

CHAPTER 4.0

KEY HABITATS AND NATURAL COMMUNITIES

*What is most striking in the Maine wilderness is the continuousness of the forest,
With fewer open intervals of glades than you had imagined.
Except the few burnt lands, the narrow intervals on the rivers,
The bare tops of the high mountains, and the lakes and streams,
the forest is uninterrupted.*

Henry David Thoreau, 1846, *The Maine Woods*

4.1 LANDSCAPE OVERVIEW

The State of Maine is approximately 21 million acres in size from the dramatic coastline to the heights of Mount Katahdin, eastward through the impressive peatlands downeast, and north into the belt of northern forestlands, which stretch west to New York and east to the Canadian Maritimes. Maine is a large state by eastern standards -- as large as the remaining New England states combined. It has a wealth of coastal, freshwater, and upland habitats. More than 31,800 miles of streams and rivers course through the state. Over 5,600 lakes and ponds dot the landscape. Maine's scenic, rock-bound coast is 4,100 miles long and embraces 4,613 islands between Kittery and Eastport. One-third of the state's area is comprised of freshwater wetlands, including hardwood floodplains, freshwater marshes, and dense assemblages of vernal pools. Maine is the most heavily forested state in the United States, but also contains some of the most significant grassland and agricultural lands in the Northeast.

4.1.1 CLIMATE

Maine's climate has played a major role in determining the plant and animal assemblages occurring within the State. The National Weather Service separates Maine into three distinct climatological divisions – coastal, southern interior, and northern interior (Brandes 2001). The coastal division runs from Kittery northeast to Eastport and about 20 miles inland. Here the ocean moderates the climate, making coastal winters warmer and summers cooler than the interior. The southern interior division, covering the bottom one-third of the state, has the warmest summer weather and the highest numbers of clear days, whereas the northern interior (upper two-thirds of the state) boasts a mixed bag of snowy winters, warm summers, and the state's lowest rainfall.

The southern and coastal regions are influenced by air masses from the south and west. Mean annual temperatures range from 37° to 39°F in the north and from 43° to 45°F in the southern

interior and coastal regions. Mean temperatures are about 62°F throughout the state during the summer and 20°F during the winter. Clear days range from about 100 per year in the south to only 70 in the north, and annual precipitation averages 36 to 48 inches. Snowfall averages 71 inches in the south and more than 100 inches in the north and higher elevations.

4.1.2 PHYSIOGRAPHY

The Appalachian Mountain chain extends into Maine from New Hampshire, terminating at Mount Katahdin, at 5,268 feet the state's tallest peak. The western and northwestern borders adjoining New Hampshire and Quebec are characterized by rugged terrain with numerous glacier-scoured peaks, lakes, and valleys. South and east of mountain areas lie rolling hills, smaller mountains, and broad river valleys.

Maine's coastline consists of long sand beaches interrupted intermittently by rocky promontories in the southwest, and a series of peninsulas, narrow estuaries, bays, fjords, and coves located north and east of Portland, the state's largest city. The tides along Maine's coast are among the highest in the world, running between 12 and 24 feet. More than 4,600 islands dot the coast, some no more than rock ledges; others are vegetated and home to fulltime and seasonal residents.

Geologically, Maine is something of a youngster; the oldest rocks, found in the Chain of Ponds area in the western part of the state, are only 1.6 billion years old – more than 2 billion years younger than the world's oldest rocks (Brandes 2001). The state has experienced several episodes of glaciation; the most recent was about 18,000 years ago when Maine was covered by glacial ice about a mile thick (Gawler et al. 1996). The present-day biological diversity in Maine is the result of post-glacial movements of plants, animals, and microorganisms into the state.

4.1.3 COASTAL ECOSYSTEMS

The Gulf of Maine watershed comprises a total land area of 69,115 square miles, encompassing Nova Scotia, New Brunswick, Maine, New Hampshire, Massachusetts, and a small portion of Quebec. Maine is the only jurisdiction located entirely within the watershed [Gulf of Maine Council on the Marine Environment (GOMC) 2004]. The Gulf of Maine, largely created by glaciers 10,000 to 20,000 years ago, is a semi-enclosed sea bounded to the south and east by Browns Bank and Georges Bank, and includes the Bay of Fundy. Underwater valleys plunge to depths of 1,500 feet and mountains rise from depths 800 feet toward the surface of the sea (GOMC 2004).

Riverine Habitats:

Rivers sustain the Gulf of Maine's anadromous (lives in saltwater, spawns in freshwater) and catadromous (lives in freshwater, spawns in saltwater) fish species (collectively referred to as diadromous), which are valuable members of the region's biological diversity. The rich diversity of habitats – particularly different substrates, flow regimes, adjacent wetlands, riparian areas, and floodplain forests – is vitally important for aquatic biological diversity (GOMC 2004).

Intertidal and Subtidal Habitats:

Gulf of Maine intertidal areas are comprised of salt marsh, rocky intertidal, and mudflat. The location and extent of these habitats are influenced by substrate, wave and tidal energy, tidal range, and slope (GOMC 2004). These habitats support several commercially important species such as the softshell clam and Irish moss, which is used as a thickening agent in many domestic products.

Salt marshes occur throughout the Gulf of Maine as large estuarine complexes or small fringe marshes. Of more than 5 million acres of wetlands in the state, 157,500 acres are tidal (tidal flats, salt marsh, brackish marsh, aquatic beds, beach bars and reefs) [Maine Department of Environmental Protection (MDEP) 1996], comprising more than half of all the tidal wetlands within the Gulf of Maine [Maine Environmental Priorities Council (MEPC) 1998]. In fact, there are more tidal wetlands in Maine than in any state north of New Jersey (MEPC1998).

Salt marshes are flooded twice daily, and are characterized by widely fluctuating temperature, wetness, and salinity (GOMC 2004). Despite harsh growing conditions and low plant diversity, salt marshes are among the most productive ecosystems on Earth. They provide food, shelter, spawning, and nursery areas for striped bass, flounder, and mummichogs. Clams and ribbed mussels inhabit salt marshes and adjacent tidal flats, and birds rely on the rich food webs of salt marshes for breeding and during migration. Salt marsh is one of Maine's most highly valued and protected wetland habitats, yet direct physical alteration of coastal wetlands (more likely to occur by dock and pier construction than deposition of large amounts of fill) can still be permitted.

Estuaries, places where freshwater rivers meet the ocean, are comparatively rare worldwide, making up less than one percent of the Earth's coastline (GOMC 2004). However, about 30 significant estuaries – 17 in the U.S. and 13 in Canada – cover at least 3,000 miles of the Gulf of Maine's coastline, making the Gulf as a whole somewhat estuarine in character (GOMC 2004). Estuaries receive high concentrations of nutrients that are exported from watersheds, particularly during late winter and early spring snowmelt. Land-derived nutrients combine with nutrients from salt marshes, rockweeds, and oceanic sources to stimulate phytoplankton growth throughout the year. Estuaries are critically important as nurseries for larval and juvenile invertebrates and fish, and feeding and nesting areas for migratory fish and birds. In addition, these areas serve as coastal storm buffers and filter sediments and pollutants before they reach coastal waters. Despite their importance, up to 50% of the region's original estuarine marshes have been lost through various human activities (MEPC1998).

Islands, Beaches, and Dunes

More than 4,600 coastal islands and ledges dot the Maine coastline, and roughly 500 of them support island-nesting wading birds, seabirds, and common eiders. Islands cause upwelling of deep, nutrient-rich water to the sea surface, enriching nearby waters (GOMC 2004). Currents driven by tidal action swirl around islands and surge through passages, "creating a funnel effect that increases the volume of feed available to filter feeders, as well as those species that prey on the filter feeders" (Conkling 1995 as cited in GOMC 2004). In this way, the physical presence of islands augments the productivity and biodiversity.

Nearly all of Maine's larger islands were cleared in the past, primarily for pasture. Many islands were burned repeatedly to remove trees and increase hay production. Human use of the islands peaked roughly 100 years ago, and since early in this century, gradual abandonment of many of

islands has resulted in their reforestation. In the last few decades, heavy recreational use and construction of seasonal homes have limited the ecological recovery of many islands. Conkling et al. (1984) summarize the natural resource values of Maine's islands, including uncommon plant communities, rare plants, and "old growth" forests -- although even the forested islands in Conkling's study had trees that averaged less than 100 years old.

Beaches, pounded by an average 8,000 waves a day, are high-energy, climatically extreme environments (GOMC 2004). They vary in nature from long shorelines of fine-grained silt or sand to boulders bigger than a breadbox. Large sand beaches are mostly limited to southern Maine.

Sand dunes, often located upslope of sand beaches, are hillocks of wind-blown sand originally brought to the rear of beaches by ocean waves, and stabilized by beach grasses. Major dune systems in Maine are located at Scarborough Beach, and Popham and Reid State Parks.

The most pervasive threat to Maine's coastal habitats are permanent structures, many built years ago, such as roads, tide gates, dams, and culverts (MEPC1998). According to the Maine Environmental Priorities Council (MEPC 1998), these structures can drastically alter tidal flooding and draining, reduce or eliminate access to estuarine habitats by fish and other aquatic organisms, hinder a salt marsh's intrinsic ability to keep pace with sea level rise, and can lead to marsh subsidence (sinking). Ultimately, they render the salt marsh vulnerable to invasion by pest plants that displace native wetland vegetation, which can cause the conversion of salt marsh to fresh marsh or upland. Up to 25% of Maine's existing salt marsh acreage is compromised by such tidal restrictions (MEPC1998).

In addition to the effects of marsh filling and tidal restriction, the ecology of salt marsh ecosystems is threatened by human actions along the marsh-upland border (Teal 1969, MEPC1998). The salt marsh perimeter is especially vulnerable to development, as developable beachfront property becomes scarcer and scarcer. This development contributes further alteration of salt marsh functions and values through plant invasion, excess nutrients, toxic contaminants, and loss of wildlife habitat.

Despite state and local coastal wetland regulations, alterations in and around wetlands continue to degrade coastal wetland functions and values. Inconsistent implementation and enforcement of Maine's Mandatory Shoreland Zoning Law, and a lack of data on the impacts of marsh filling, tidal restriction, and development within the coastal wetland and adjacent buffer, are in part, hampering effective protection and restoration efforts.

The Gulf of Maine Council on the Marine Environment (GOMC) is a collaborative effort of public and private entities around the Gulf of Maine that was developed to improve and protect the estuarine, coastal, and marine resources of the Gulf. The GOMC Habitat Restoration Subcommittee developed the *Gulf of Maine Habitat Restoration Strategy* that identifies a number of threats to, and restoration opportunities for, the Gulf of Maine. This report, found in Appendix 5, provided much of the background information for this section.

4.1.4 FRESHWATER ECOSYSTEMS

Rivers and Streams: Maine has more than 5,000 rivers and streams comprising 31,800 miles of flowing waters that provide nearly half of the watershed for the Gulf of Maine. Despite great improvements in water quality in Maine's larger rivers since the passage of the original Clean

Water Act, our understanding of the dynamics of these ecosystems is rudimentary. Free-flowing rivers, in particular, are considered threatened throughout much of northern North America (Dynesius and Nillson 1994 as cited in Gawler et al. 1996); however, more of Maine's rivers and streams are undeveloped and free-flowing than in any other state in the northeastern United States (Bennett 1988). The state's major rivers include the Penobscot (350 mi), the St. John (211 mi), the Androscoggin (175 mi), the Kennebec (150 mi), the Saco (104 mi), and the St. Croix (75 mi).

Lakes and Ponds: Maine also boasts more than 5,600 lakes and ponds, most of which can be linked to a single cause: glaciation. In fact, the state has the second largest number of natural glaciated lakes of any state east of the Mississippi River – 3,000 lakes and ponds more than 10 acres in size and another 2,000 between 1 and 10 acres (Bennett 1988).

Northwestern Maine's Moosehead Lake, covering about 117 mi², is the state's largest lake – in fact, it is the largest lake in New England to lie wholly within the boundaries of a single state. Sebago Lake in southern Maine is second to Moosehead in size, with a surface area of over 44 mi², however, it holds the distinction of being the deepest at 316 ft (40 ft below sea level).

Of Maine's more than 5,600 lakes and ponds, 2,314 (covering 958,886 acres or 97% of the state's total lake area) are deemed "significant" and are regularly evaluated by the Maine Department of Environmental Protection. Of these 2,314 lakes, 52, totaling 49,969 acres or 5.2% of the total significant lake area, were considered only partially suitable for swimming in 1996 (MEPC 1998). Although this percentage has remained constant in recent years, land development pressures are mounting.

An assessment of water quality in Maine lakes (MDEP 1994) found 203 lakes in Maine to be "impaired" in their ability to support native aquatic life. Algal blooms from human-caused eutrophication are becoming annual occurrences in some southern Maine lakes; at least 54 lakes in Maine have experienced substantial eutrophication (MDEP 1994). Ecological effects of eutrophication include shifts in the phytoplankton community, lower dissolved-oxygen levels, and consequent shifts in the fish and invertebrate composition (Gawler et al. 1996).

Freshwater Wetlands: Our famous jagged coastline, and generally rugged terrain statewide, has provided Maine with an abundance and diversity of wetlands unequalled in the northeastern United States. Wetlands account for 25-30% of the surface area of Maine (Calhoun 2001), four times the wetland area of the other five New England States combined (MDEP 1996). According to MDEP (1996), over 5 million acres of Maine's wetlands are freshwater types (wooded swamps, shrub swamps, bogs, freshwater meadows, freshwater marshes, peatlands and floodplains).

