committee [NESWDTC] (all vertebrates and freshwater mussels) – Therres 1999
b. Northeast Regional Synthesis [RSGCN] (all vertebrates, freshwater mussels, and tiger beetles) – Terwilliger 2013
c. NatureServe (all taxa) – NatureServe 2014
d. Partners in Flight (land birds). Partners In Flight Science Committee 2012 Species Assessment Database, version 2012.
e. North American Waterbird Conservation Plan [NAWCP] (all waterbirds) – Kushlan et al. 2002 and 2006 (marsh birds)
f. North Atlantic Regional Shorebird Plan [NARSP] (shorebirds) – Clark and Niles 2000
g. U.S. Shorebird Conservation Plan [USSCP] (shorebirds) – U.S. Shorebird Conservation Plan 2004
h. Birds of Conservation Concern (all birds) – USFWS 2008
i. Northeast Partners In Amphibian and Reptile Conservation [NEPARC] (herpetofauna) – NEPARC 2010
j. American Fisheries Society (freshwater & diadromous fish) – Jelks et al. 2008
k. Atlantic States Marine Fisheries Commission Stock Assessments [ASMFC] - ASMFSC 2012
l. Eastern Brook Trout Joint Venture [EBTJV] - EBTJV 2011
m. Northeast Odonate Assessment (damselflies & dragonflies) – White et al. 2014
n. Committee on the Status of Endangered Wildlife in Canada [COSEWIC] (all taxa) – COSEWIC 2015

Note: Priority 2 designation is not intended for species that have expanded their range into Maine within the past 25 years.

1.5.3 PRIORITY 3 (MODERATE PRIORITY) SGCN

Generally, Priority 3 species include those that meet at least one of the following criteria:

1. **Global Vulnerability** – A species designated as Vulnerable by the International Union for the Conservation of Nature (IUCN).

2. **State Special Concern** – Listed as a current or proposed species of Special Concern in Maine.

3. **Recent Significant Declines** – A species currently (within 30 years) undergoing steep population decline statewide or regionally, which has already led to, or if unchecked is likely to lead to, local extinction and/or significant range contraction.

4. **Regional Endemic** – A species whose global geographic range is at least 90% contained within the area defined by USFWS Region 5, the Canadian Maritime Provinces, and southeastern Quebec (south of the St. Lawrence River).

5. **High Climate Change Vulnerability** – A species identified as highly vulnerable by Whitman et al. 2013 or Galbraith et al. 2014 (or other published source).

6. **Understudied Rare Taxa** -- Recently documented or poorly surveyed rare species for which risk of extirpation is potentially high (e.g. few known occurrences), but insufficient data exist to conclusively assess distribution and status.

7. **Historical** -- Species currently listed as state (SH) or global (GH) Historical (by MDIFW or NatureServe) that have a reasonable probability of population rediscovery with further survey.

8. **Culturally Significant** -- Species identified as both biologically vulnerable and culturally significant by Maine's tribes.

9. **High Regional Conservation Priority** -- Identified as a high regional or global species of conservation concern by one of the following authorities (see Table 1-2 for Priority 2 subcriteria):

    a. Northeast Endangered Species and Wildlife Diversity Technical Committee [NESWDTC] (all vertebrates and freshwater mussels) – Therres 1999
    b. Northeast Regional Synthesis [RSGCN] (all vertebrates, freshwater mussels, and tiger beetles) – Terwilliger 2013
    c. NatureServe (all taxa) – NatureServe 2014
    d. Partners in Flight (land birds). Partners In Flight Science Committee 2012 Species Assessment Database, version 2012.
    e. North American Waterbird Conservation Plan [NAWCP] (all waterbirds) – Kushlan et al. 2002 and 2006 (marsh birds)
    f. North Atlantic Regional Shorebird Plan [NARSP] (shorebirds) – Clark and Niles 2000
    g. U.S. Shorebird Conservation Plan [USSCP] (shorebirds) – U.S. Shorebird Conservation Plan 2004
    h. Birds of Conservation Concern (all birds) – USFWS 2008
    i. Northeast Partners In Amphibian and Reptile Conservation [NEPARC] (herpetofauna) – NEPARC 2010
    j. American Fisheries Society (freshwater & diadromous fish) – Jelks et al. 2008
    k. Atlantic States Marine Fisheries Commission Stock Assessments [ASMFC] - ASMFSC 2012
    l. Eastern Brook Trout Joint Venture [EBTJV] - EBTJV 2011
    m. Northeast Odonate Assessment (damselflies & dragonflies) – White et al. 2014
    n. Committee on the Status of Endangered Wildlife in Canada [COSEWIC] (all taxa) – COSEWIC 2015

Note: Priority 3 designation is not intended for species that have expanded their range into Maine within the past 10 years.

Table 1-2. Vulnerability concepts and criteria for designating Maine's SGCN.

Vulnerability Factor	Authority (Source)	Metric[1]	Potential Priority	Primary Taxa
Extirpation	IUCN	"CR" or "EN"	1-2	all
Extirpation	IUCN	"VU"	1-3	all
Extirpation	ESA (USFWS)	"E" or "T" or "C" or "P"	1-2	all
Extirpation	MESA (MDIFW)	"E" or "T" or "P"	1-2	all
Potential Extirpation	MDIFW	"Special Concern"	2-3	all
Potential Extirpation	NMFS	"Species of Concern"	2-3	marine
Recent Decline	MDIFW (multiple)	Steep declines < 15 yrs.	1	all
Recent Decline	MDIFW (multiple)	Steep declines < 30 yrs.	2-3	all
Regional Endemics	MDIFW (multiple)	>90% of geographic range in the Northeast	1-3	all
Specialist Group Assessment	NEFWDTC (Therres 1999)	> 1: risk, data, area, spec, federal concerns	1-3	vertebrates & mussels
Specialist Group Assessment	RSGCN (Terwilliger & NEFWDTC 2013)	"high responsibility" AND "very high concern"	1	vertebrates
Specialist Group Assessment	RSGCN (Terwilliger & NEFWDTC 2013)	"high responsibility" AND "high concern"	2-3	vertebrates
Specialist Group Assessment	NatureServe (2014)	"G1-G2" (vertebrates) "G1" (invertebrates)	1	all
Specialist Group Assessment	NatureServe (2014)	"G3" (vertebrates) "G2" (invertebrates)	2-3	all
Specialist Group Assessment	COSEWIC (2015)	"E" or "T" in Atlantic Canada	2-3	all
Specialist Group Assessment	Partners in Flight (2012)	"concern, regional concern, or stewardship species" in US & CA	1-3	landbirds
Specialist Group Assessment	NAWCP (Kushlan et al. 2002, 2006)	"high concern"	1-3	waterbirds
Specialist Group Assessment	USSCP & NARSP (USSCP 2004; Clark & Niles 2000)	"highly imperiled" OR species of "high concern"	1-3	shorebirds
Specialist Group Assessment	Birds of Conservation Concern (USFWS 2008)	Listed in BCR 14 or 30	1-3	all birds
Specialist Group Assessment	NEPARC (2010)	"high responsibility" + "high concern" (red list)	1-3	reptiles & amphibians
Specialist Group Assessment	American Fisheries Society (Jelks et al. 2008)	Imperiled	1-3	fish

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

Vulnerability Factor	Authority (Source)	Metric[1]	Potential Priority	Primary Taxa
Specialist Group Assessment	ASMFC (2012)	"decreasing, unstable/decreasing, or local subpopulation"	1-3	marine fish
Specialist Group Assessment	EBTJV (2011)	"imperiled"	1-3	brook trout
Specialist Group Assessment	Northeast RCN Odonate Assessment (White et al. 2014)	"high vul" OR ["mod vul" + "primary-significant" responsibility]	1-3	damselflies & dragonflies
Climate Change	Manomet (Whitman et al. 2013)	"high vulnerability" + > "low confidence"	2-3	all
Climate Change	(Galbraith et al. 2014)	"high concern, highly imperiled, or critical"	2-3	shorebirds
Climate Change	Multiple	miscellaneous	2-3	marine
Rare & Poorly Surveyed	MDIFW	specialized habitat + <5 EOs and "G4-G5" OR < 10 EOs and "G3"	3	all
Historical	MDIFW & NatureServe (2014)	SH/GH and high rediscovery potential	2-3	all
Culturally Significant	Maine Tribes	culturally significant + biologically vulnerable	3	all

[1]**Metric Notes:** CR = Critically Endangered, EN = Endangered, VU = Vulnerable, E = Endangered, T = Threatened, C = Candidate, P = Proposed, G1-G5 & GH = NatureServe Global rarity ranks (range ranks rounded as follows: G1G2=G1, G1G3=G2), SH = State Historic, BCR = Bird Conservation Region, EO = Element Occurrences

1.6 MAINE'S 2015 SGCN

Vulnerability concepts and criteria (Table 1-2) adopted in this Plan identified 378 SGCN in Maine. This number is significantly greater than the 213 SGCN recognized in the 2005 Plan, however of the 2005 total, 33 species have lost SGCN eligibility in 2015 (Appendix 1-5). The net expansion of the SGCN list between 2005 and 2015 mostly reflects updates and additions in SGCN designation criteria, recent significant declines for some species, more scrutiny of invertebrate taxa not assessed in 2005, and much greater attention to marine fauna now at risk in the Gulf of Maine.