Wetland losses in Maine (~20%) have been less severe than in the nation as a whole, which has lost over one-half of wetlands that existed prior to European settlement (Whitney 1994 as cited in Weik 2004). Wetland losses in Maine have been attributed to draining and filling for residential and commercial development (Widoff 1988 as cited in Weik 2004), and flooding.

Peatlands: Maine has a remarkable diversity of high-quality peatlands, and most of the larger ones are relatively intact (Gawler et al. 1996). In fact, Maine's diversity of peatland types is unequalled in the United States (Davis et al. 1983). The state's latitudinal, altitudinal, and coastal-inland gradients are all reflected in the varying peatland morphologies and vegetation composition. Gawler et al. (1996) report that some of Maine's peatland types are rare in the state (maritime slope bogs, coastal plateau bogs, circumneutral fens, patterned fens, and

eccentric bogs), while others are common (unpatterned fens, domed bogs, level bogs, kettlehole bogs and ponds, and some streamshore ecosystems).

Healthy freshwater resources support a wide array of biodiversity and are integral to Maine's economy and to the aesthetic, recreational, and ecological values, which define a way of life for Maine residents and draw so many visitors to the state. Despite the importance of freshwater ecosystems and the wildlife they support, the Maine Environmental Priorities Council (1998) found that Maine's freshwater ecosystems are threatened by non-point source pollution from land use activities over a broad area, and their impacts are likewise diffuse. Examples include failing septic systems; storm water runoff; excess nutrient loading, especially phosphorous; and atmospheric deposition of pollutants – mercury in particular. Similarly, point-source pollutants, those discharged directly from a pipe or sewer, are known to contribute to water quality concerns. Gawler et al. (1996) attribute additional impacts as a result of dam building and introduction of non-native species.

The Maine Center for Invasive Aquatic Plants (MCIAP) website (<http://www.mciap.org/>) states "The introduction of non-indigenous invasive aquatic plant and animal species to the United States has been escalating with widespread destructive consequences. The impacts of the spread of invasive aquatic plants are well known: habitat disruption, loss of native plant and animal communities, reduced property values, impaired fishing and degraded recreational experiences, and enormous and ongoing control costs."

With over 5,600 lakes and ponds, and thousands of miles of stream habitat, the task of preventing the spread of invasive aquatic species (e.g. non-native milfoils, etc.) in Maine waters is one of the greatest environmental challenges of our time. Again from MCIAP, "Invasive plants and animals are moved about in complex and often unseen ways. The speed at which a new introduction can explode into an ecologically and economically disastrous infestation is well documented. Once an invader is well established, eradication is extremely difficult and costly, if not impossible."

Nonetheless, the quality of Maine waters has improved substantially in the past 20 years (MEPC1998). Striped bass, alewives, and other migratory fish now return to Maine rivers. Though dioxin advisories still remain on more than 200 miles of rivers, testing shows that dioxin concentrations in fish have declined substantially from levels seen in the mid 1980s (MEPC 1998). In the late 1990s, Maine passed several important laws to address point source and non-point source pollution. Other initiatives, including aquatic biodiversity studies, lake and stream surveys and inventories, integrated watershed-based planning, and control of exotics and invasive species, are contributing significantly to the understanding and conservation of freshwater resources in Maine.

4.1.5 UPLAND ECOSYSTEMS

The State of Maine's environment is inextricably linked to its lands, open space, and rich variety of terrestrial ecosystems. Maine falls in the transition between the deciduous forest region to the south and the boreal forest region to the north (Barbour and Billings 1988). Maine's forests cover more than 17 million acres, giving the state the distinction of being the most heavily forested state in the nation. Unlike some areas, such as the Midwest – where forest cover has been almost completely lost due to conversion to agriculture or other uses – Maine retains or has regrown much of its forest cover. Sixty-seven woody plant species reach their range limits in south-central Maine, and an additional 44 woody plant species define a coastal-inland transition

zone, reaching their western range limits in a southwest-northeast belt bisecting the state (McMahon 1990). *Natural Landscapes of Maine* (Gawler and Cutko, in press) describes 98 Natural Community types and 24 broader Ecosystems that encompass the broad range of Maine's biological landscape.

There are approximately 1,432 native and 643 introduced species of vascular plants in Maine (Gawler et al. 1996). The state's vascular plants include both Appalachian representatives at the northern edge of their range and boreal representatives at the southern limit of their range. Nearly one quarter of Maine's native flora (363 species) is considered rare, Threatened, or Endangered in the State, and 27 species, or fewer than two percent, of the plants native to Maine are rare throughout their worldwide range.

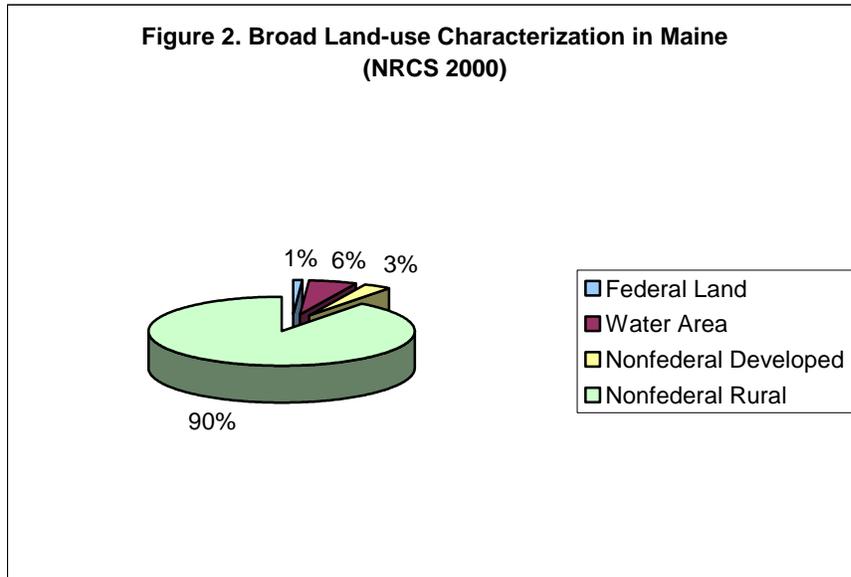
The Official List of Endangered and Threatened Plants in Maine is a list of native vascular plant species whose populations within the state are highly vulnerable to loss. Species on the list are typically known from a very small number of sites within the state, and many require unique habitat for survival. This list is used to assist scientific research, environmental assessment, permit review, land management, and for educational purposes. The list is managed by the Maine Natural Areas Program and is under the jurisdiction of the Commissioner of the Department of Conservation. Section 6 funding under the Endangered Species Act supports conservation of federally listed plants in Maine.

No plant species are included as SGCN taxa because this list is intended for wildlife only. There is presently no statutory protection for any native plant in Maine, though we expect that community and landscape level conservation of SGCN and their habitats will provide secondary benefits to many sensitive and rare plants.

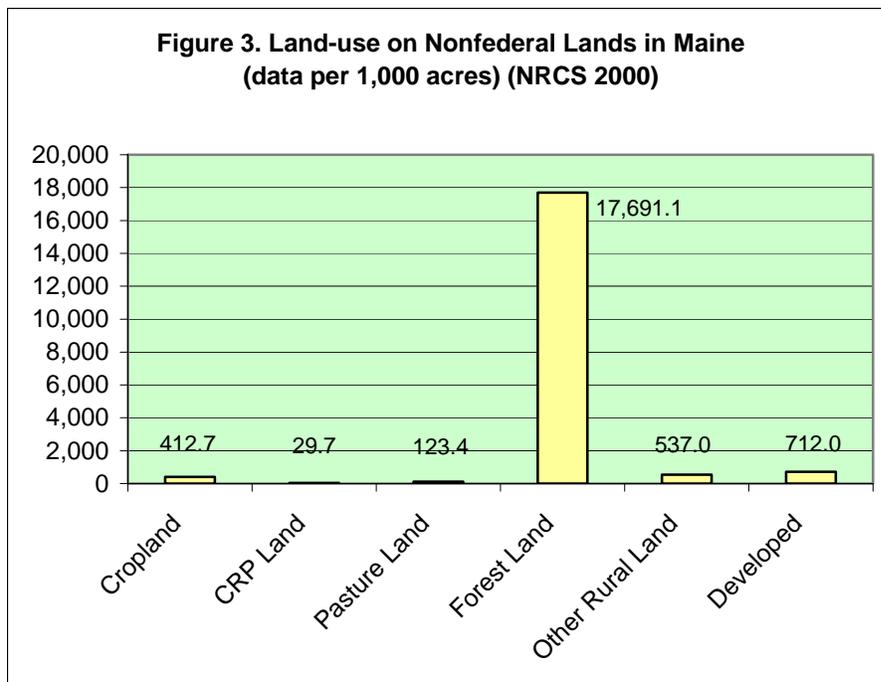
Open space for wildlife is generally ample in the state, though loss of critical types of habitats, such as wetlands and open space near developed areas, is affecting some species, particularly in southern and coastal areas where biodiversity is the greatest (Maine Environmental Priorities Council 1998).

4.1.6 LAND USE

The Natural Resources Conservation Service (NRCS) conducts a National Resources Inventory (NRI) approximately every five years that describes the status, condition, and trends of soil, water, and land resources across the country. According to the 1997 NRI, revised in 2000 (NRCS 2000), the vast majority of the state (90%) is characterized as nonfederal rural lands, referring to all lands in private, municipal, state, or tribal ownership (Figure 2).



Of the 19,505,900 acres of nonfederal land in Maine, 17,691,100 (91%) are classified as forestland. Developed land, cropland, and pastureland comprise nearly 4%, 2%, and less than 1% of nonfederal lands in the State respectively (Figure 3).



4.1.7 CONSERVATION LAND IN MAINE

According to the best available data, there are 3,087,100 acres of conservation land in Maine, accounting for less than 15% of the State¹ (Cutko and Frisina 2005). This conservation land includes parcels with a variety of restrictions, including “working forest” conservation easements, public lands managed for multiple uses, private conservation lands, state Ecological Reserves, and others (Table 25 and Figure 4).

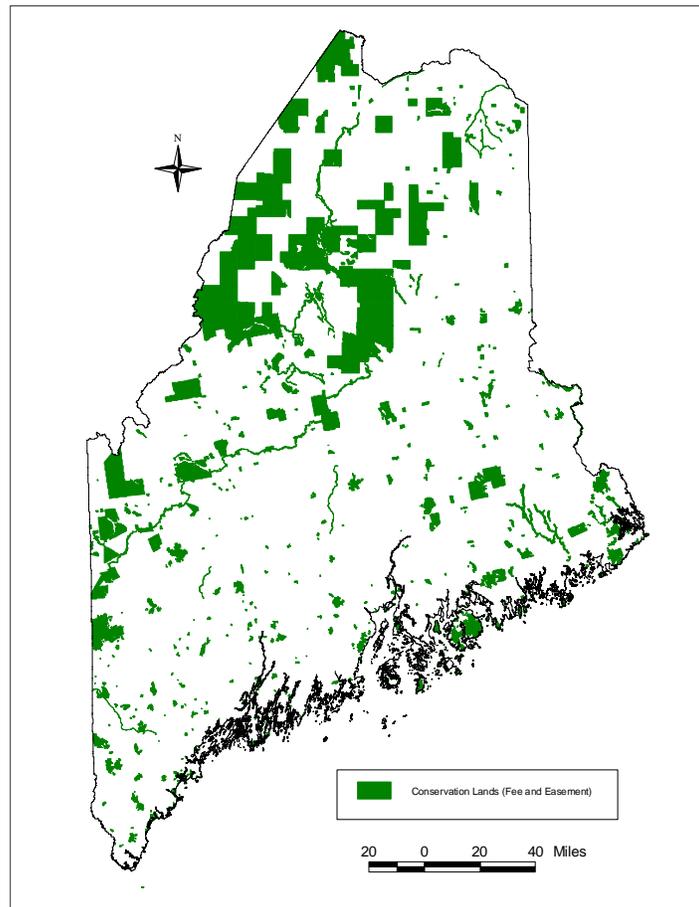
The Maine Department of Inland Fisheries and Wildlife (MDIFW) holds title to approximately 106,000 acres on 54 Wildlife Management Areas (WMA). Most of these lands were purchased with Pittman-Robertson funds, other federal matching funds, Maine citizen approved bond monies, gifts, Maine State Lottery Outdoor Heritage funds, and North Atlantic Wetland Conservation Act grants. Holdings include forested uplands, grasslands, freshwater wetlands, and seabird nesting islands. For each WMA, MDIFW develops a management plan that describes the natural resources occurring on the property, history of past uses, wildlife management objectives, and future plans for additional acquisitions, habitat maintenance, and development activities. Plans are updated every five years to reflect new land acquisitions and any changes in management objectives. A complete list of MDIFW-owned properties with existing management plans, including an example of a WMA plan, is found in Appendix 6.

Conservation Lands	Acres
State Owned Land	944,050
TNC Owned Land	257,200
Land Under Conservation Easement	1,463,200
Other Conservation Ownership Lands (including federal)	422,650
Total Area under Broad Form of Conservation²	3,087,100
¹ Not all categories are included in subtotals.	
² Includes conservation easements and fee ownership. Excludes pending easements and acquisitions.	

Source: Managed Areas shape file provided by the Maine Field Office of the Nature Conservancy, 2005 [as cited in (Cutko and Frisina 2005)]

¹ The state's database of conservation lands is not complete; omitting numerous small land trust parcels, municipal lots, and some privately held conservation lands.

Figure 4. Public and Private Conservation Lands in Maine.
(Source: Maine Office of GIS)

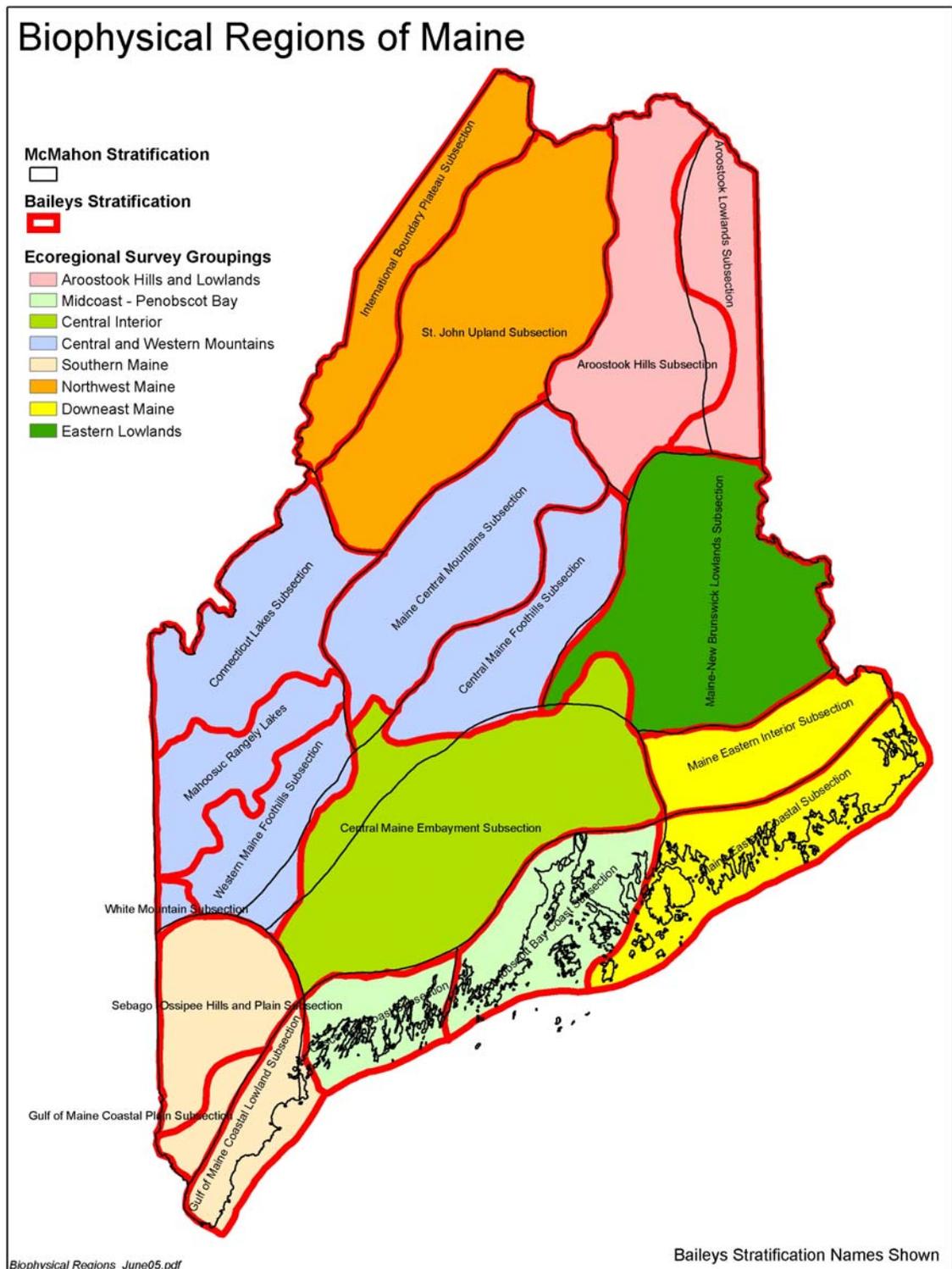


4.1.8 ECOREGIONS

Ecoregions (or biophysical regions) are defined as large areas of regional extent with similar biota, climate, and physical environment. Most coarse-grained ecoregional classifications (e.g., Westveld 1956, Bailey 1980) typically divide Maine into two or three ecoregions. More recently, Bailey (1997) and McMahon (1990) described Maine as lying within 18 subsections and 15 biophysical regions respectively. McMahon's 15 biophysical regions are based on climate variables, topography, and soil characteristics, correlated with vegetation characteristics. While a map of the 15 regions gives the impression of distinct entities, the gradients in environment and species composition really form a continuum of change (McMahon 1990). A complete description of McMahon's 15 biophysical regions is found in Appendix 7.

To facilitate survey, inventory, and conservation planning efforts, McMahon's (1990) 15 biophysical regions were consolidated into eight ecoregional groupings briefly described below. Figure 5 overlays Bailey's and McMahon's stratifications with those of the eight ecoregional groupings currently used in Maine.

Figure 5. Biophysical Regions of Maine.



Northwest Maine Ecoregion (Boundary Plateau and St. John Upland Region) comprises more than 4.5 million acres that extend from Fort Kent south to the Seboomook Lake area and west to the St. Francis River along the Maine-Quebec border, and includes the lands surrounding the St. John River, the Allagash, and the Boundary Mountains (Figure 6). Lowland forests, relatively undisturbed river ecosystems, and sparsely populated areas with virtually no year-round settlements characterize this region.

Although plant diversity in the western ecoregions is low compared to other areas of Maine, the almost complete lack of development suggests that there remains high potential for biodiversity conservation. Vast blocks of land are fragmented only by forestry practices, and the impacts from many of these practices are ephemeral. The Boundary Plateau supports the highest concentration of ribbed fens anywhere in Maine (Sorenson 1986). These sloped peatlands, which form on gentle slopes where drainage is impeded, are among the rarest types of peatlands in Maine.

Aroostook Hills and Lowlands Ecoregion comprises approximately 2.5 million acres in the northeastern corner of Maine (Figure 7). The western boundary of the area is delineated by the 1,000-foot contour line, and the northern and eastern boundaries by the Canadian border.

Geologically, the region is underlain by metamorphosed pelites and sandstones, along with the most extensive area of alkaline bedrock in Maine. There are also scattered, uplifted plutons of more resistant granite and basalt. Glacial deposits include vast areas of weakly calcareous till, glacio-lacustrine deposits, and two large stagnation moraines. In the Aroostook Lowlands, deep, fine-grained loams provide the basis for a large agricultural sector.

In the northern and western portion of the Aroostook Hills, the vegetation is transitional between temperate northern hardwoods and boreal spruce-fir forests. In part because of this transition, and in part because of the region's geologic variability, forested habitats are more diverse in the Aroostook Hills and Lowlands than in the western parts of Aroostook County. In addition, two rare peatland types, eccentric bogs and patterned raised bogs, reach their western range limit in the Aroostook Hills.

Because of the calcareous nature of the soils and bedrock in the Aroostook Lowlands, this region supports rare wetland types and numerous rare plants that occur nowhere else in Maine. Circumneutral (i.e., slightly alkaline) fens and northern white cedar swamps are more common in these two regions than anywhere else in Maine, and the region supports the highest richness of woody species of any of the four regions in northern Maine.

Compared to southern Maine, the Aroostook Hills and Lowlands remain sparsely populated, with most of the population concentrated along the Aroostook River (Caribou, Presque Isle) and the St. John River (Fort Kent, Madawaska). Approximately 50% of the land area is unorganized townships in commercial timber production (Irving, Fraser, Seven Islands, among others), with most of this land concentrated in the southern part of the Aroostook Hills. Less than 3% of the area is in public or private conservation ownership, with the majority of protected land in one tract - the state's Eagle Lake unit. A significant portion of the land in the Aroostook Lowlands is in agricultural production.

Figure 6. Map of Northwest Maine Ecoregion (Boundary Plateau and St. John Upland).
 (Source: Maine Office of GIS)

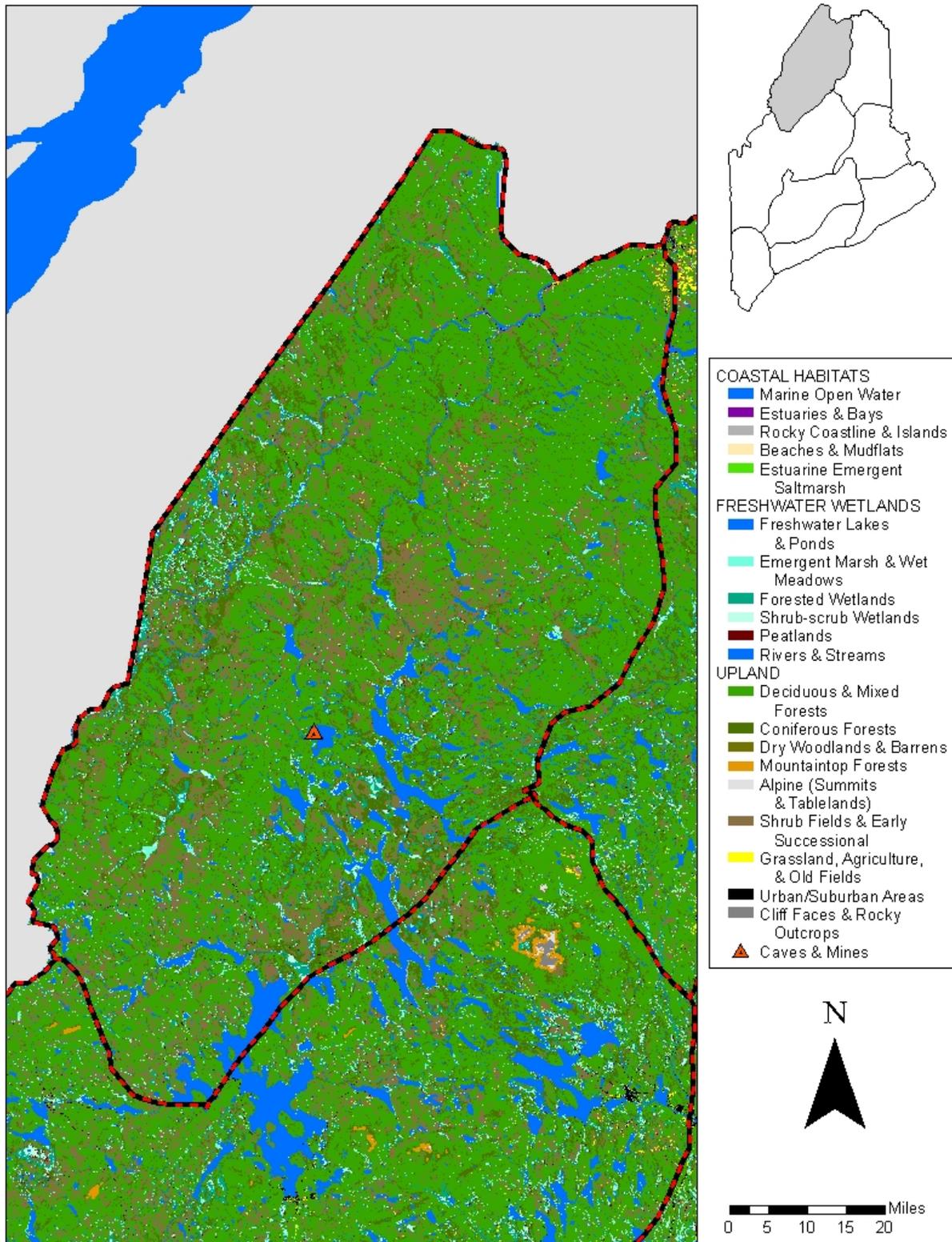
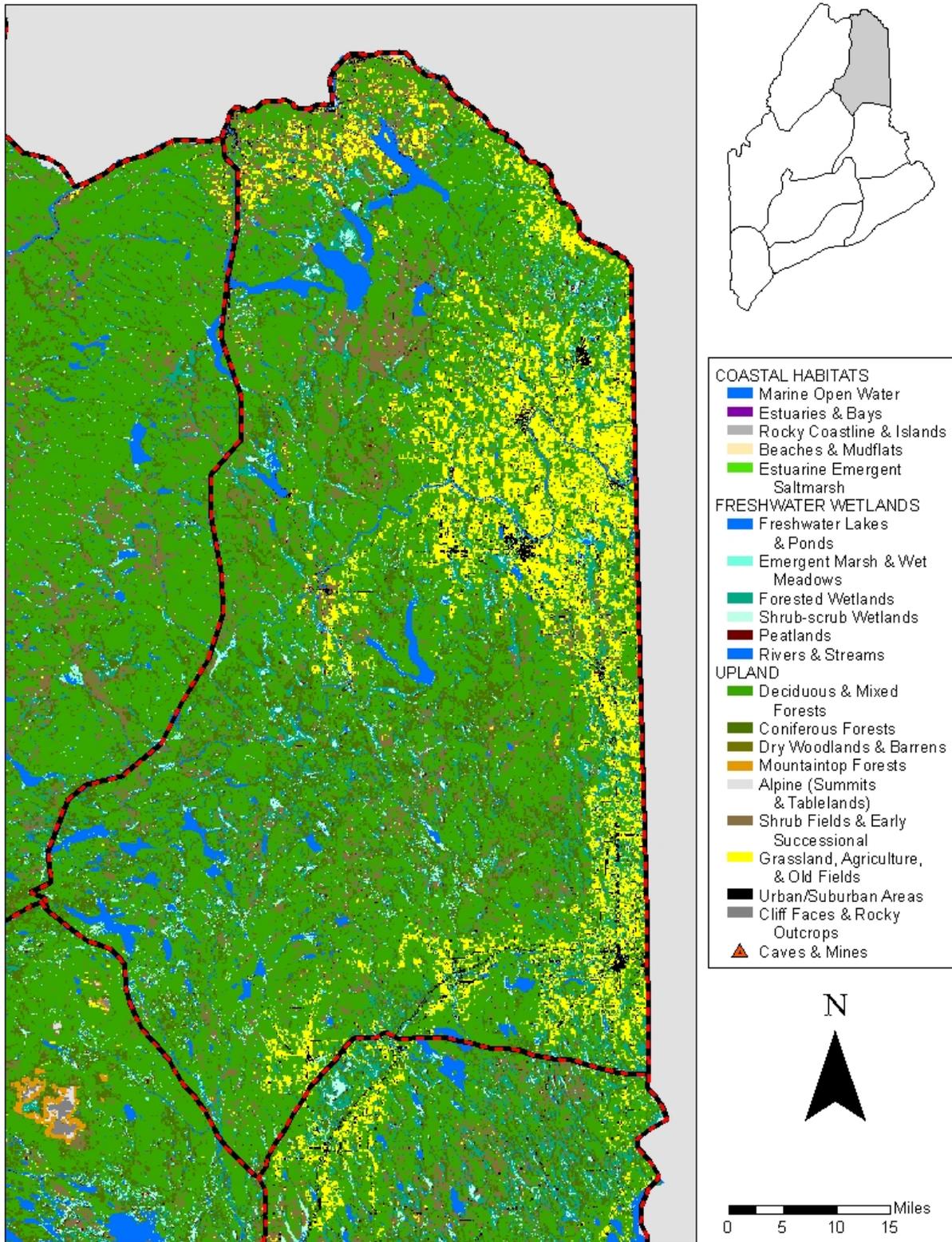