For example, Maine's 2005 CWCS identified only 13 marine SGCN (five finfish, five whales, and three sea turtles), of which 11 were federally-listed as E/T. All 13 retain their SGCN status, but the 2015 Plan identifies 62 additional fauna in the Gulf of Maine as SGCN, a tally that does not consider species (especially marine invertebrates) for which there are no data to evaluate vulnerability. MDMR, the lead state agency for marine fauna (except birds), focused SGCN designations on species with reliable abundance indices and/or significant stressors.

The 2015 compilation of Maine's SGCN (Table 1-3) includes 378 fauna. Each cell for a species is linked to an SGCN Report that summarizes qualification criteria, habitat associations (Element 2), significant stressors to the species or its habitats (Element 3), potential conservation actions (Element 4), and conservation range maps. Click on the cell with the scientific name / common name to view reports of these details for each Maine SGCN, including data (e.g., range) that can be updated during the life of the Plan.

"The net expansion of the SGCN list between 2005 and 2015 mostly reflects changes in SGCN designation criteria, recent significant declines for some species, more scrutiny of invertebrate taxa not assessed in 2005, and much greater attention to marine fauna now at risk in the Gulf of Maine."

Priority tiers of SGCN in this Plan ultimately are based on the degree of vulnerability for each species. Tier 1 SGCN receive utmost concern throughout the various Plan elements. However, higher SGCN priority levels do not necessarily infer they are absolute priority conservation targets. Instead, habitat-based conservation actions, or those that address a guild of several SGCN, may be more significant than a strategy that benefits a single Tier 1 SGCN. Feasibility, outcomes, and cost of conservation actions also influence Plan priorities. Among the 378 SGCN recognized in this Plan, the total number of SGCN by priority level separate as follows:

- Tier 1 (Highest Priority) – 58 SGCN
- Tier 2 (High Priority) – 131 SGCN
- Tier 3 (Moderate Priority) – 189 SGCN

Table 1-3. Maine's SGCN (by taxa class) and qualifying factors, 2015.

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
ACTINOPTERYGII (ray-finned fishes; N = 33)							
Acipenseriformes (sturgeons and paddlefishes; N = 2)							
Acipenser brevirostrum Shortnose sturgeon	1	1	E	yes	E	VU	
Acipenser oxyrinchus Atlantic sturgeon	1	1		yes	T		1
Anguilliformes (true eels; N = 1)							
Anguilla rostrata American Eel	1	2	SC	yes			2
Clupeiformes (herrings; N = 3)							
Alosa aestivalis Blueback Herring	no	1		yes	SoC	VU	2
Alosa pseudoharengus Alewife	no	2		yes	SoC		2
Alosa sapidissima American Shad	2	1		yes			3
Cypriniformes (carps, minnows, loaches and allies; N = 7)							
Catostomus catostomus Longnose Sucker	2	3					1
Erimyzon oblongus Creek Chubsucker	no	3	SC				1
Hybognathus regius Eastern Silvery Minnow	no	3					1
Margariscus margarita Pearl Dace	no	3					1
Notropis bifrenatus Bridle Shiner	no	2	SC	yes			
Notropis heterolepis Blacknose Shiner	no	3					1
Rhinichthys cataractae Longnose Dace	no	3	SC				1
Esociformes (pikes and mudminnows; N = 1)							
Esox americanus americanus Redfin Pickerel	1	2	E				

[1] Click on a species name to launch a full SGCN report summarizing associated habitats, stressors, and conservation strategies for that species.

[2] State & Federal ESA Codes: Endangered Species [E]; Threatened Species [T]; Candidate Species [C]; Special Concern Species [SC]; Species of Concern [SoC]. IUCN Codes: Critically Endangered [CR]; Endangered [EN]; Vulnerable [VU].

[3] Other potential qualifying factors for 2015 SGCN designation include: climate change, recent significant decline, understudied species, regional endemism, historic taxon with rediscovery potential, and tribal cultural significance.

Table 1-3. *continued: page 2 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
ACTINOPTERYGII (ray-finned fishes; continued)							
Gadiformes (cods, haddocks, grenadiers; N = 4)							
Brosme brosme Cusk	no	2		yes	SoC		1
Gadus morhua Atlantic Cod	no	1		yes		VU	
Lota lota Burbot	2	3					1
Melanogrammus aeglefinus Haddock	no	1		yes		VU	
Gasterosteiformes (sticklebacks; N = 1)							
Culaea inconstans Brook Stickleback	no	3	SC				1
Osmeriformes (smelts and allies; N = 1)							
Osmerus mordax Rainbow Smelt	2	1		yes	SoC		3
Perciformes (perch-like fishes; N = 6)							
Ammodytes americanus American Sand Lance	no	3		yes			
Anarhichas lupus Atlantic Wolffish	no	2			SoC		2
Anarhichas minor Spotted Wolffish	no	3		yes			1
Etheostoma fusiforme Swamp Darter	1	2	T				
Morone saxatilis Striped Bass	no	2		yes			2
Thunnus thynnus Atlantic Bluefin Tuna	no	2		yes	SoC	EN	
Pleuronectiformes (flatfish; N = 1)							
Pseudopleuronectes americanus Winter Flounder	no	2		yes			1

[1] Click on a species name to launch a full SGCN report summarizing associated habitats, stressors, and conservation strategies for that species.
[2] State & Federal ESA Codes: Endangered Species [E]; Threatened Species [T]; Candidate Species [C]; Special Concern Species [SC]; Species of Concern [SoC]. IUCN Codes: Critically Endangered [CR]; Endangered [EN]; Vulnerable [VU].
[3] Other potential qualifying factors for 2015 SGCN designation include: climate change, recent significant decline, understudied species, regional endemism, historic taxon with rediscovery potential, and tribal cultural significance.

Table 1-3. *continued: page 3 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
ACTINOPTERYGII (ray-finned fishes; continued)							
Salmoniformes (salmon, trout, and whitefish; N = 6)							
Coregonus clupeaformis Lake Whitefish	1	2	SC				2
Prosopium cylindraceum Round Whitefish	2	2		yes			1
Salmo salar Atlantic Salmon	1	1		yes	E		1
Salvelinus alpinus oquassa Arctic Charr	1	1	SC	yes			1
Salvelinus fontinalis Brook Trout	2	3		yes			1
Salvelinus namaycush Lake Trout	1	3					1
AMPHIBIA (amphibians; N = 4)							
Anura (frogs and toads; N = 2)							
Lithobates pipiens Northern Leopard Frog	no	2	SC	yes			
Lithobates septentrionalis Mink Frog	no	3					1
Caudata (salamanders; N = 2)							
Ambystoma laterale Blue-spotted Salamander	2	2	SC	yes			
Gyrinophilus porphyriticus porphyriticus Northern Spring Salamander	no	2	SC	yes			
ANTHOZOA (corals, sea pens, sea fans, sea anemones; N = 2)							
Alcyonacea (soft corals; N = 2)							
Alcyonium digitatum Dead Man's Fingers	no	3					2
Gersemia rubiformis Sea Strawberry	no	2					3

[1] Click on a species name to launch a full SGCN report summarizing associated habitats, stressors, and conservation strategies for that species.
[2] State & Federal ESA Codes: Endangered Species [E]; Threatened Species [T]; Candidate Species [C]; Special Concern Species [SC]; Species of Concern [SoC]. IUCN Codes: Critically Endangered [CR]; Endangered [EN]; Vulnerable [VU].
[3] Other potential qualifying factors for 2015 SGCN designation include: climate change, recent significant decline, understudied species, regional endemism, historic taxon with rediscovery potential, and tribal cultural significance.