Figure 7. Map of Aroostook Hills and Lowlands Ecoregion.
 (Source: Maine Office of GIS)

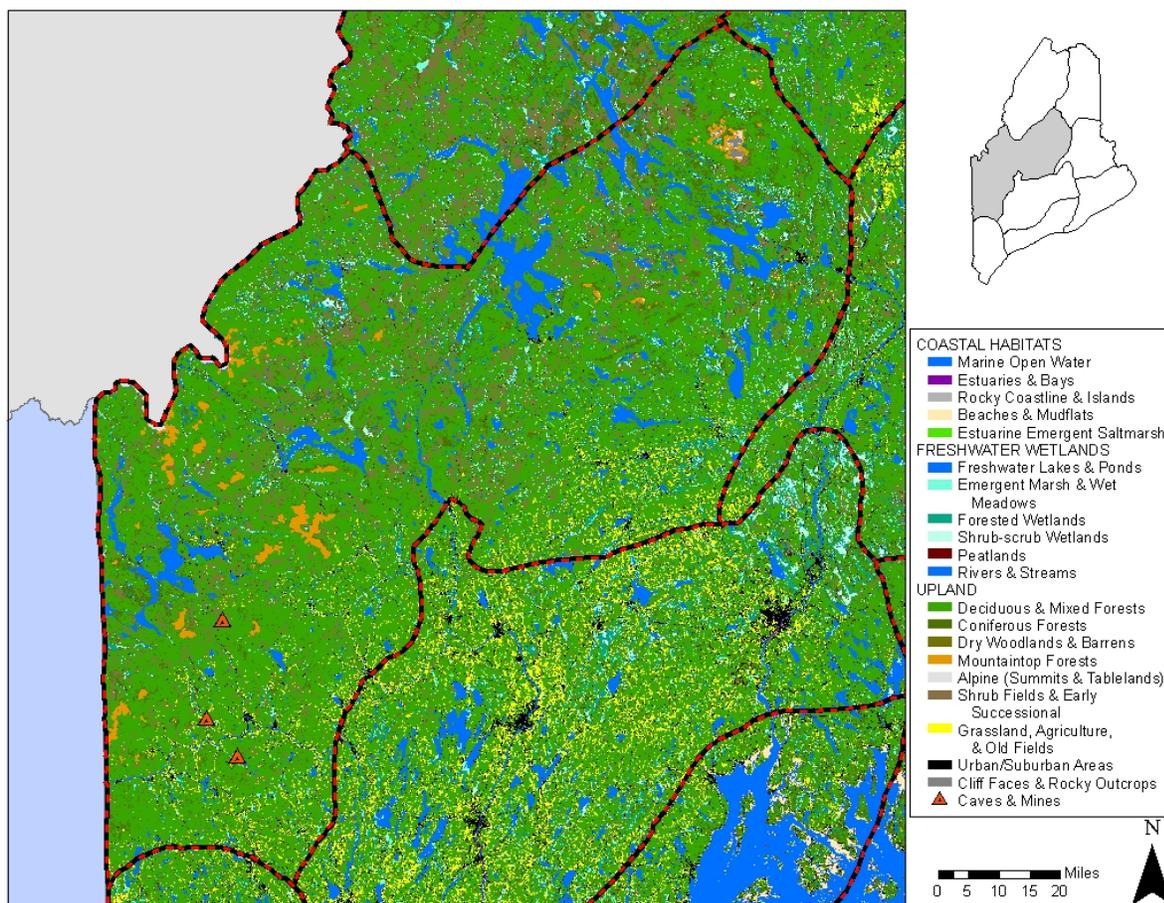


Central and Western Mountain Ecoregion encompasses approximately 5 million acres in the west-central region of Maine (Figure 8). The region is bounded on the west by the State of New Hampshire, the White Mountains National Forest to the south, Aroostook County to the north, and the western foothills to the east.

Geologically, metasedimentary rocks primarily underlie the region. The bedrock of the region is extremely complex. The Katahdin Pluton is composed of granite and granodiorite. A series of smaller plutons composed of gabbro and other ultramafic rocks underlies the Whitecap Mountain area. Bedrock of the surrounding hills is composed primarily of weakly metamorphosed pelites and sandstones. Melange and metavolcanic outcrops occur northeast of Moosehead Lake.

The climate is relatively uniform throughout the region with the exception of high elevations in the central mountains region. At elevations greater than 2500 feet, soils are cold, acidic, and generally well drained. Spruce-fir forests in poorly drained valleys and on ridges dominate the region, and northern hardwoods predominate at middle elevations. Extensive stands of subalpine forest occur between the krummholz zone and the 2500' contour. On treeless peaks, alpine communities such as dwarf shrub and alpine bog occur. Ribbed fens are believed to reach their southern extent in North America in the northern part of this region. Woody species richness increases markedly from west to east.

Figure 8. Map of Central and Western Mountain Ecoregion.
(Source: Maine Office of GIS)



Central Interior Ecoregion extends from the foothills of the White Mountains to the lowlands of the lower Penobscot River Valley (Figure 9). It is characterized by flat to gently rolling terrain of lower river valleys, with increasing relief eastward in the Orland Hills area east of the Penobscot River. The Region includes the majority of Kennebec County and portions of seven other counties, and it has relatively few private conservation or public lands.

Most of the region is underlain by sedimentary and metamorphic bedrock, but there are sizeable granitic plutons in the Belgrade Lakes area, southwest of Androscoggin Lake, and east of Augusta (Osberg, 1985). There are also a few northeast/southwest trending strikes of interbedded pelite and limestone that contribute in a few locations to more alkaline or basic wetland conditions than the surrounding habitats, which tend to be more acidic.

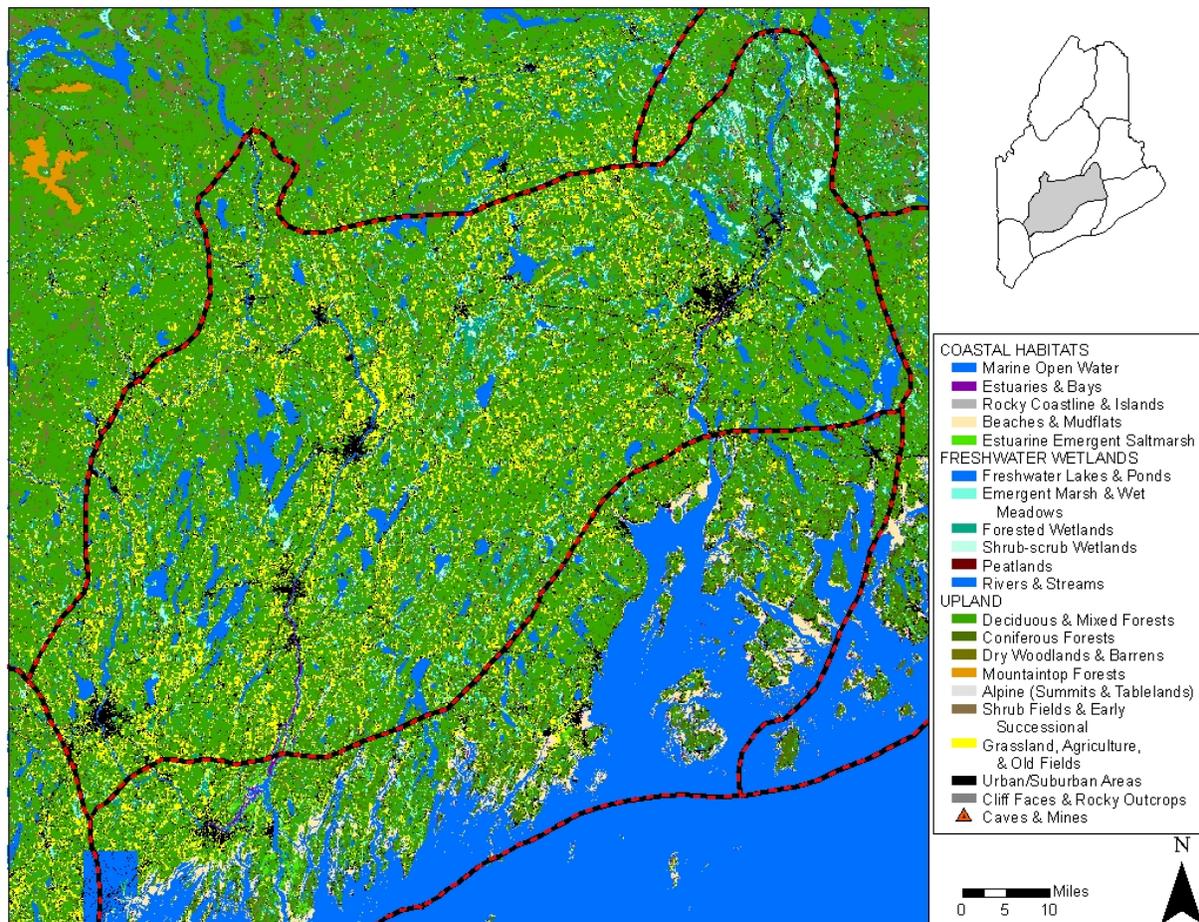
Relative to more recent geologic history, the northwest border of the Central Interior roughly follows the inland extent of glacial submergence. Consequently, the lowlands of the lower Androscoggin, Kennebec, and Penobscot valleys have filled with glaciomarine clays and silts. Uplands outside of the major river valleys are covered with tills and varied ice-contact deposits. Other glacial features, including eskers and stream alluvium, are scattered throughout the region, with the most pronounced esker ridge extending from Clinton to Dresden along the Kennebec River (Thompson 1985).

Soils in the Central Interior tend to be deep, well to moderately drained, coarse sandy loams, with more poorly drained silt loams on the glaciomarine flats of the lower Penobscot Valley. In Freeport and Fayette, two small inland sand barrens exist. While these barrens originated from large eolian (wind-blown) sand deposits during the immediate post-glacial era, their current presence and configuration may be influenced by anthropogenic factors.

The climate of the Central Interior region is transitional between the more moderate climate of the coast and continental conditions (i.e., colder winters, warmer summers) further inland. The northwestern boundary of the region roughly follows a line of 22 inches of potential evapotranspiration -- water surplus is generally more north of this line and less south of it.

Vegetation associations in the Central Interior region are transitional from Appalachian forests of oaks, pine, and mixed hardwood to more boreal spruce-fir and northern hardwood forests of northern and eastern Maine. Northern range limits of at least 60 woody and more than 250 herbaceous species are concentrated along the inland boundary of the region (McMahon 1990). Wetland types are transitional as well, with red maple swamps and vernal pools more abundant in the southwest part of the region, and various types of peatlands more common further north and east. The largest concentration of wetlands is an extensive mosaic of bogs, fens, and streamshore wetlands that extend from Unity northeast through Plymouth. A few of these large wetlands are greater than 2,000 acres, and several others are over 1,000 acres (National Wetland Inventory 1981-1992).