Table 1-3. *continued: page 4 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
ASTEROIDEA (sea stars; N = 5)							
Forcipulatida (sea stars; N = 3)							
Asterias forbesi Forbes's Starfish	no	2					3
Asterias rubens Common Sea Star	no	2					3
Stephanasterias albula White Sea Star	no	2					3
Valvatida (N = 2)							
Crossaster papposus Common Sun Star	no	2					3
Solaster endeca Purple Sunstar	no	2					3
AVES (birds; N = 130)							
Accipitriformes (hawks, kites, eagles, and allies; N = 3)							
Aquila chrysaetos Golden Eagle	2	2	E	yes			
Buteo platypterus Broad-winged Hawk	no	3		yes			
Circus cyaneus Northern Harrier	no	3	SC				
Anseriformes (waterfowl; N = 5)							
Aythya marila Greater Scaup	2	2	SC				1
Bucephala islandica Barrow's Goldeneye	2	1	T				1
Clangula hyemalis Long-tailed Duck	no	3				VU	
Histrionicus histrionicus Harlequin Duck	2	1	T	yes			1
Somateria mollissima Common Eider	2	3					1

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Table 1-3. *continued: page 5 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Apodiformes (swifts and hummingbirds; N = 1)							
Chaetura pelagica Chimney Swift	2	2	SC	yes			1
Caprimulgiformes (nightjars; N = 2)							
Antrostomus vociferus Eastern Whip-poor-will	2	2	SC	yes			
Chordeiles minor Common Nighthawk	2	3		yes			
Charadriiformes (plovers, sandpipers, and allies; N = 30)							
Alca torda Razorbill	2	2	T				1
Arenaria interpres Ruddy Turnstone	2	2		yes			2
Bartramia longicauda Upland Sandpiper	1	1	T	yes			
Calidris alba Sanderling	2	2		yes			1
Calidris alpina Dunlin	no	3					1
Calidris canutus rufa Red Knot	2	1	SC	yes	T		1
Calidris maritima Purple Sandpiper	2	1		yes			2
Calidris minutilla Least Sandpiper	no	3					1
Calidris pusilla Semipalmated Sandpiper	2	2	SC	yes			2
Charadrius melodus Piping Plover	1	1	E	yes	T		
Chlidonias niger Black Tern	1	2	E				1
Chroicocephalus philadelphia Bonaparte's Gull	2	3	SC				

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Table 1-3. *continued: page 6 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Charadriiformes (plovers, sandpipers, and allies; continued)							
Fratercula arctica Atlantic Puffin	2	2	T				1
Haematopus palliatus American Oystercatcher	1	3	SC	yes			1
Leucophaeus atricilla Laughing Gull	no	3	SC				
Limnodromus griseus Short-billed Dowitcher	no	3		yes			1
Numenius phaeopus Whimbrel	2	2	SC	yes			1
Phalaropus fulicarius Red Phalarope	no	3					1
Phalaropus lobatus Red-necked Phalarope	2	2	SC				2
Pluvialis squatarola Black-bellied Plover	no	3					1
Scolopax minor American Woodcock	2	3					1
Sterna dougallii Roseate Tern	1	1	E	yes	E		
Sterna hirundo Common Tern	2	2	SC	yes			
Sterna paradisaea Arctic Tern	2	1	T	yes			
Sternula antillarum Least Tern	1	1	E	yes			
Tringa flavipes Lesser Yellowlegs	no	1	SC	yes			1
Tringa melanoleuca Greater Yellowlegs	2	3					1
Tringa semipalmata Willet	2	3					1

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Table 1-3. *continued: page 7 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Charadriiformes (plovers, sandpipers, and allies; continued)							
Tringa solitaria Solitary Sandpiper	no	2		yes			1
Uria aalge Common Murre	2	3	SC				1
Coraciiformes (kingfishers and allies; N = 1)							
Megaceryle alcyon Belted Kingfisher	no	3		yes			
Cuculiformes (cuckoos; N = 2)							
Coccyzus americanus Yellow-billed Cuckoo	no	2	SC	yes			
Coccyzus erythropthalmus Black-billed Cuckoo	2	3		yes			
Falconiformes (caracaras and falcons; N = 2)							
Falco peregrinus Peregrine Falcon	1	1	E	yes			
Falco sparverius American Kestrel	no	3		yes			
Galliformes (grouse, quail, and allies; N = 1)							
Falcipennis canadensis Spruce Grouse	no	3					2
Gaviiformes (loons; N = 2)							
Gavia immer Common Loon	2	3					1
Gavia stellata Red-throated Loon	no	3		yes			
Gruiformes (cranes and rails; N = 4)							
Coturnicops noveboracensis Yellow Rail	2	2	SC	yes			1
Fulica americana American Coot	2	3	SC				
Gallinula galeata Common Gallinule	2	2	T				1

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Table 1-3. *continued: page 8 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Gruiformes (cranes and rails; continued)							
Porzana carolina Sora	no	3		yes			
Passeriformes (perching birds; N = 59)							
Ammodramus caudacutus Saltmarsh Sparrow	1	1	SC	yes		VU	1
Ammodramus nelsoni Nelson's Sparrow	2	2	SC	yes			1
Ammodramus savannarum Grasshopper Sparrow	2	1	E	yes			
Anthus rubescens American Pipit	2	2	E				1
Cardellina canadensis Canada Warbler	2	2	SC	yes			
Catharus bicknelli Bicknell's Thrush	1	1	SC	yes		VU	1
Catharus fuscescens Veery	2	2	SC	yes			
Catharus ustulatus Swainson's Thrush	no	3					1
Cistothorus platensis Sedge Wren	1	1	E	yes			
Coccothraustes vespertinus Evening Grosbeak	no	2	SC	yes			1
Contopus cooperi Olive-sided Flycatcher	2	2	SC	yes			
Contopus virens Eastern Wood-Pewee	no	2	SC	yes			
Dolichonyx oryzivorus Bobolink	2	3		yes			
Empidonax flaviventris Yellow-bellied Flycatcher	no	3					1

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Table 1-3. *continued: page 9 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Passeriformes (perching birds; continued)							
Empidonax minimus Least Flycatcher	no	3	SC				
Eremophila alpestris Horned Lark	2	3	SC				
Euphagus carolinus Rusty Blackbird	2	1	SC	yes		VU	
Geothlypis philadelphia Mourning Warbler	no	3					1
Haemorhous purpureus Purple Finch	2	3		yes			
Hirundo rustica Barn Swallow	2	2	SC	yes			1
Hylocichla mustelina Wood Thrush	2	1	SC	yes			1
Icterus galbula Baltimore Oriole	2	3		yes			
Icterus spurius Orchard Oriole	no	3	SC				
Loxia curvirostra Red Crossbill	2	3					1
Loxia leucoptera White-winged Crossbill	no	3					1
Melospiza lincolnii Lincoln's Sparrow	no	3					1
Mniotilta varia Black-and-white Warbler	2	2	SC	yes			
Oreothlypis peregrina Tennessee Warbler	no	2	SC				1
Parkesia motacilla Louisiana Waterthrush	2	3		yes			
Passerella iliaca Fox Sparrow	no	3	SC				

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Table 1-3. *continued: page 10 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Passeriformes (perching birds; continued)							
Perisoreus canadensis Gray Jay	no	3					1
Petrochelidon pyrrhonota Cliff Swallow	no	3					1
Pheucticus ludovicianus Rose-breasted Grosbeak	2	3		yes			
Pinicola enucleator Pine Grosbeak	no	3					1
Pipilo erythrophthalmus Eastern Towhee	2	2	SC	yes			
Piranga olivacea Scarlet Tanager	2	3		yes			
Poecile hudsonicus Boreal Chickadee	no	2		yes			1
Progne subis Purple Martin	2	2	SC				1
Regulus calendula Ruby-crowned Kinglet	no	2					2
Riparia riparia Bank Swallow	no	1		yes			1
Setophaga americana Northern Parula	2	3					1
Setophaga caerulescens *Black-throated Blue Warbler*	2	3		yes			
Setophaga castanea Bay-breasted Warbler	2	3		yes			
Setophaga discolor Prairie Warbler	2	2	SC	yes			
Setophaga fusca Blackburnian Warbler	2	3		yes			
Setophaga pensylvanica Chestnut-sided Warbler	2	2	SC	yes			

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Table 1-3. *continued: page 11 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Passeriformes (perching birds; continued)							
Setophaga petechia Yellow Warbler	no	3	SC				
Setophaga ruticilla American Redstart	no	2	SC	yes			
Setophaga striata Blackpoll Warbler	no	3					1
Setophaga tigrina Cape May Warbler	2	3					1
Setophaga virens Black-throated Green Warbler	2	3		yes			
Spizella pusilla Field Sparrow	2	3		yes			
Stelgidopteryx serripennis Northern Rough-winged Swallow	no	3	SC				
Sturnella magna Eastern Meadowlark	2	2	SC	yes			
Tachycineta bicolor Tree Swallow	no	2	SC	yes			
Toxostoma rufum Brown Thrasher	2	2	SC	yes			
Tyrannus tyrannus Eastern Kingbird	2	2	SC	yes			
Vermivora cyanoptera Blue-winged Warbler	1	2	SC	yes			
Zonotrichia albicollis White-throated sparrow	no	3	SC				
Pelecaniformes (pelecans, herons, ibises, and allies; N = 6)							
Ardea herodias Great Blue Heron	2	2	SC				1
Botaurus lentiginosus American Bittern	2	3		yes			

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Table 1-3. *continued: page 12 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Pelecaniformes (pelecans, herons, ibises, and allies; continued)							
Egretta caerulea Little Blue Heron	2	3		yes			
Egretta thula Snowy Egret	2	3		yes			
Ixobrychus exilis Least Bittern	2	1	E	yes			
Nycticorax nycticorax Black-crowned Night-heron	2	2	E				
Piciformes (woodpeckers; N = 3)							
Colaptes auratus Northern Flicker	2	3		yes			
Picoides arcticus Black-backed Woodpecker	no	3					1
Picoides dorsalis American Three-toed Woodpecker	2	3					1
Podicipediformes (grebes; N = 2)							
Podiceps auritus Horned Grebe	no	3		yes			
Podilymbus podiceps Pied-billed Grebe	2	3		yes			
Procellariiformes (tubenoses; N = 2)							
Oceanodroma leucorhoa Leach's Storm-petrel	no	3	SC				
Puffinus gravis Great Shearwater	2	3		yes			
Strigiformes (owls; N = 4)							
Asio flammeus Short-eared Owl	1	2	T	yes			
Asio otus Long-eared Owl	2	3					1
Megascops asio Eastern Screech-Owl	2	3	SC				1

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Table 1-3. *continued: page 13 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
AVES (birds; continued)							
Strigiformes (owls; continued)							
Tyto alba Barn Owl	no	3	SC				
Suliformes (frigatebirds, boobies, cormorants, darters, and allies; N = 1)							
Phalacrocorax carbo Great Cormorant	2	1	T	yes			1
BIVALVIA (marine and freshwater molluscs; N = 14)							
Myoida (saltwater clams; N = 3)							
Mya arenaria Softshell Clam	no	3					1
Mya truncata Gaper Clam	no	3					4
Zirfaea crispata Atlantic Great Piddock	no	2					3
Mytiloida (mussels; N = 1)							
Mytilus edulis Blue Mussel	no	3					1
Ostreoida (oysters, scallops, and allies; N = 1)							
Crassostrea virginica Eastern oyster	no	3					2
Pectinoida (N = 2)							
Chlamys islandica Icelandic Scallop	no	3					2
Placopecten magellanicus Atlantic Sea Scallop	no	3					1
Unionoida (freshwater mussels; N = 6)							
Alasmidonta undulata Triangle Floater	no	3		yes			
Alasmidonta varicosa Brook Floater	2	1	T	yes			
Anodonta implicata Alewife Floater	no	3		yes			

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Table 1-3. *continued: page 14 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
BIVALVIA (marine and freshwater molluscs; continued)							
Unionoida (freshwater mussels; continued)							
Lampsilis cariosa Yellow Lampmussel	1	1	T	yes		EN	
Leptodea ochracea Tidewater Mucket	1	1	T	yes			
Margaritifera margaritifera Eastern Pearlshell	no	3				EN	
Veneroida (veneroids; N = 1)							
Mercenaria mercenaria Hard-shelled Clam	no	3					1
CEPHALASPIDOMORPHI (lampreys; N = 1)							
Petromyzontiformes (lampreys; N = 1)							
Lethenteron appendix American Brook Lamprey	no	3		yes			
CHONDRICHTHYES (sharks, rays, and skates; N = 9)							
Carcharhiniformes (ground sharks; N = 2)							
Prionace glauca Blue Shark	no	3					
Sphyrna zygaena Smooth Hammerhead	no	3				VU	
Lamniformes (sharks, skates, and rays ; N = 3)							
Alopias vulpinus Common Thresher Shark	no	3				VU	
Isurus oxyrinchus Shortfin Mako	no	2		yes		VU	
Lamna nasus Porbeagle	no	2		yes	SoC	VU	
Rajiformes (rays; N = 4)							
Amblyraja radiata Thorny Skate	no	2			SoC	VU	
Dipturus laevis Barndoor Skate	no	2		yes		EN	

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Table 1-3. *continued: page 15 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
CHONDRICHTHYES (sharks, rays, and skates; continued)							
Rajiformes (rays; continued)							
Leucoraja ocellata Winter Skate	no	2				EN	
Malacoraja senta Smooth Skate	no	2				EN	
ECHINOIDEA (sea urchins; N = 1)							
Camarodonta (sea urchins; N = 1)							
Strongylocentrotus droebachiensis Green Sea Urchin	no	2					2
GASTROPODA (aquatic and terrestrial snails; N = 15)							
Basommatophora (air-breathing freshwater snails; N = 2)							
Stagnicola mighelsi Bigmouth Pondsnail	2	1	SC	yes			1
Stagnicola oronoensis Obese Pondsnail	no	3					1
Littorinimorpha (N = 2)							
Arrhoges occidentalis American Pelican Foot	no	2					3
Limneria undata Wavy Lamellaria	no	3					2
Neotaenioglossa (mostly sea snails; N = 5)							
Boreotrophon clathratus Clathrate Trophon	no	2					3
Boreotrophon truncatus Murex	no	2					3
Colus pygmaeus Colus Snail	no	2					3
Floridobia winkleyi New England Silt Snail	no	3					2
Ptychatractus ligatus Spindle Shell	no	2					3

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Table 1-3. *continued: page 16 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
GASTROPODA (aquatic and terrestrial snails; continued)							
Stylommatophora (air-breathing snails land snails; N = 5)							
Appalachina sayana Spike-lip Crater	no	3					1
Neohelix dentifera Big-tooth Whitelip	no	3					1
Vertigo malleata Malleated Vertigo	no	3	SC				1
Vertigo morsei Six-whorl Vertigo	2	1	E				2
Vertigo paradoxa Mystery Vertigo	2	2	SC				
Thecosomata (sea butterflies; N = 1)							
Limacina helicina Limancina Snail	no	3					1
HOLOTHUROIDEA (sea cucumbers; N = 4)							
Dendrochirotida (sea cucumbers; N = 4)							
Cucumaria frondosa Orange-footed Sea Cucumber	no	2					2
Psolus fabricii Psolus	no	2					3
Psolus phantapus Psolus	no	2					3
Thyonidium drummondii Sea Cucumber	no	2					3
INSECTA (insects; N = 119)							
Coleoptera (beetles; N = 4)							
Cicindela ancocisconensis White Mountain Tiger Beetle	no	2	SC	yes			1
Cicindela marginata Salt Marsh Tiger Beetle	no	2	SC				1
Cicindela marginipennis Cobblestone Tiger Beetle	no	1	E	yes			1

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Table 1-3. *continued: page 17 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; N = 119)							
Coleoptera (beetles; continued)							
Nebria nivalis gaspesiana Gaspe Gazelle Beetle	no	3					1
Ephemeroptera (mayflies; N = 15)							
Ameletus browni A Mayfly	no	3	SC				1
Baetisca berneri A Mayfly	no	3	SC				1
Baetisca carolina A Mayfly	no	3	SC				1
Baetisca lacustris A Mayfly	no	3	SC				1
Baetisca rubescens A Mayfly	2	3	SC				2
Epeorus frisoni Roaring Brook Mayfly	1	1	T	yes			1
Hexagenia rigida A Mayfly	no	3	SC				1
Metretopus borealis A Mayfly	no	3	SC				1
Nixe horrida A Mayfly	2	3	SC	yes			1
Parameletus midas A Mayfly	no	3	SC				1
Rhithrogena undulata A Mayfly	no	3	SC				1
Siphlonisca aerodromia Tomah Mayfly	1	1	T				1
Siphlonurus barbaroides A Mayfly	no	3	SC				1
Siphlonurus barbarus A Mayfly	no	2	SC	yes			1

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Table 1-3. *continued: page 18 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Ephemeroptera (mayflies; continued)							
Siphlonurus demaryi A Mayfly	2	2	SC	yes			2
Hymenoptera (ants, bees, wasps and sawflies; N = 10)							
Bombus affinis Rusty-patched Bumble Bee	no	1	SC	yes			1
Bombus ashtoni Ashton's Cuckoo Bumble Bee	no	2	SC				2
Bombus citrinus Lemon Cuckoo Bumble Bee	no	3	SC				1
Bombus fernaldae Fernald's Cuckoo Bumble Bee	no	3	SC				1
Bombus fervidus Yellow Bumble Bee	no	3	SC				1
Bombus griseocollis Brown-belted Bumble Bee	no	3	SC				1
Bombus insularis Indiscriminate Cuckoo Bumble Bee	no	2	SC				2
Bombus pensylvanicus American Bumble Bee	no	2	SC				2
Bombus sandersoni Sanderson's Bumble Bee	no	3	SC				1
Bombus terricola Yellowbanded Bumble Bee	no	3	SC				1
Lepidoptera (butterflies, skippers, and moths; N = 47)							
Atrytonopsis hianna Dusted Skipper	no	3	SC				1
Boloria chariclea grandis Purple Lesser Fritillary	2	2	T				2
Boloria frigga saga Frigga Fritillary	2	1	E				2
Callophrys gryneus Juniper Hairstreak	2	2	E				1