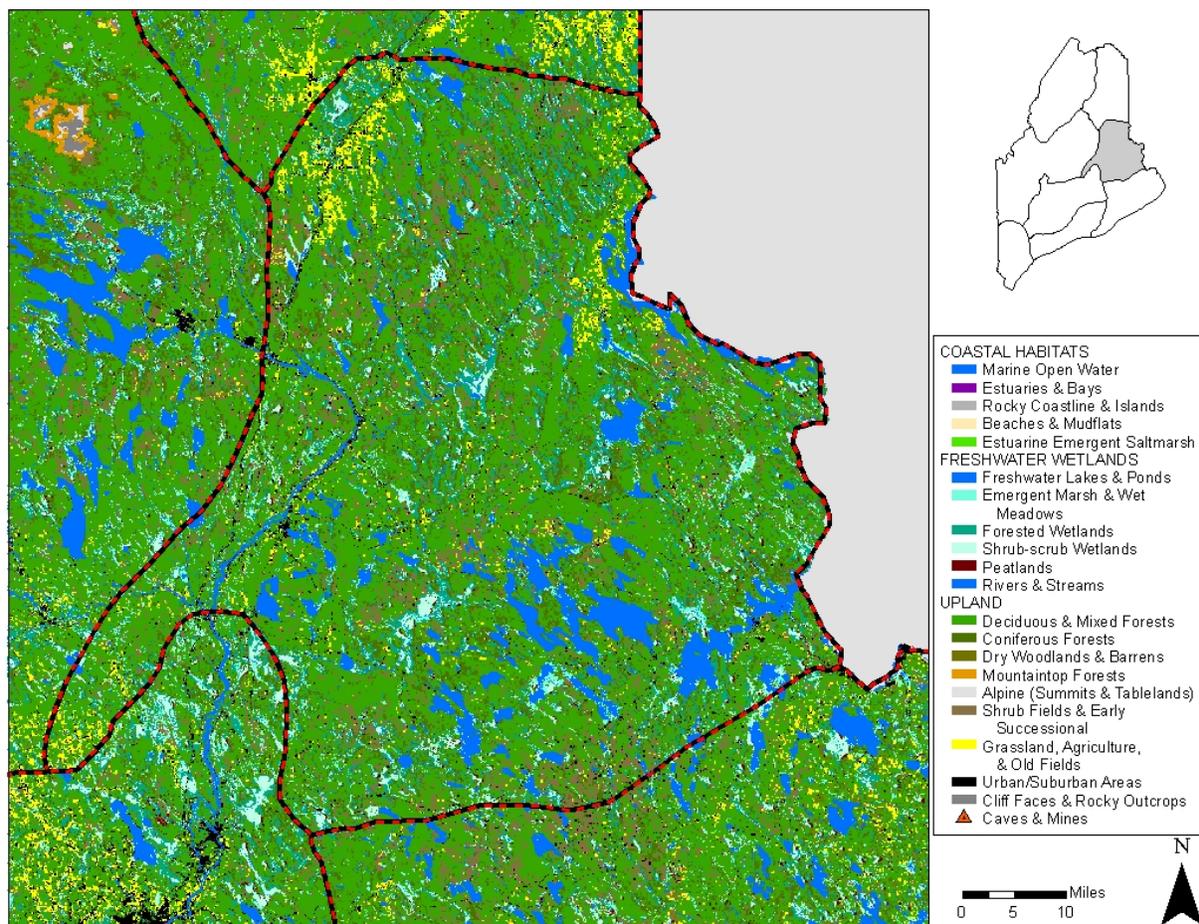
Figure 9. Map of Central Interior Ecoregion.
(Source: Maine Office of GIS)



Eastern Lowlands Ecoregion encompasses approximately 2.2 million acres in east central Maine (Figure 10). Geologically, the region is underlain by mineral soils that are generally wet and dense. More specifically, glaciolacustrine deposits are extensive throughout the region, while glaciomarine clays are prominent in the St. Croix and Penobscot River basins. Depressions are often filled with organic soils. A variety of mucks, clays, and silts are also common in depressions and on broad flat lowlands. These soil conditions lead to the formation of some of the largest forested wetlands in the state.

Climate in this region is transitional between that of the coastal zone and the more continental climate of regions to the north and west. As a result, the Eastern Lowlands support the greatest variety of peatland ecosystem types in the state. While both ribbed and eccentric bogs reach their southern limit in this region, many woody species reach the northern limits of their range (e.g. silky dogwood, buttonbush, bayberry, smooth sumac). Natural communities include rare 'patch forest' types (e.g. enriched northern hardwood forests, hardwood floodplain forests, and red pine woodlands) in addition to more common 'matrix' forest types (e.g. spruce-fir flats forest, oak-pine forest, and red maple swamp).

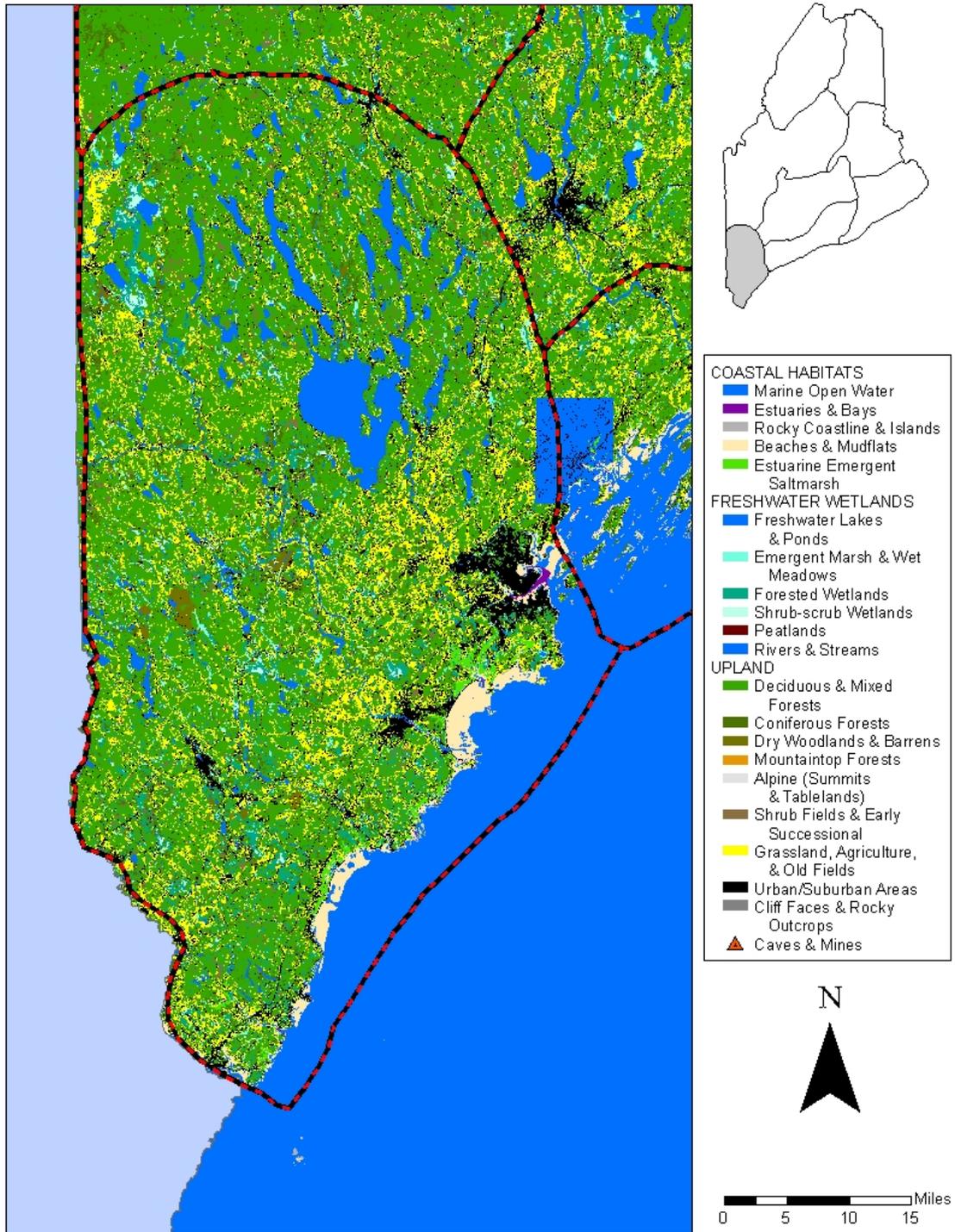
Figure 10. Map of Eastern Lowlands Ecoregion.
(Source: Maine Office of GIS)



Southern Maine Ecoregion (South Coastal, Southwestern, and Southern Interior) extends roughly from Kittery to the New Hampshire border in Stow, and from Kittery up the coast to Yarmouth, with the northeastern boundary making a broad arc between Yarmouth and Stow passing just west of Lewiston and just south of the White Mountain National Forest (Figure 11).

This area includes a wide variety of geologic and hydrologic settings that have influenced the development and persistence of an amazing array of natural communities. For example, many landscapes were created as the result of scouring and depositional action that took place when glaciers last covered the state. When the glaciers retreated they left behind eskers and moraines, which created extensive wetland systems by impairing water flow. The glaciers also left vast sand and gravel outwash deposits which result in droughty acidic soils conducive to fire-prone pitch pine barrens. Glacial plucking, a process that removes large chunks of bedrock from mountains in the path of the glacier, has created steep talus slopes and bedrock exposures on many mountains and hills. Other natural community types such as floodplain forests, river beaches, and tidal marshes have evolved due to sedimentation from streams and rivers. In southern Maine, the many plants and animals found in these different habitats reflect their unique adaptation to both the geographic location within the state and region and the environmental limitations that are characteristic of the given habitat.

**Figure 11. Map of Southern Maine Ecoregion
(South Coastal, Southwestern, and Southern Interior).**
(Source: Maine Office of GIS)



Midcoast – Penobscot Bay Ecoregion includes the Casco Bay and Penobscot Bay coast subsections, which extend from the east shore of Casco Bay through the east shore of Blue Hill Bay and inland roughly 20 miles (Figure 12).

While recent population growth is not quite as high in these regions as in York and Cumberland Counties, the Casco Bay Coast and Penobscot Bay Coast remain among the more populated regions of the state, with pockets of heavy growth around Merrymeeting Bay, the St. George River, and the Belfast area.

The Casco Bay Coast extends from Falmouth to Bristol and inland approximately 20 miles. Geologically, it is characterized by numerous peninsulas and islands composed of ridges of folded and uplifted bedrock. Most of the bedrock is highly metamorphosed sandstone and pelite, but there are scattered intrusions of granite (Osberg et al. 1985; Marvinney and Thompson 1994). The river valleys within this pattern of "indented embayment shoreline" are underlain by softer metamorphic bedrock that has been substantially eroded during and following glaciation (Maine State Planning Office 1983).

The Penobscot Bay Coast extends from the Muscongus Bay through Penobscot Bay to Blue Hill Bay. It includes numerous large islands such as Isleboro, Vinalhaven, and Northaven. The Penobscot Bay Coast region has greater topographic variation than the Casco Bay Coast, with several small summits exceeding 1,000 feet. The Muscongus Bay area and the east shore of Penobscot Bay are underlain by granite, and the summits of the Camden Hills and Blue Hill area are formed by granitic plutons. The west shore of Penobscot Bay and the Pemaquid Point area are underlain by metamorphosed pelites and sandstones (Osberg et al. 1985).

With the exception of several higher elevation "islands," nearly the entire Midcoast region was submerged during the most recent glaciation, when the ocean reached up the Kennebec drainage to Bingham and up the Penobscot drainage to Mattawamkeag. Over the last 13,000 years, the coast has taken on its current form due to isostatic rebound following glacial retreat (Marvinney and Thompson 1994); hence, it is often referred to as a "drowned coastline."

Soils within the region reflect the movement and distribution of materials scoured and fragmented by the glaciers. Within the Midcoast region, many ridges and headlands are covered with shallow, excessively drained Lyman or Abram sandy loams. On mid-slopes, coarse loamy Tunbridge and Dixfield soils have been derived from till and thin drift, which were in turn derived from schists and gneiss. On lower slopes, coarse-grained but poorly drained Colonel and Brayton soils mix with finer-grained Buxton soils. In the valley bottoms and lowlands, deep, poorly drained glaciomarine clays and silts predominate (McMahon 1990).

Vegetation of the Midcoast region is transitional between the cool spruce-forests of the Maritime region and the oak-pine associations of central New England. For instance, Maine's coastal spruce-fir forests reach their southernmost extent in the Harpswell area. Conversely, several plant species more typical of southwestern Maine reach their easternmost extent in the Penobscot Bay Coast, including shagbark hickory (*Carya ovata*), white oak (*Quercus alba*), and musclewood (*Carpinus caroliniana*).

The transitional nature of the vegetation results in a high level of species diversity. Within the Casco Bay Coast, woody species richness is 191 - the highest level of any sub-section in the state (McMahon 1990, Krohn et al. 1997). This richness reflects the confluence of plant species at their range limits: northern species extending to their southern limit, southern species

extending to their northern limit, and coastal species extending to their inland limit. In terms of rare plants and exemplary natural communities, the Maine Natural Areas Program (MNAP) has 579 records that occur within the Midcoast region. While part of this abundance reflects disproportionate survey effort, this figure represents nearly 14% of the total number of rare plant and natural community records for Maine in an area that accounts for only 5% of the state.