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Table 1-3. *continued: page 19 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Lepidoptera (butterflies, skippers, and moths; continued)							
Callophrys hesseli Hessel's Hairstreak	1	1	E				1
Callophrys lanoraieensis Bog Elfin	no	3					1
Catocala similis Similar Underwing	no	3	SC				1
Chaetaglaea cerata A Noctuid Moth	2	2	SC				1
Chaetaglaea tremula Barrens Chaetaglaea	no	3	SC				1
Citheronia sepulcralis Pine Devil	2	2	SC				1
Cucullia speyeri A Moth	2	3					1
Cupido amyntula maritima Western Tailed Blue	no	3					1
Danaus plexippus Monarch	no	3					1
Erora laeta Early Hairstreak	2	2	SC				1
Erynnis brizo Sleepy Duskywing	2	2	T				
Hemaris gracilis Graceful Clearwing	2	3	SC				1
Hemileuca lucina New England Buckmoth	no	3					1
Hemileuca maia maia Eastern Buckmoth	2	2	SC				1
Hesperia leonardus Leonard's Skipper	2	3	SC				
Hesperia metea Cobweb Skipper	2	3	SC				1

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Table 1-3. *continued: page 20 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Lepidoptera (butterflies, skippers, and moths; continued)							
Lapara coniferarum Southern Pine Sphinx	no	3	SC				1
Lepipolys perscripta A Moth	no	3	SC				1
Lithophane lepida lepida Pine Pinion	2	2	SC	yes			2
Lycaena dorcas claytoni Clayton's Copper	1	2	T	yes			
Lycia rachelae Twilight Moth	1	2	T				1
Metarranthis apiciaria Barrens Metarranthis Moth	no	2	SC	yes			1
Nepytia pellucidaria A Moth	2	3	SC				1
Oeneis polixenes katahdin Katahdin Arctic	1	1	E	yes			1
Paonias astylus Huckleberry Sphinx	no	3	SC				1
Papilio brevicauda gaspeensis Short-tailed Swallowtail	no	3	SC				1
Papilio troilus Spicebush Swallowtail	2	3	SC				
Plebejus idas Northern Blue	no	2	SC				2
Plebejus idas empetri Crowberry Blue	2	2	SC				1
Polygonia satyrus Satyr Comma	no	3	SC				1
Psectraglaea carnosa Pink Sallow	2	2	SC				2
Satyrium edwardsii Edwards' Hairstreak	2	2	E				1

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Table 1-3. *continued: page 21 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Lepidoptera (butterflies, skippers, and moths; continued)							
Satyrium titus Coral Hairstreak	2	3	SC				
Satyrodes appalachia Appalachian Brown	no	3	SC				
Spartiniphaga inops Spartina Borer Moth	no	3					1
Speranza exonerata Barrens Itame	2	2	SC				2
Thorybes bathyllus Southern Cloudywing	no	3	SC				1
Xylena thoracica Acadian Swordgrass Moth	no	3	SC				
Xylotype capax Broad Sallow	no	3	SC				1
Xystopeplus rufago Red-winged Sallow	no	3	SC				1
Zale lunifera Bold-based Zale Moth	2	3	SC				1
Zale obliqua Oblique Zale	no	3	SC				1
Zanclognatha martha Pine Barrens Zanclognatha	2	1	T				2
Odonata (dragonflies and damselflies; N = 36)							
Aeshna juncea Sedge Darner	2	2	SC	yes			2
Aeshna sitchensis Zigzag Darner	no	3	SC	yes			
Anax longipes Comet Darner	no	3	SC				1
Argia translata Dusky Dancer	2	3	SC				1

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Table 1-3. *continued: page 22 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Odonata (dragonflies and damselflies; continued)							
Arigomphus furcifer Lilypad Clubtail	no	3	SC				
Celithemis martha Martha's Pennant	no	3		yes			1
Cordulegaster obliqua Arrowhead Spiketail	2	3	SC	yes			
Enallagma carunculatum Tule Bluet	2	3	SC				1
Enallagma durum Big Bluet	2	3	SC				1
Enallagma laterale New England Bluet	no	2		yes			1
Enallagma pictum Scarlet Bluet	2	2	SC	yes			1
Epiaeschna heros Swamp Darner	2	3	SC				1
Erythrodiplax berenice Seaside Dragonlet	no	3		yes			
Gomphus quadricolor Rapids Clubtail	1	2	E				
Gomphus vastus Cobra Clubtail	2	3	SC				1
Ischnura hastata Citrine Forktail	2	3	SC				1
Ischnura ramburii Rambur's Forktail	2	3	SC				1
Lanthus vernalis Southern Pygmy Clubtail	no	2	SC				1
Leucorrhinia patricia Canada Whiteface	2	2	SC	yes			1
Libellula needhami Needhams Skimmer	no	3	SC				1

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Table 1-3. *continued: page 23 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Odonata (dragonflies and damselflies; continued)							
Libellula semifasciata Painted Skimmer	no	3	SC				
Nannothemis bella Elfin Skimmer	no	3		yes			
Neurocordulia michaeli Broad-tailed Shadowdragon	no	3		yes			
Ophiogomphus anomalus Extra-striped Snaketail	no	3		yes			
Ophiogomphus colubrinus Boreal Snaketail	2	1	T	yes			
Ophiogomphus howei Pygmy Snaketail	2	2	SC	yes			
Progomphus obscurus Common Sanddragon	no	3	SC				
Rhionaeschna mutata Spatterdock Darner	1	3	SC				1
Somatochlora albicincta Ringed Emerald	no	3	SC				
Somatochlora brevicincta Quebec Emerald	2	2	SC	yes			1
Somatochlora incurvata Incurvate Emerald	no	3	SC	yes			
Somatochlora minor Ocellated Emerald	no	3		yes			
Stylurus spiniceps Arrow Clubtail	2	3	SC				
Tramea carolina Carolina Saddlebags	no	3	SC				1
Tramea lacerata Black Saddlebags	no	3	SC				1
Williamsonia lintneri Ringed Boghaunter	1	1	T	yes		VU	1

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Table 1-3. *continued: page 24 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
INSECTA (insects; continued)							
Plecoptera (stoneflies; N = 3)							
Alloperla voinae A Stonefly	no	3					1
Neoperla mainensis A Stonefly	2	3	SC	yes			1
Pteronarcys comstocki Spiny Salmonfly	no	3					1
Trichoptera (caddisflies; N = 4)							
Hydroptila blicklei A Caddisfly	no	3	SC	yes			2
Hydroptila parachelops A Caddisfly	no	3	SC	yes			2
Hydroptila tomah A Caddisfly	2	3	SC	yes			2
Ochrotrichia denningi A Caddisfly	no	3					2
MALACOSTRACA (crustaceans; N = 4)							
Decapoda (decapods; N = 4)							
Lebbeus groenlandicus Spiny Lebbeid Shrimp	no	2					3
Lebbeus polaris Polar Lebbeid Shrimp	no	2					3
Orconectes limosus Spinycheek Crayfish	no	3					1
Pandalus borealis Northern Shrimp	no	1		yes			2
MAMMALIA (mammals; N = 22)							
Artiodactyla (even-toed ungulates; N = 1)							
Alces alces americanus Moose	no	3					1
Carnivora (carnivores; N = 1)							
Lynx canadensis Canada Lynx	2	2	SC		T		1

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Table 1-3. *continued: page 25 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
MAMMALIA (mammals; continued)							
Cetacea (whales; N = 7)							
Balaenoptera borealis Sei Whale	1	2	E	yes	E	EN	
Balaenoptera musculus Blue Whale	no	2		yes	E	EN	
Balaenoptera physalus Finback Whale	1	2	E	yes	E	EN	
Eubalaena glacialis North Atlantic Right Whale	1	1	E	yes	E	EN	
Megaptera novaeangliae Humpback Whale	1	1	E	yes	E		
Phocoena phocoena Harbor Porpoise	no	2					
Physeter macrocephalus Sperm Whale	1	2	E	yes	E	VU	
Chiroptera (bats; N = 8)							
Eptesicus fuscus Big Brown Bat	no	2	SC				1
Lasionycteris noctivagans Silver-haired Bat	no	2	SC	yes			
Lasiurus borealis Eastern Red Bat	no	3	SC				
Lasiurus cinereus Hoary Bat	no	3	SC				
Myotis leibii Eastern Small-footed Myotis	2	1	T	yes			
Myotis lucifugus Little Brown Bat	no	1	E				1
Myotis septentrionalis Northern Long-eared Myotis	no	1	E	yes	T		1
Perimyotis subflavus Tri-colored Bat	no	2	SC	yes			