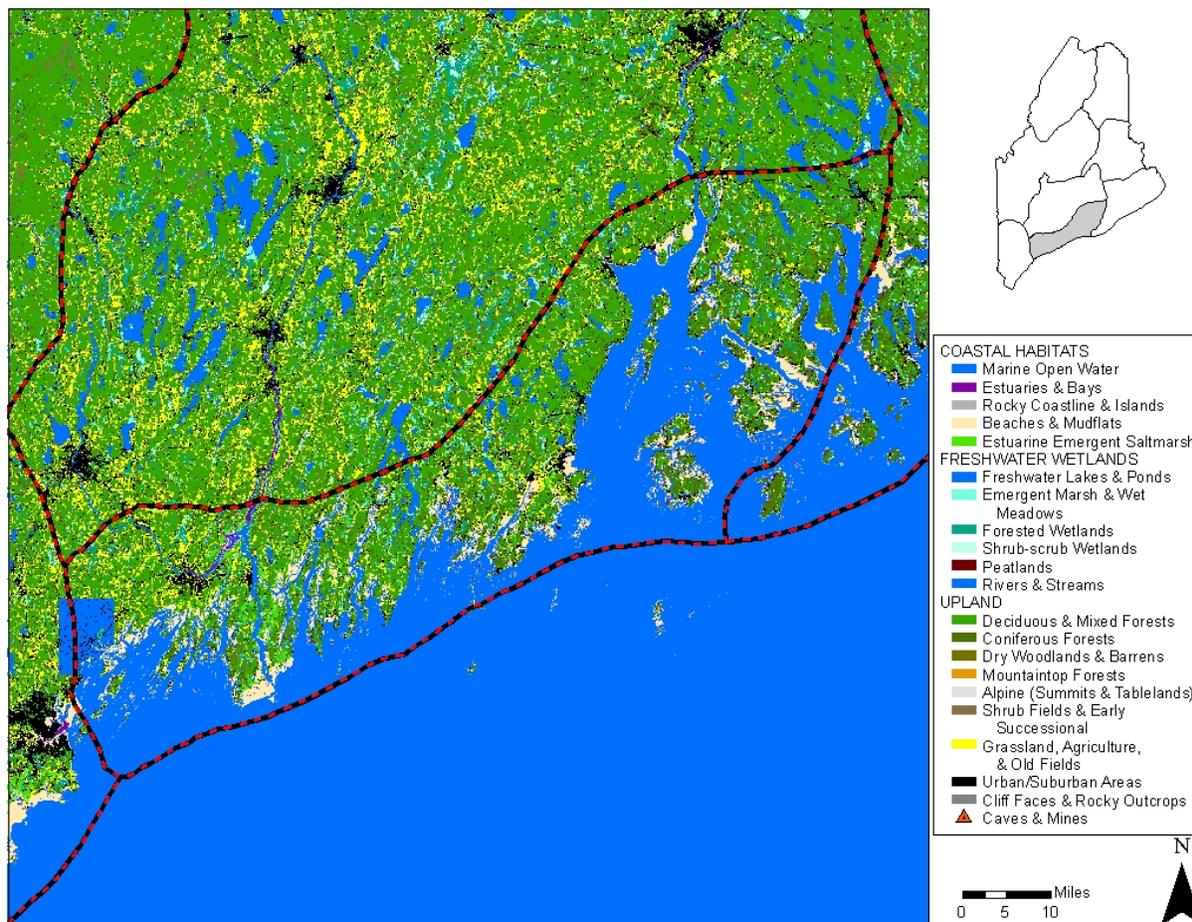
Within these two regions, several plant communities are particularly characteristic. Along the immediate coast, habitats are influenced by a distinct maritime climate, with comparatively high annual precipitation, cool summer temperatures, warm winter temperatures, and frequent fog. A few true maritime headlands occur in the region, characterized by boreal plants such as mountain cranberry (*Vaccinium vitis-idea*) and black crowberry (*Empetrum nigrum*), but these communities are chiefly restricted to offshore islands such as Matinicus Isle and Matinicus Rock.

Pitch pine woodlands, considered globally rare to uncommon by NatureServe (NatureServe 2005), reach some of their greatest development in Maine on the dry ridge tops of Phippsburg and Georgetown. Unlike interior pitch pine communities on glacial outwash plains, these fire-dependant coastal pitch pine forests occur on xeric bedrock ridges. Within Maine, broom crowberry (*Corema conradii*) is a plant that seems to be endemic to these systems. Smooth sandwort (*Minuartia glabra*) a plant typical of low acidic summits in Maine, also occurs in several coastal pitch pine woodlands. Pitch pine forms another rare natural community at its northeastern range limit, a pitch pine dune semi-forest, on some of the coastal back dunes in Phippsburg and Georgetown.

Major tidal rivers such as the Kennebec, Sheepscot, and Penobscot support a robust network of tidal wetlands ranging from salt marshes [salinity of roughly 20 to 30 parts per thousand (ppt)] to brackish (salinity 5 to 20 ppt) to fresh (salinity less than 5 ppt). Many of these marshes are important nesting, feeding, and staging areas for shorebirds and waterfowl, and they are important nurseries for anadromous fish including the rare shortnosed and Atlantic sturgeon. Moreover, these tidal marshes support numerous rare plants adapted to fresh and brackish tidal conditions. Merrymeeting Bay, for instance, is one of the largest and least disturbed freshwater tidal marshes in the eastern United States, and it supports over a dozen rare plant species.

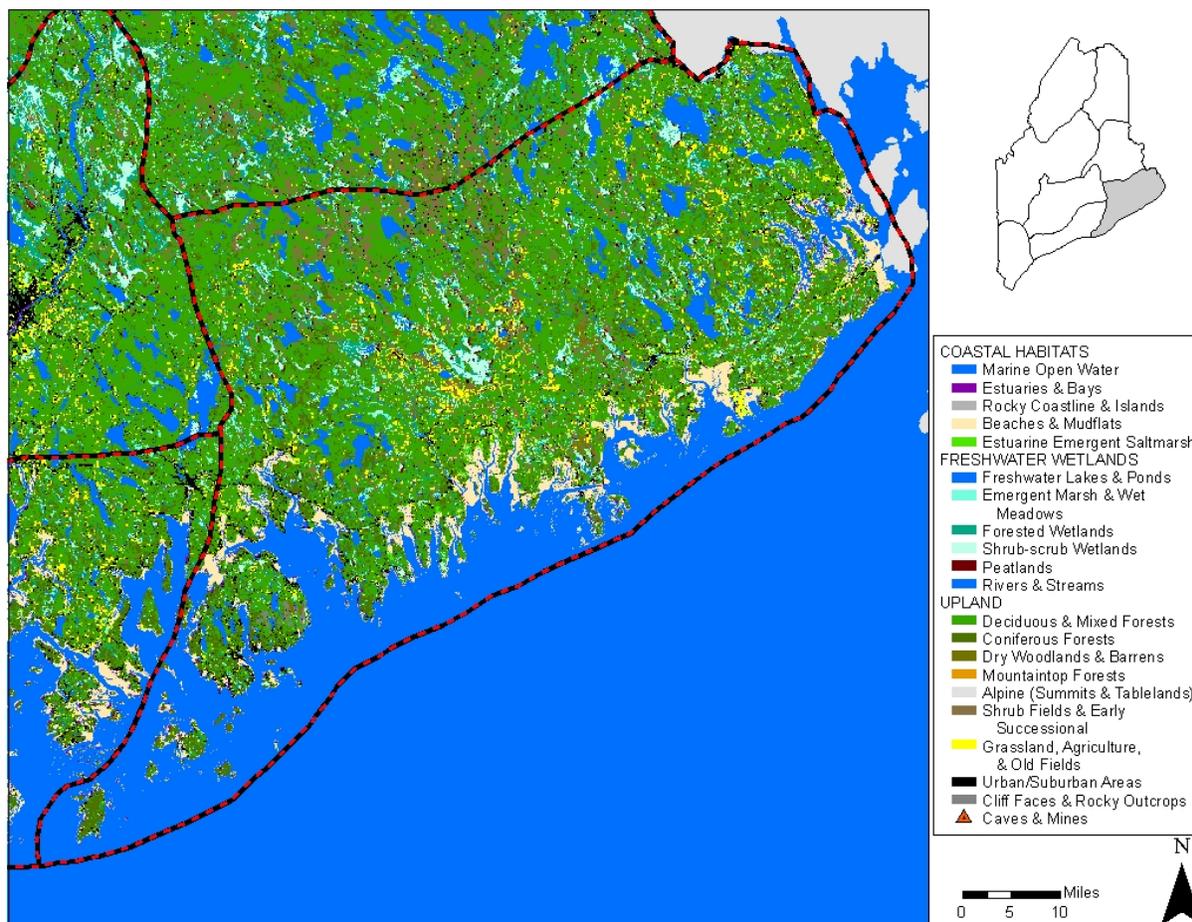
Most of Maine's beaches and dunes occur further westward, but Popham Beach State Park and Reid State Park support outstanding examples of these communities at their northeastern range limit. In fact, the northernmost occurrence of beach heather (*Hudsonia tomentosa*) within the United States occurs in a back-dune area of Reid State Park.

Figure 12. Map of Midcoast – Penobscot Bay Ecoregion.
(Source: Maine Office of GIS)



Downeast Maine Ecoregion (Eastern Coastal and Eastern Interior) of Maine encompasses more than 1.4 million acres that extend from Ellsworth to Eastport and inland to north of Route 9 (Figure 13). Low acidic summits, blueberry barrens, coastal spruce-fir forests, industrial timberlands, and many of the largest peatlands in Maine characterize this region. In particular, coastal plateau peatlands, which occur within five miles of the coast and are restricted to downeast Maine, are among the most ecologically unique wetlands in the state. These peatlands have distinct plant communities that also support some of the rarest wildlife in Maine - boreal dragonflies such as the warpaint emerald (*Somatochlora incurvata*, Special Concern). Large, undisturbed streamshore and lakeshore marshes provide habitat for rare wading birds, including the least bittern (*Ixobrychus exilis*, Special Concern) and yellow rail (*Coturnicops noveboracensis*, Special Concern), and open barrens support the upland sandpiper (*Bartramia longicauda*, State-Threatened) and vesper sparrow (*Pooecetes gramineus*, Special Concern). Some of the region's rivers contain the globally rare brook floater mussel (*Alasmidonta varicosa*, Special Concern) and may contain other rare mussels.

Figure 13. Map of Downeast Maine Ecoregion (Eastern Coastal and Eastern Interior).
 (Source: Maine Office of GIS)



4.2 CWCS KEY HABITATS

Ecoregions are an effective coarse-filter approach for inventorying and assessing resources and setting regional conservation goals, but a finer level of precision is required for many conservation actions. Maine's CWCS identifies 21 key habitat types for conservation purposes (Table 26). These habitats were crosswalked with the National Vegetation Classification (NVC) and NatureServe ecological systems as suggested by IAFWA for regional and national consistency and further linked and matched with the Maine Natural Areas Program's 24 Ecosystem and 98 Natural Community classifications (Gawler and Cutko, *in press*) (Table 27). Complete profiles for Maine's natural communities (Gawler and Cutko, *in press*) are found in Appendix 8.

Table 26. Descriptions of 21 Key Habitats in Maine's CWCS.		
Coastal (C)		
Habitat	Code	Description
Marine Open Water ^{a, b, c}	CO	Watered marine areas.
Estuaries and Bays ^{a, c}	CE	Subtidal estuarine channels and tidal aquatic beds.
Rocky Coastline and Islands ^{a, b, c}	CC	Areas adjacent to water where ledge, gravel, rock, boulders, bedrock, or stones predominate.
Unconsolidated Shore (beaches and mudflats) ^{a, b, c}	CU	Dunes, flats, beaches with vegetation, sand, mud, or gravel.
Estuarine Emergent Saltmarsh ^{a, b, c}	CS	Estuarine/intertidal waters with emergent, herbaceous (non-woody) vegetation.
Freshwater Wetlands (W)		
Habitat	Code	Description
Freshwater Lakes and Ponds ^{b, c, d}	WL	Permanently flooded fresh waterbodies without emergent vegetation.
Emergent Marsh and Wet Meadows ^{b, c}	WM	Fresh, shallow wetlands and waterbodies with emergent, herbaceous (non-woody) vegetation and wet meadows dominated by grasses and sedges.
Forested Wetland ^{b, c}	WF	Fresh, shallow wetlands and waterbodies with tall woody vegetation or dead, standing trees.
Shrub-scrub Wetland ^b	WS	Fresh, shallow wetlands and waterbodies with short woody vegetation
Peatlands ^c	WP	Vegetation dominated by mosses, ericaceous shrubs, or sedges.
Rivers and Streams ^{b, d}	WR	Fresh, flowing water.
Upland (U)		
Habitat	Code	Description
Deciduous and Mixed Forest ^c	UD	Forests with >75% canopy closure composed of deciduous or mixed coniferous and deciduous trees.
Coniferous Forest ^c	UC	Forest with >75% canopy closure composed of at least 75% coniferous trees.
Dry Woodlands and Barrens ^{c, e}	UB	Pitch pine / scrub oak woodlands and barrens
Mountaintop Forest (including krummholz) ^{c, f}	UM	Forested areas above 3,000 ft ^g .
Alpine ^c	UA	Mountain zones between the treeline.

Table 26. Descriptions of 21 Key Habitats in Maine's CWCS.

Upland (U) continued		
Habitat	Code	Description
Shrub / Early Successional and Regenerating Forest ^c	US	Areas dominated by woody shrubs and/or harvested before 1991 with seedling to sapling-sized trees; forestland where >50% of the overstory has been removed.
Grassland, Agricultural, Old Field ^c	UG	Abandoned agricultural fields, blueberry barrens, crop fields, bare ground, grasslands (hay fields, pastures, lawns, golf courses).
Urban / Suburban ^{c, h}	UU	Areas where percent cover by buildings, roads, and other impervious surfaces is greater than vegetative cover.
Cliff Face and Rocky Outcrops (including talus) ^c	UR	Exposed bedrock, talus, bare mountain tops, gravel pits.
Caves and Mines ⁱ	UCM	Documented bat hibernacula ^j .

^a. Coastal Marine Geologic Environment data, Maine Geological Survey, 1974-1976.

^b. National Wetland Inventory data, U.S. Fish & Wildlife Service, 1971-1992.

^c. Maine GAP Analysis – A Geographic Analysis of Biodiversity; Maine Cooperative Fish and Wildlife Research Unit (Dept. of Wildlife Ecology), Maine Image Analysis Laboratory (Dept. of Forest Management), U.S. Geological Survey (Biological Resources Division); 1991-1993.

^d. Maine GIS/USGS National Hydrography Data project, U. S. Geological Survey, Maine Office of GIS, 2004.

^e. Rare and exemplary natural communities, Maine Natural Areas Program, 2005.

^f. Digital Elevation Model (30 m), U. S. Geological Survey, 2001.

^g. The 3,000 ft. cutoff used to identify mountaintop forest is an unrealistic model because elevation effects on forest habitats are influenced by latitude. Additional modeling is needed to improve this habitat data.

^h. Impervious Surfaces in Developed Areas of Maine; Space Imaging, Inc., Maine Office of GIS, 2004.

ⁱ. Mapped Bat Hibernacula from the Maine Natural Heritage (NatureServe) / Biological Conservation Database (BCD), Maine Department of Inland Fisheries and Wildlife, 2004.

^j. Not all suitable caves and mines are mapped in the Natural Heritage/BCD database. Additional observations and information needs to be incorporated.

Table 27. CWCS Key Habitats Crosswalked with NatureServe's Ecological Systems and MNAP's Ecosystems and Natural Communities					
CWCS Habitat Classification	# SGCN²	Associated NatureServe Ecological Systems	MNAP Ecosystems	MNAP Communities	S Rank
COASTAL ECOSYSTEM					
Marine Open Water	22	Atlantic Coastal Plain Northern Seagrass Bed	N/A	N/A	
Estuaries and Bays	26	Acadian Estuary Marsh North Atlantic Intertidal Mudflat	N/A	N/A	
Rocky Coastline and Islands	23	Acadian-North Atlantic Rocky Coast	Maritime Forest	Rose - Bayberry Maritime Shrubland	S4
		North Atlantic Rocky Intertidal	Coastal Headland	Crowberry - Bayberry Headland	S3
				Seaside Goldenrod - Goosetongue Open Headland	S4
				Acidic Cliff - Gorge	S4
Unconsolidated Shore (beaches and mudflats)	11	Atlantic Coastal Plain Northern Dune and Maritime Grassland	Coastal Dune - Marsh	Dune Grassland	S2
		Atlantic Coastal Plain Northern Sandy Beach		Beach Strand	S4
		North Atlantic Tidal Sand Flat			
		North Atlantic Cobble Shore			
Estuarine Emergent Saltmarsh	16	Acadian Coastal Salt Marsh	Tidal Marsh Estuary	Brackish Tidal Marsh	S3
		Acadian Estuary Marsh	Coastal Dune - Marsh	Mixed Graminoid - Forb Saltmarsh	S4
		Atlantic Coastal Plain Northern Tidal Salt Marsh		Spartina Saltmarsh	S3
				Freshwater Tidal Marsh	S2
FRESHWATER ECOSYSTEM					
Lakes and Ponds	39	Laurentian-Acadian Rocky Lakeshore	Lakeshore	Pickerelweed - Macrophyte Aquatic Bed	S5
			Coastal Plain Pondshore	Pipewort - Water Lobelia Aquatic Bed	S5
				Water-lily - Macrophyte Aquatic Bed	S5
				Three-way Sedge - Goldenrod Outwash Plain Pondshore	S1
				Circumneutral-Alkaline Water Macrophyte Suite	S2
				Bulrush Bed	S4
Emergent Marsh and Wet Meadows	28	Laurentian-Acadian Wet Meadow-Shrub Swamp and Marsh	Appalachian - Acadian Basin Swamp	Three-way Sedge - Goldenrod Outwash Plain Pondshore	S1
			Coastal Plain Basin Swamp	Bluejoint Meadow	S3
				Mixed Graminoid - Shrub Marsh	S5

² SGCN may occur in more than one habitat type.

Table 27. CWCS Key Habitats Crosswalked with NatureServe's Ecological Systems and MNAP's Ecosystems and Natural Communities					
CWCS Habitat Classification	# SGCN²	Associated NatureServe Ecological Systems	MNAP Ecosystems	MNAP Communities	S Rank
Emergent Marsh and Wet Meadows (continued)				Bulrush Bed	S4
				Cattail Marsh	S5
				Tussock Sedge Meadow	S3
				Freshwater Tidal Marsh	S2
Forested Wetland	16	Acadian Conifer Seepage Forest	Appalachian - Acadian Basin Swamp	Spruce - Fir - Cinnamon Fern Forest	S4
		Eastern Boreal Floodplain	Coastal Plain Basin Swamp	Northern White Cedar Swamp	S4
		Laurentian-Acadian Acidic Swamp		Cedar - Spruce Seepage Forest	S3
		Laurentian-Acadian Floodplain Forest		Atlantic White Cedar Swamp	S2
				Silver Maple Floodplain Forest	S3
				Hardwood River Terrace Forest	S2
				Balsam Poplar Floodplain Forest	S2
				Hardwood Seepage Forest	S3
				Hemlock - Hardwood Pocket Swamp	S2
				Spruce - Larch Wooded Bog	S4
		Pitch Pine Bog	S2		
		Red Maple - Sensitive Fern Swamp	S4		
Shrub-Scrub Wetland	14	Laurentian-Acadian Acidic Swamp	Appalachian - Acadian Basin Swamp	Alder Shrub Thicket	S5
			Coastal Plain Basin Swamp	Sweetgale Mixed Shrub Fen	S4
Peatlands	14	Acadian Maritime Bog	Unpatterned Fen	Northern White Cedar Woodland Fen	S4
		Boreal Patterned Peatland	Patterned Fen	Spruce - Larch Wooded Bog	S4
		Eastern Boreal Semi-Treed Bog	Coastal Plateau Bog	Atlantic White Cedar Bog	S2
		Laurentian Conifer Bog	Domed Bog	Pitch Pine Bog	S2
		Laurentian-Acadian Acidic Basin Fen	Raised Level Bog	Red Maple Wooded Fen	S4
		Laurentian-Acadian Alkaline Fen	Eccentric Bog	Sheep Laurel Dwarf Shrub Bog	S4
		North-Central Interior and Appalachian Acid Peatland	Kettlehole Bog Pond	Leatherleaf Boggy Fen	S4
				Huckleberry - Crowberry Bog	S3
				Heath - Lichen Subalpine Slope Bog	S1
				Heath - Crowberry Maritime Slope Bog	S2
				Sedge - Leatherleaf Fen Lawn	S4
				Mixed Tall Sedge Fen	S4
				Low Sedge - Buckbean Fen Lawn	S3
		Shrubby Cinquefoil - Sedge Circumneutral Fen	S2		
		Deer-hair Sedge Bog Lawn	S3		

Table 27. CWCS Key Habitats Crosswalked with NatureServe's Ecological Systems and MNAP's Ecosystems and Natural Communities					
CWCS Habitat Classification	# SGCN²	Associated NatureServe Ecological Systems	MNAP Ecosystems	MNAP Communities	S Rank
Peatlands (continued)				Cotton-grass - Heath Alpine Bog	S2
				Sweetgale Mixed Shrub Fen	S4
				Mountain Holly - Alder Woodland Fen	S4
				Bog Moss Lawn	S4
				Red Maple Wooded Fen	S4
				Sheep Laurel Dwarf Shrub Bog	S4
				Bog Moss Lawn	S4
Rivers and Streams	48	Laurentian-Acadian Ice-Scour Rivershore	Appalachian - Acadian Rivershore	Bluebell - Balsam Ragwort Shoreline Outcrop	S3
				Sand Cherry - Tufted Hairgrass River Beach	S2
				Circumneutral Riverside Seep	S2
			Coastal Plain Rivershore	Dogwood - Willow Shoreline Thicket	S2
			Streamshore	Hudsonia River Beach	S1
UPLAND ECOSYSTEM					
Deciduous and Mixed Forest	38	Acadian Lowland Spruce-Fir-Hardwood Forest	Spruce - Fir - Northern Hardwoods	Beech - Birch - Maple Forest	S4
		Acadian Montane Spruce-Fir-Hardwood Forest	White Pine - Mixed Hardwoods	Maple - Basswood - Ash Forest	S3
		Boreal Aspen-Birch Forest	Central Hardwoods Oak Forest	White Oak - Red Oak Forest	S3
		Boreal White Spruce-Fir-Hardwood Forest		Red Oak - Northern Hardwoods - White Pine Forest	S4
		Central Appalachian Oak and Pine Forest		Red Pine - White Pine Forest	S3
		Laurentian-Acadian Northern Hardwoods Forest		Spruce - Northern Hardwoods Forest	S4
		Laurentian-Acadian Pine-Hemlock-Hardwood Forest		Aspen - Birch Woodland/Forest Complex	S5
Coniferous Forest	23	Acadian Near-Boreal Spruce Flat	Spruce - Fir - Northern Hardwoods	White Pine - Mixed Conifer Forest	S4
		Boreal White Spruce Forest and Woodland	White Pine - Mixed Hardwoods	Hemlock Forest	S4
		Laurentian-Acadian White Pine-Red Pine Forest		Red Pine - White Pine Forest	S3
				Maritime Spruce - Fir Forest	S4
				Spruce - Fir - Broom-moss Forest	S4
				Spruce - Fir - Wood-sorrel - Feather-moss Forest	S4
				Jack Pine Forest	S1
Dry Woodlands and Barrens (<60% canopy cover)	31	Acadian Near-Boreal Spruce Barrens	Pine Barrens	Birch - Oak Talus Woodland	S3
		Central Appalachian Pine-Oak Rocky Woodland		Black Spruce Woodland	S3

Table 27. CWCS Key Habitats Crosswalked with NatureServe's Ecological Systems and MNAP's Ecosystems and Natural Communities

CWCS Habitat Classification	# SGCN²	Associated NatureServe Ecological Systems	MNAP Ecosystems	MNAP Communities	S Rank
Dry Woodlands and Barrens (<60% canopy cover) (continued)		North-Central Appalachian Pine Barrens		Chestnut Oak Woodland	S1
		Northeastern Interior Dry Oak Forest		Ironwood - Oak - Ash Woodland	S3
				Jack Pine Woodland	S3
				Oak - Pine Woodland	S4
				Pitch Pine - Heath Barren	S1
				Pitch Pine - Scrub Oak Barren	S1
				Pitch Pine Dune Woodland	S1
				Pitch Pine Woodland	S3
				Red Pine Woodland	S3
				Red Spruce - Mixed Conifer Woodland	S4
				Spruce Talus Woodland	S4
				White Cedar Woodland	S2
				Spruce - Heath Barren	S2
		Aspen - Birch Woodland/Forest Complex	S5		
Mountaintop Forest (including krummholz)	3	Acadian Subalpine Woodland and Barrens	Alpine	Fir – Heart-leaved Birch Subalpine Forest	S3
Alpine (summits and tablelands above treeline)	2	Acadian Alpine Barrens	Alpine	Spruce - Fir - Birch Krummholz	S3
				Mountain Alder - Bush-honeysuckle Subalpine Meadow	S2
				Crowberry - Bilberry Summit Bald	S3
				Dwarf Heath - Graminoid Alpine Ridge	S2
				Diapensia Alpine Ridge	S1
				Bilberry - Mountain Heath Alpine Snowbank	S1
				Labrador Tea Talus Dwarf-shrubland	S2
				Subalpine Heath - Krummholz	S4
				Alpine Cliff	S1
Shrub / Early Successional (including regenerating forests)	24	N/A	N/A	Blueberry - Lichen Barren	S2
				Labrador Tea Talus Dwarf-shrubland	S2
				Three-toothed Cinquefoil - Blueberry Low Summit Bald	S3
Grasslands / Agriculture / Old Field (shrubs <50%)	25	Atlantic Coastal Plain Northern Dune and Maritime Grassland	N/A	Little Bluestem – Blueberry Sandplain Grassland	S1
Urban / Suburban	6	N/A	N/A	N/A	

CWCS Habitat Classification	# SGCN²	Associated NatureServe Ecological Systems	MNAP Ecosystems	MNAP Communities	S Rank
Cliff Face and Rock Outcrop (including talus)	6	Boreal Acidic Rocky Outcrop	Rock Outcrop	Alpine Cliff	S1
		Laurentian-Acadian Acidic Cliff and Talus		Labrador Tea Talus Dwarf-shrubland	S2
		Laurentian-Acadian Acidic Rocky Outcrop		Boreal Circumneutral Open Outcrop	S2
		Laurentian-Acadian Calcareous Cliff and Talus		Acidic Cliffs and Talus	
		Laurentian-Acadian Calcareous Rocky Outcrop			
		North-Central Appalachian Circumneutral Cliff and Talus			
Caves and Mines	1	N/A	N/A	N/A	

State Rarity Ranks (determined by Maine Natural Areas Program)

- S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3 Rare in Maine (on the order of 20-100 occurrences).
- S4 Apparently secure in Maine.
- S5 Demonstrably secure in Maine.

Maine has identified 213 Species of Greatest Conservation Need: 103 birds, 7 herpetofauna, 12 inland fish, 72 invertebrates, 6 non-marine mammals, and 13 marine species. MDIFW and MDMR staff, in consultation with species experts and stakeholders, identified the primary and secondary habitats important to the lifecycle of each of Maine's SGCN species. However, habitat requirements for all SGCN species, especially some invertebrates, are not well understood, so best professional judgment was exercised in those cases. Distribution of SGCN taxa is summarized in Table 28 and species-specific distribution information is presented in Table 29.

To understand the following discussion, please keep in mind that some SGCN species are double-counted because of distinctly different habitat requirements during different stages of their life or different seasons (e.g. breeding season vs. winter requirements). Therefore, we use the number 222 instead of 213 when discussing primary habitats of SGCN species.