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Table 1-3. *continued: page 26 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
MAMMALIA (mammals; continued)							
Lagomorpha (rabbits, hares, and pikas; N = 1)							
Sylvilagus transitionalis New England Cottontail	1	1	E	yes	C	VU	2
Rodentia (rodents; N = 3)							
Microtus pennsylvanicus shattucki Penobscot Meadow Vole	1	2	SC	yes			
Ondatra zibethicus Muskrat	no	3					1
Synaptomys borealis sphagnicola Northern Bog Lemming	2	1	T	yes			
Soricomorpha (shrews and relatives; N = 1)							
Sorex dispar Long-tailed Shrew	no	3		yes			
MAXILLOPODA (crustaceans; N = 1)							
Calanoida (calanoid copepods; N = 1)							
Calanus finmarchicus A Copepod	no	3					1
MEROSTOMATA (horseshoe crabs and sea scorpions; N = 1)							
Xiphosurida (horseshoe crabs; N = 1)							
Limulus polyphemus Horseshoe Crab	no	1		yes			1
OPHIUROIDEA (brittle stars; N = 1)							
Euryalida (basket stars; N = 1)							
Gorgonocephalus arcticus Northern Basket Starfish	no	2					3
REPTILIA (reptiles; N = 11)							
Squamata (lizards and snakes; N = 3)							
Coluber constrictor constrictor Northern Black Racer	2	1	E	yes			
Storeria dekayi dekayi Northern Brownsnake	no	2	SC				1

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Table 1-3. *continued: page 27 of 27*

CLASS Order *Scientific name*[1] Common name[1]	Maine SGCN Tier		Scale of Conservation Concern[2]				Number of Other Factors[3]
	2005	2015	State	Regional	National	Global	
REPTILIA (reptiles; N = 11)							
Squamata (lizards and snakes; continued)							
Thamnophis sauritus Eastern Ribbon Snake	no	2	SC	yes			
Testudines (turtles and tortoises; N = 8)							
Caretta caretta Loggerhead Seaturtle	no	2	T	yes	T	EN	
Chelonia mydas Green Seaturtle	no	2		yes	E	EN	
Clemmys guttata Spotted Turtle	2	1	T	yes		EN	
Dermochelys coriacea Leatherback Seaturtle	no	1	E	yes	E	VU	
Emydoidea blandingii Blanding's Turtle	1	1	E	yes		EN	
Glyptemys insculpta Wood Turtle	2	1	SC	yes		EN	
Lepidochelys kempii Kemp's Ridley Seaturtle	no	2	E	yes	E	CR	
Terrapene carolina carolina Eastern Box Turtle	1	2	E	yes		VU	
RHYNCHONELLATA (brachiopods; N = 1)							
Terebratulida (articulate brachiopods; N = 1)							
Terebratulina septentrionalis Lamp Shell	no	2					3

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1.8 APPENDICES

Appendix 1-1. Maine's list of state-designated Endangered / Threatened plants administered by Natural Areas Program - Maine Department of Agriculture, Conservation and Forestry.

Taxa group (class) *Scientific name*	Common name	State status (updated, 2015)
Class Dicotyledoneae (Dicots)		
Adlumia fungosa	Allegheny Vine	Endangered
Agalinis neoscotica	Nova Scotia False-foxglove	Threatened
Agalinis purpurea	Large-purple False Foxglove	Endangered
Amelanchier nantucketensis	Nantucket Shadbush	Threatened
Amerorchis rotundifolia	Small Round-leaved Orchis	Threatened
Anemone multifida	Cut-leaved Anemone	Threatened
Arctous alpina	Alpine Bearberry	Threatened
Arnica lanceolata	Hairy Arnica	Threatened
Asarum canadense	Wild Ginger	Threatened
Astragalus robbinsii var. *minor*	Robbins' Milk Vetch	Endangered
Bartonia paniculata	Screwstem	Threatened
Benthamidia florida	Flowering Dogwood	Endangered
Betula glandulosa	Tundra Dwarf Birch	Endangered
Betula minor	Dwarf White Birch	Endangered
Bistorta vivipara	Alpine Bistort	Endangered
Boechera laevigata	Smooth Rockcress	Threatened
Boechera missouriensis	Missouri Rockcress	Threatened
Calystegia spithamaea	Upright Bindweed	Threatened
Cardamine bellidifolia	Alpine Bitter-cress	Endangered
Cardamine concatenata	Cut-leaved Toothwort	Endangered
Cardamine longii	Long's Bitter-cress	Threatened
Carya cordiformis	Bitternut Hickory	Endangered
Ceanothus americanus	New Jersey Tea	Threatened
Chenopodium foggii	Fogg's Goosefoot	Threatened
Chimaphila maculata	Spotted Wintergreen	Endangered
Coptidium lapponicum	Lapland Buttercup	Threatened
Cynoglossum virginianum var. *boreale*	Northern Wild Comfrey	Endangered
Dicentra canadensis	Squirrel-corn	Threatened
Draba arabisans	Rock Whitlow-grass	Threatened
Draba cana	Lance-leaved Draba	Endangered
Draba glabella	Smooth Draba	Endangered
Drosera anglica	English Sundew	Endangered
Drosera linearis	Slender-leaved Sundew	Endangered
Epilobium anagallidifolium	Alpine Willow-herb	Endangered
Epilobium hornemannii	Hornemann's Willow-herb	Endangered
Eupatorium pubescens	Hairy Boneset	Endangered
Eupatorium sessidifolium	Upland Boneset	Endangered
Euthamia caroliniana	Narrow-leaved Goldenrod	Threatened
Gentiana rubricaulis	Red-stemmed Gentian	Threatened
Gentianella amarella ssp. *acuta*	Northern Gentian	Endangered

Appendix 1-1. *continued: page 2 of 5.*

Taxa group (class) *Scientific name*	Common name	State status (updated, 2015)
Class Dicotyledoneae (Dicots) - *continued*		
Geum fragarioides	Barren-strawberry	Endangered
Hackelia deflexa ssp. *americana*	Northern Stickseed	Endangered
Harrimanella hypnoides	Moss Bell-heather	Threatened
Hieracium robinsonii	Robinson's Hawkweed	Endangered
Hieracium venosum var. *nudicaule*	Rattlesnake Hawkweed	Endangered
Hottonia inflata	Featherfoil	Threatened
Hypericum ascyron	Great Saint John's-wort	Endangered
Ilex glabra	Ink-berry	Endangered
Iva frutescens ssp. *oraria*	Marsh-elder	Endangered
Kalmia procumbens	Alpine Azalea	Threatened
Krigia virginica	Dwarf Dandelion	Endangered
Lespedeza hirta hirta	Hairy Bush-clover	Endangered
Liatris novae-angliae	Northern Blazing Star	Threatened
Lomatogonium rotatum	Marsh Felwort	Threatened
Lonicera dioica	Mountain Honeysuckle	Endangered
Micranthes foliolosa	Star Saxifrage	Endangered
Minuartia michauxii	Michaud's Stitchwort	Endangered
Minuartia rubella	Arctic Sandwort	Endangered
Nabalus boottii	Boott's Rattlesnake Root	Endangered
Nymphaea leibergii	Pygmy Water-lily	Threatened
Omalotheca supina	Alpine Cudweed	Endangered
Oxytropis campestris var. *johannensis*	Saint John Oxytrope	Threatened
Panax quinquefolius	American Ginseng	Endangered
Paronychia argyrocoma	Silverling	Threatened
Pedicularis furbishiae	Furbish's Lousewort	Endangered
Phyllodoce caerulea	Mountain Heath	Threatened
Pinguicula vulgaris	Common Butterwort	Endangered
Polemonium vanbruntiae	Bog Jacob's-ladder	Endangered
Polygala senega	Seneca Snakeroot	Endangered
Proserpinaca pectinata	Comb-leaved Mermaid-weed	Endangered
Prunus maritima	Beach Plum	Endangered
Quercus bicolor	Swamp White Oak	Threatened
Quercus coccinea	Scarlet Oak	Endangered
Quercus montana	Chestnut Oak	Threatened
Ranunculus fascicularis	Early Crowfoot	Threatened
Rhododendron lapponicum	Lapland Rosebay	Threatened
Rhododendron maximum	Great Rhododendron	Threatened
Rhododendron viscosum	Clammy Azalea	Endangered
Salix arctophila	Arctic Willow	Endangered
Salix candida	Hoary Willow	Endangered
Salix exigua ssp. *interior*	Sandbar Willow	Endangered
Salix herbacea	Dwarf Willow	Threatened
Salix myricoides	Blue-leaf Willow	Threatened
Salix planifolia	Tea-leaved Willow	Threatened

Appendix 1-1. *continued: page 3 of 5.*

Taxa group (class) *Scientific name*	Common name	State status (updated, 2015)
Class Dicotyledoneae (Dicots) - *continued*		
Salix uva-ursi	Bearberry Willow	Threatened
Sanguisorba canadensis	Canada Burnet	Threatened
Saxifraga paniculata ssp. *neogaea*	Livelong Saxifrage	Endangered
Sericocarpus asteroids	White-topped Aster	Endangered
Shepherdia canadensis	Canada Buffaloberry	Endangered
Solidago leiocarpa	Cutler's Goldenrod	Threatened
Solidago speciose	Showy Goldenrod	Threatened
Suaeda calceoliformis	American Sea-blite	Threatened
Symphyotrichum anticostense	Anticosti Aster	Endangered
Symphyotrichum subulatum	Small Salt-marsh Aster	Threatened
Thalictrum thalictroides	Rue-anemone	Endangered
Thalictrum venulosum var. *confine*	Boundary Meadow-rue	Threatened
Triosteum aurantiacum	Wild Coffee	Endangered
Veronica wormskjoldii	Alpine Speedwell	Endangered
Vitis aestivalis var. *bicolor*	Summer Grape	Threatened
Class Filicopsida (Ferns)		
Adiantum aleuticum	Aleutian Maidenhair Fern	Endangered
Asplenium viride	Green Spleenwort	Endangered
Cryptogramma stelleri	Slender Cliffbrake	Threatened
Dryopteris filix-mas ssp. *brittonii*	Male Wood Fern	Endangered
Woodsia alpine	Northern Woodsia	Threatened
Woodsia glabella	Smooth Woodsia	Threatened
Woodsia obtusa	Blunt-lobed Woodsia	Threatened
Class Isoetopsida (Quillworts & Spike-mosses)		
Isoetes prototypus	Prototype Quillwort	Threatened
Selaginella apoda	Creeping Spike-moss	Endangered
Selaginella selaginoides	Low Spike-moss	Threatened
Class Lycopodiopsida (Clubmosses)		
Diphasiastrum sitchense	Alaskan Clubmoss	Threatened
Huperzia selago	Northern Firmoss	Threatened
Lycopodiella alopecuroides	Foxtail Bog-clubmoss	Endangered
Class Monocotyledoneae (Monocots)		
Agrostis mertensii	Boreal Bentgrass	Threatened
Anthoxanthum monticola	Alpine Sweet-grass	Threatened
Bolboschoenus novae-angliae	Marsh Bulrush	Endangered
Bromus kalmia	Wild Chess	Endangered
Calamagrostis pickeringii	Pickering's Reed Bent-grass	Threatened
Calamagrostis stricta ssp. *inexpansa*	Northern Reed Grass	Endangered
Calamagrostis stricta ssp. *stricta*	Neglected Reed-grass	Threatened
Carex adusta	Swarthy Sedge	Endangered
Carex atherodes	Awned Sedge	Threatened
Carex bicknellii	Bicknell's Sedge	Endangered

Appendix 1-1. *continued: page 4 of 5.*

Taxa group (class) *Scientific name*	Common name	State status (updated, 2015)
Class Monocotyledoneae (Monocots) - *continued*		
Carex eburnea	Ebony Sedge	Endangered
Carex granularis	Meadow Sedge	Threatened
Carex laxiculmis	Spreading Sedge	Endangered
Carex media	Intermediate Sedge	Endangered
Carex muehlenbergii	Muhlenberg Sedge	Endangered
Carex oronensis	Orono Sedge	Threatened
Carex polymorpha	Variable Sedge	Endangered
Carex prairea	Prairie Sedge	Threatened
Carex saxatilis	Russett Sedge	Endangered
Carex sparganioides	Bur-reed Sedge	Endangered
Carex typhina	Cattail Sedge	Endangered
Carex vacillans	Brackish Sedge	Endangered
Carex vestita	Clothed Sedge	Endangered
Corallorhiza odontorhiza	Autumn Coral-root	Endangered
Cyperus erythrorhizos	Red-root Flatsedge	Endangered
Cypripedium arietinum	Ram's-head Lady's-slipper	Endangered
Eleocharis rostellata	Beaked Spikerush	Threatened
Eleocharis tuberculosa	Long-tubercled Spikerush	Endangered
Festuca prolifera	Arctic Red Fescue	Endangered
Galearis spectabilis	Showy Orchis	Endangered
Glyceria acutiflora	Sharp-scaled Manna-grass	Endangered
Goodyera oblongifolia	Giant Rattlesnake-plantain	Endangered
Iris prismatica	Slender Blue Flag	Threatened
Isotria medeoloides	Small Whorled Pogonia	Endangered
Juncus secundus	Secund Rush	Threatened
Juncus subtilis	Slender Rush	Endangered
Juncus vaseyi	Vasey's Rush	Endangered
Lipocarpha micrantha	Dwarf Bulrush	Threatened
Luzula confuse	Northern Wood-rush	Endangered
Luzula spicata	Spiked Wood-rush	Threatened
Malaxis monophyllos	White Adder's-mouth	Endangered
Muhlenbergia sobolifera ssp. *brachypoda*	Cliff Muhly	Endangered
Listera auriculata	Auricled Twayblade	Threatened
Phleum alpinum	Mountain Timothy	Threatened
Platanthera leucophaea	Prairie White-fringed Orchid	Endangered
Poa glauca	White Bluegrass	Threatened
Poa laxa fernaldiana	Wavy Bluegrass	Endangered
Potamogeton friesii	Fries' Pondweed	Endangered
Potamogeton pulcher	Spotted Pondweed	Threatened
Potamogeton strictifolius	Straight-leaved Pondweed	Threatened
Rhynchospora capillacea	Horned Beak-rush	Threatened
Rhynchospora macrostachya	Tall Beak-rush	Endangered
Scirpus longii	Long's Bulrush	Threatened

Appendix 1-1. *continued: page 5 of 5.*

Taxa group (class) *Scientific name*	Common name	State status (updated, 2015)
Class Monocotyledoneae (Monocots) - *continued*		
Sorghastrum nutans	Indian Grass	Endangered
Spiranthes lucida	Shining Ladies'-tresses	Threatened
Sporobolus compositus var. *drummondii*	Longleaf Dropseed	Endangered
Triphora trianthophora	Nodding Pogonia	Threatened
Vahlodea atropurpurea	Mountain Hairgrass	Endangered
Xyris smalliana	Yellow-eyed Grass	Endangered
Class Ophioglossopsida (Adder's-tongues and Grapeferns)		
Botrychium lunaria	Moonwort	Endangered
Botrychium oneidense	Blunt-lobed Grapefern	Threatened
Botrychium pallidum	Pale Moonwort	Endangered

Appendix 1-2. Maine's list of state-designated Endangered and Threatened inland fish and wildlife administered by the Maine Department of Inland Fisheries and Wildlife (in statute; see Title 12 MRSA, §12803, http://legislature.maine.gov/legis/statutes/12/title12sec12803.html).

Taxa group (class) *Scientific name*	Common name	State status (year listed)
Class Actinopterygii (Fish)		
Esox americanus americanus	Redfin Pickerel	Endangered (2007)
Etheostoma fusiforme	Swamp Darter	Threatened (1997)
Class Aves (Birds)		
Alca torda	Razorbill	Threatened (1997)
Ammodramus savannarum	Grasshopper Sparrow	Endangered (1987)
Anthus rubescens	American Pipit	Endangered (1997)
Aquila chrysaetos	Golden Eagle	Endangered (1987)
Asio flammeus	Short-eared Owl	Threatened (1987)
Bartramia longicauda	Upland Sandpiper	Threatened (1997)
Bucephala islandica	Barrow's Goldeneye	Threatened (2007)
Charadrius melodus	Piping Plover	Endangered (1987)
Chlidonias niger	Black Tern	Endangered (1997)
Cistothorus platensis	Sedge Wren	Endangered (1987)
Falco peregrinus	Peregrine Falcon	Endangered (1975)
Fratercula arctica	Atlantic Puffin	Threatened (1997)
Gallinula galeata	Common Gallinule	Threatened (2007)
Haliaeetus leucocephalus	Bald Eagle	Recovered (2009) / Threatened (1996) / Endangered (1978)
Histrionicus histrionicus	Harlequin Duck	Threatened (1997)
Ixobrychus exilis	Least Bittern	Endangered (2007)
Nycticorax nycticorax	Black-crowned Night Heron	Endangered (2015) Threatened (2007)
Phalacrocorax carbo	Great Cormorant	Threatened (2007)
Sternula antillarum	Least Tern	Endangered (1984)
Sterna paradisaea	Arctic Tern	Threatened (1997)
Sterna dougallii	Roseate Tern	Endangered (1997) / Threatened (1987)
Class Bivalvia (Molluscs)		
Alasmidonta varicose	Brook Floater	Threatened (2007)
Lampsilis cariosa	Yellow Lampmussel	Threatened (1997)
Leptodea ochracea	Tidewater Mucket	Threatened (1997)
Class Gastropoda (Snails)		
Vertigo morseii	Six-whorled Vertigo	Endangered (2015)

Appendix 1-2. *continued: page 2 of 2.*

Taxa group (class) *Scientific name*	Common name	State status (year listed)
Class Insecta (Insects)		
Boloria chariclea grandis	Purple Lesser Fritillary	Threatened (2007)
Boloria frigga	Frigga Fritillary	Endangered (2015)
Callophrys gryneus	Juniper Hairstreak	Endangered (2007)
Callophrys hesseli	Hessel's Hairstreak	Endangered (1997)
Cicindela marginipennis	Cobblestone Tiger Beetle	Endangered (2015)
Epeorus frisoni	Roaring Brook Mayfly	Threatened (2015) / Endangered (2007)
Erynnis brizo	Sleepy Duskywing	Threatened (2007)
Gomphus quadricolor	Rapids Clubtail	Endangered (2007)
Lycaena dorcas claytoni	Clayton's Copper	Threatened (2015) / Endangered (1997)
Lycia rachelae	Twilight Moth	Threatened (2007)
Oeneis polixenes katahdin	Katahdin Arctic	Endangered (1997)
Ophiogomphus colubrinus	Boreal Snaketail	Threatened (2007)
Satyrium edwardsii	Edwards' Hairstreak	Endangered (1997)
Siphlonisca aerodromia	Tomah Mayfly	Threatened (1997)
Williamsonia lintneri	Ringed Boghaunter	Threatened (2007)
Zanclognatha martha	Pine Barrens Zanclognatha	Threatened (1997)
Class Mammalia (Mammals)		
Myotis leibii	Eastern Small-footed Bat	Threatened (2015)
Myotis lucifugus	Little Brown Bat	Endangered (2015)
Myotis septentrionalis	Northern Long-eared Bat	Endangered (2015)
Sylvilagus transitionalis	New England Cottontail	Threatened (2007)
Synaptomys borealis	Northern Bog Lemming	Endangered (1987)
Class Reptilia (Reptiles)		
Clemmys guttata	Spotted Turtle	Threatened (1987)
Coluber constrictor	Black Racer	Endangered (1987)
Emydoidea blandingii	Blanding's Turtle	Endangered (1997) / Threatened (1987)
Terrapene carolina	Box Turtle	Endangered (1987)

Appendix 1-3. Maine's list of state-designated Endangered and Threatened marine fish and wildlife administered by the Maine Department of Marine Resources (in statute; see Title 12 MRSA, §6975, http://legislature.maine.gov/legis/statutes/12/title12sec6975.html).

Taxa group (class) *Scientific name*	Common name	State status (year listed)
Class Actinopterygii (Fish)		
Acipenser brevirostrum	Short-nosed Sturgeon	Endangered (1975)
Class Mammalia (Mammals)		
Balaenoptera borealis	Sei Whale	Endangered (1975)
Balaenoptera physalus	Finback Whale	Endangered (1975)
Eubalaena glacialis	North Atlantic Right Whale	Endangered (1975)
Megaptera novaeangliae	Humpback Whale	Endangered (1975)
Physeter macrocephalus	Sperm Whale	Endangered (1975)
Class Reptilia (Reptiles)		
Caretta caretta	Loggerhead Sea Turtle	Threatened (1978)
Dermochelys coriacea	Leatherback Sea Turtle	Endangered (1975)
Lepidochelys kempii	Kemp's Ridley Sea Turtle	Endangered (1975)

Appendix 1-4. Maine's list of federally-designated Endangered and Threatened species administered by the U.S. Fish and Wildlife Service and National Marine Fisheries Service; see http://ecos.fws.gov/ecp/.

Taxa group (class) *Scientific name*	Common name	Federal status (year listed)
FAUNA		
Class Actinopterygii (Fish)		
Acipenser brevirostrum	Short-nosed Sturgeon	Endangered (1967)
Acipenser oxyrinchus (Gulf of Maine distinct population segment)	Atlantic Sturgeon	Threatened (2012)
Salmo salar (Gulf of Maine distinct population segment)	Atlantic Salmon	Endangered (2000)
Class Aves (Birds)		
Calidris canutus rufa	Red Knot	Threatened (2015)
Charadrius melodus	Piping Plover	Threatened (1985)
Falco peregrinus anatum	American Peregrine Falcon	Recovered (1999) / Endangered (1970)
Falco peregrinus tundrius	Arctic Peregrine Falcon	Recovered (1994) / Threatened (1984) / Endangered (1970)
Haliaeetus leucocephalus	Bald Eagle	Recovered (2007) / Threatened (1995) / Endangered (1978)
Sterna dougallii	Roseate Tern	Endangered (1987)
Class Mammalia (Mammals)		
Balaenoptera borealis	Sei Whale	Endangered (1970)
Balaenoptera musculus	Blue Whale	Endangered (1970)
Balaenoptera physalus	Finback Whale	Endangered (1970)
Canis lupus	Gray Wolf	Endangered (1967)
Eubalaena glacialis	North Atlantic Right Whale	Endangered (1970)
Lynx canadensis	Canada Lynx	Threatened (2000)
Megaptera novaeangliae	Humpback Whale	Endangered (1970)
Myotis septentrionalis	Northern Long-eared Bat	Threatened (2015)
Physeter macrocephalus	Sperm Whale	Endangered (1970)
Class Reptilia (Reptiles)		
Caretta caretta	Loggerhead Sea Turtle	Threatened (1978)
Chelonia mydas	Green Sea Turtle	Threatened (1978)
Dermochelys coriacea	Leatherback Sea Turtle	Endangered (1970)
Lepidochelys kempii	Kemp's Ridley Sea Turtle	Endangered (1970)
FLORA		
Class Dicotyledonae (Dicots)		
Isotria medeoloides	Small Whorled Pogonia	Threatened (1994) / Endangered (1982)
Pedicularis furbishiae	Furbish's Lousewort	Endangered (1978)
Class Monocotyledonae (Monocots)		
Platanthera leucophaea	Prairie White-fringed Orchid	Threatened (1989)

Appendix 1-5. Maine's 2005 SGCN that are removed from the 2015 Wildlife Action Plan.

Taxa group (class) *Scientific name*	Common name	Factors contributing to loss of SGCN status in Maine (2005 → 2015)
Class Aves (Birds)		
Anas rubripes	American Black Duck	revised regional significance criteria
Ardea alba	Great Egret	recent range expansion & low vulnerability
Bubulcus ibis	Cattle Egret	recent range expansion & low vulnerability
Cistothorus palustris	Marsh Wren	former decline insignificant in 2012 update
Egretta tricolor	Tricolored Heron	recent range expansion & low vulnerability
Empidonax traillii	Willow Flycatcher	former decline insignificant in 2012 update
Grus canadensis	Sandhill Crane	recent, general range expansion
Haliaeetus leucocephalus	Bald Eagle	full species recovery & habitat safeguards
Lanius ludoviciaus	Loggerhead Shrike	long-term extirpation
Myiarchus crinitus	Great Crested Flycatcher	former decline insignificant in 2012 update
Oxyura jamaicensis	Ruddy Duck	revised regional significance criteria
Plegadis falcinellus	Glossy Ibis	recent range expansion & low vulnerability
Pooecetes gramineus	Vesper Sparrow	revised regional significance criteria
Polioptila caerulea	Blue-gray Gnatcatcher	former decline insignificant in 2012 update
Sphyrapicus varius	Yellow-bellied Sapsucker	revised regional significance criteria
Strix varia	Barred Owl	revised regional significance criteria
Vireo flavifrons	Yellow-throated Vireo	former decline insignificant in 2012 update
Class Gastropoda (Snails)		
Amnicola decisus	A Spire Snail	errant record: mistaken identification
Catinella exile	Pleistocene Catinella	uncertain identification & taxonomy
Paravitrea lamellidens	Lamellate Supercoil	errant record: mistaken identification
Physella magnalacustris	Great Lakes Physa	uncertain identification & taxonomy
Vertigo nylanderi	Deep-throat Vertigo	relatively secure status in recent surveys
Class Insecta (Insects)		
Catocala pretiosa pretiosa	Precious Underwing	long-term extirpation
Nicrophorus americanus	American Burying Beetle	long-term extirpation
Nixe rusticalis	A Mayfly	secure status in updated assessment
Plauditus cestus	A Mayfly	uncertain taxonomy
Plebejus saepiolus amica	Greenish Blue	likely non-native & range expansion
Procloeon mendax	A Mayfly	secure status in updated assessment
Procloeon ozburni	A Mayfly	errant record: mistaken identification
Procloeon simplex	A Mayfly	secure status in updated assessment
Siphlonurus securifer	A Mayfly	secure status in updated assessment
Class Mammalia (Mammals)		
Canis lupus	Gray Wolf	long-term extirpation
Class Reptilia (Reptiles)		
Crotalus horridus	Timber Rattlesnake	long-term extirpation