Of the 222 primary habitats identified for SGCN species, freshwater habitats accounted for 39%, upland habitats 37%, and coastal habitats 24% (Table 28). Primary habitats for SGCN birds accounted for 72% of the coastal primary habitats, invertebrates 52% of the freshwater, and birds 59% of the upland primary habitats.

If we examine primary habitats by taxa, we find that 45% of the primary habitats for SGCN birds are in coastal habitats, all primary habitats for SGCN herpetofauna and inland fish are in freshwater habitats, 63% of primary habitats for SGCN invertebrates are in freshwater habitats, 83% of primary habitats for non-marine SGCN mammals are in upland habitats, and 72% of the primary habitats for SGCN marine species are in coastal habitats. Of the 21 habitat types we identified, rivers and streams account for 14% of the SGCN primary habitats, followed by lakes and ponds (12%), and rocky coastline and islands (9%). Essentially all 21 habitats, except caves and mines, serve as primary habitats for at least one SGCN species, and all serve as secondary habitats for at least one SGCN species.

Table 28. Distribution of SGCN Taxa in 21 Key Habitats in Maine (Primary/Secondary Habitat).

Key Habitat Type	Birds	Herpetofauna	Inland Fish	Invertebrates	Mammals	Marine	All SGCN
COASTAL							
Marine Open Water (CO)	2 / 6	0 / 0	0 / 2	0 / 0	0 / 0	12 / 0	14 / 8
Estuaries and Bays (CE)	5 / 9	0 / 0	0 / 2	0 / 2	0 / 0	1 / 7	6 / 20
Rocky Coastline and Islands (CC)	19 / 3	0 / 0	0 / 0	0 / 0	1 / 0	0 / 0	20 / 3
Unconsolidated Shore (CU)	8 / 3	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	8 / 3
Estuarine Emergent Salt Marsh (CS)	4 / 11	0 / 0	0 / 0	1 / 0	0 / 0	0 / 0	5 / 11
Total - Coastal	38 / 32	0 / 0	0 / 4	1 / 2	1 / 0	13 / 7	53 / 45
FRESHWATER							
Lakes and Ponds (WL)	4 / 8	0 / 2	11 / 0	11 / 3	0 / 0	0 / 0	26 / 13
Emergent Marsh & Wet Meadows (WM)	11 / 7	0 / 3	0 / 0	1 / 6	0 / 0	0 / 0	12 / 16
Forested Wetland (WF)	0 / 4	0 / 5	0 / 0	3 / 4	0 / 0	0 / 0	3 / 13
Shrub-scrub Wetlands (WS)	2 / 4	3 / 1	0 / 0	1 / 3	0 / 0	0 / 0	6 / 8
Peatlands (WP)	0 / 2	0 / 0	0 / 0	8 / 4	0 / 0	0 / 0	8 / 6
Rivers and Streams (WR)	3 / 3	1 / 3	2 / 7	21 / 4	0 / 0	5 / 0	31 / 17
Total - Freshwater	20 / 28	4 / 14	13 / 7	45 / 24	0 / 0	5 / 0	87 / 73
UPLAND							
Deciduous and Mixed Forest (UD)	15 / 9	1 / 5	0 / 0	5 / 0	0 / 3	0 / 0	21 / 17

Key Habitat Type	Birds	Herpetofauna	Inland Fish	Invertebrates	Mammals	Marine	All SGCN
Coniferous Forest (UC)	9 / 4	0 / 4	0 / 0	2 / 2	0 / 2	0 / 0	11 / 12
Dry Woodland and Barrens (UB)	3 / 9	1 / 2	0 / 0	13 / 3	0 / 0	0 / 0	17 / 14
Mountaintop Forest (UM)	1 / 1	0 / 0	0 / 0	0 / 0	1 / 0	0 / 0	2 / 1
Alpine (UA)	1 / 0	0 / 0	0 / 0	1 / 0	0 / 0	0 / 0	2 / 0
Shrub / Early Successional (US)	10 / 2	0 / 7	0 / 0	0 / 2	3 / 0	0 / 0	13 / 11
Grassland / Agriculture / Old Fields (UG)	6 / 7	0 / 6	0 / 0	5 / 1	0 / 0	0 / 0	11 / 14
Urban / Suburban (UU)	1 / 5	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 5
Cliff Face and Rocky Outcrop (UR)	2 / 0	1 / 1	0 / 0	0 / 1	1 / 0	0 / 0	4 / 2
Caves and Mines (UCM)	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 1
Total - Upland	48 / 37	3 / 25	0 / 0	26 / 9	5 / 6	0 / 0	82 / 77
Total SGCN	106 / 97	7 / 39	13 / 11	72 / 35	6 / 6	18 / 7	222 / 195

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
COASTAL					
Marine Open Water (CO)					
Arctic Tern	<i>Sterna paradisaea</i>	2	Bird		X
Atlantic Puffin	<i>Fratercula arctica</i>	2	Bird		X
Common Eider	<i>Somateria mollissima</i>	2	Bird		X
Common Loon	<i>Gavia immer</i>	2	Bird		X
Common Murre	<i>Uria aalge</i>	2	Bird		X
Greater Shearwater	<i>Puffinus gravis</i>	2	Bird	X	
Razorbill	<i>Alca torda</i>	2	Bird		X
Red-necked Phalarope	<i>Phalaropus lobatus</i>	2	Bird	X	
American Eel	<i>Anguilla rostrata</i>	1	Inland Fish / Marine		X
Rainbow Smelt	<i>Osmerus mordax</i>	2	Inland Fish / Marine		X
Atlantic Salmon	<i>Salmo salar</i>	1	Marine Diadromous Fish	X	
Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>	1	Marine Diadromous Fish	X	
Striped Bass	<i>Morone saxatilis</i>	1	Marine Diadromous Fish	X	
American Shad	<i>Alosa sapidissima</i>	2	Marine Diadromous Fish	X	
Finback Whale	<i>Balaenoptera physalus</i>	1	Marine Mammal	X	
Humpback Whale	<i>Megaptera novaeangliae</i>	1	Marine Mammal	X	
Northern Right Whale	<i>Eubalaena glacialis</i>	1	Marine Mammal	X	
Sei Whale	<i>Balaenoptera borealis</i>	1	Marine Mammal	X	
Sperm Whale	<i>Physeter catodon</i>	1	Marine Mammal	X	
Atlantic Ridley	<i>Lepidochelys kempii</i>	1	Marine Turtle	X	

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.					
Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Leatherback	<i>Dermochelys coriacea</i>	1	Marine Turtle	X	
Loggerhead	<i>Caretta caretta</i>	1	Marine Turtle	X	
Estuaries and Bays (CE)					
Least Tern	<i>Sterna antillarum</i>	1	Bird		X
Roseate Tern	<i>Sterna dougallii</i>	1	Bird		X
American Black Duck (wintering)	<i>Anas rubripes</i>	2	Bird	X	
Arctic Tern	<i>Sterna paradisaea</i>	2	Bird		X
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2	Bird		X
Barrow's Goldeneye	<i>Bucephala islandica</i>	2	Bird		X
Common Eider (molting & wintering)	<i>Somateria mollissima</i>	2	Bird	X	
Common Loon (wintering & breeding)	<i>Gavia immer</i>	2	Bird	X	
Common Tern	<i>Sterna hirundo</i>	2	Bird		X
Golden Eagle	<i>Aquila chrysaetos</i>	2	Bird		X
Great Cormorant	<i>Phalacrocorax carbo</i>	2	Bird		X
Greater Scaup (non-breeding)	<i>Aythya marila</i>	2	Bird	X	
Red-necked Phalarope	<i>Phalaropus lobatus</i>	2	Bird		X
Ruddy Duck	<i>Oxyura jamaicensis</i>	2	Bird	X	
American Eel ¹	<i>Anguilla rostrata</i>	1	Inland Fish / Marine		X
Rainbow Smelt ¹	<i>Osmerus mordax</i>	2	Inland Fish / Marine		X
Big Bluet	<i>Enallagma durum</i>	2	Invertebrate Damselflies & Dragonflies		X
Rambur's Forktail	<i>Ischnura ramburii</i>	2	Invertebrate Damselflies & Dragonflies		X
Atlantic Salmon	<i>Salmo salar</i>	1	Marine Diadromous Fish		X
Atlantic Sturgeon	<i>Acipenser oxyrhynchus</i>	1	Marine Diadromous Fish		X
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	1	Marine Diadromous Fish	X	

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Striped Bass	<i>Morone saxatilis</i>	1	Marine Diadromous Fish		X
American Shad	<i>Alosa sapidissima</i>	2	Marine Diadromous Fish		X
Northern Right Whale	<i>Eubalaena glacialis</i>	1	Marine Mammal		X
Atlantic Ridley	<i>Lepidochelys kempii</i>	1	Marine Turtle		X
Loggerhead	<i>Caretta caretta</i>	1	Marine Turtle		X
Rocky Coastline and Islands (CC)					
American Oystercatcher	<i>Haematopus palliatus</i>	1	Bird	X	
Roseate Tern	<i>Sterna dougallii</i>	1	Bird	X	
Arctic Tern	<i>Sterna paradisaea</i>	2	Bird	X	
Atlantic Puffin	<i>Fratercula arctica</i>	2	Bird	X	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2	Bird	X	
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	2	Bird		X
Cattle Egret	<i>Bubulcus ibis</i>	2	Bird	X	
Common Eider (breeding)	<i>Somateria mollissima</i>	2	Bird	X	
Common Murre	<i>Uria aalge</i>	2	Bird	X	
Common Tern	<i>Sterna hirundo</i>	2	Bird	X	
Glossy Ibis	<i>Plegadis falcinellus</i>	2	Bird	X	
Great Blue Heron	<i>Ardea herodias</i>	2	Bird		X
Great Cormorant	<i>Phalacrocorax carbo</i>	2	Bird	X	
Great Egret	<i>Ardea alba</i>	2	Bird	X	
Harlequin Duck	<i>Histrionicus histrionicus</i>	2	Bird	X	
Little Blue Heron	<i>Hydranassa caerulea</i>	2	Bird	X	
Purple Sandpiper	<i>Calidris maritima</i>	2	Bird	X	
Razorbill	<i>Alca torda</i>	2	Bird	X	
Ruddy Turnstone	<i>Arenaria interpres</i>	2	Bird	X	
Semipalmated Sandpiper	<i>Calidris pusilla</i>	2	Bird		X
Snowy Egret	<i>Egretta thula</i>	2	Bird	X	

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.					
Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Tri-colored Heron	<i>Hydranassa tricolor</i>	2	Bird	X	
Penobscot Meadow Vole	<i>Microtus pennsylvanicus shattucki</i>	1	Mammal	X	
Unconsolidated Shore (CU)					
American Oystercatcher	<i>Haematopus palliatus</i>	1	Bird		X
Least Tern	<i>Sterna antillarum</i>	1	Bird	X	
Piping Plover	<i>Charadrius melodus</i>	1	Bird	X	
Great Blue Heron	<i>Ardea herodias</i>	2	Bird	X	
Greater Yellowlegs	<i>Tringa melanoleuca</i>	2	Bird	X	
Red Knot	<i>Calidris canutus</i>	2	Bird	X	
Ruddy Turnstone	<i>Arenaria interpres</i>	2	Bird		X
Sanderling	<i>Calidris alba</i>	2	Bird	X	
Semipalmated Sandpiper	<i>Calidris pusilla</i>	2	Bird	X	
Whimbrel	<i>Numenius phaeopus</i>	2	Bird	X	
Willet	<i>Catoptrophorus semipalmatus</i>	2	Bird		X
Estuarine Emergent Salt Marsh (CS)					
Least Tern	<i>Sterna antillarum</i>	1	Bird		X
Saltmarsh Sharp-tailed Sparrow	<i>Ammodramus caudacutus</i>	1	Bird	X	
Short-eared Owl	<i>Asio flammeus</i>	1	Bird		X
American Black Duck	<i>Anas rubripes</i>	2	Bird		X
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	2	Bird	X	
Cattle Egret	<i>Bubulcus ibis</i>	2	Bird		X
Glossy Ibis	<i>Plegadis falcinellus</i>	2	Bird		X
Great Egret	<i>Ardea alba</i>	2	Bird		X
Greater Yellowlegs	<i>Tringa melanoleuca</i>	2	Bird		X
Little Blue Heron	<i>Hydranassa caerulea</i>	2	Bird		X
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	2	Bird	X	
Snowy Egret	<i>Egretta thula</i>	2	Bird		X
Tri-colored Heron	<i>Hydranassa tricolor</i>	2	Bird		X
Whimbrel	<i>Numenius phaeopus</i>	2	Bird		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.					
Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Willet	<i>Catoptrophorus semipalmatus</i>	2	Bird	X	
Citrine Forktail	<i>Ischnura hastata</i>	2	Invertebrate Damselflies & Dragonflies	X	
FRESHWATER					
Lakes and Ponds (WL)					
Black Tern	<i>Chlidonias niger</i>	1	Bird		X
American Black Duck	<i>Anas rubripes</i>	2	Bird		X
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2	Bird		X
Barn Swallow	<i>Hirundo rustica</i>	2	Bird	X	
Bonaparte's Gull (breeding)	<i>Larus philadelphia</i>	2	Bird	X	
Common Loon (breeding)	<i>Gavia immer</i>	2	Bird	X	
Common Tern	<i>Sterna hirundo</i>	2	Bird		X
Great Blue Heron	<i>Ardea herodias</i>	2	Bird		X
Greater Scaup (non-breeding)	<i>Aythya marila</i>	2	Bird		X
Pied-billed Grebe	<i>Podilymbus podiceps</i>	2	Bird	X	
Purple Martin	<i>Progne subis</i>	2	Bird		X
Ruddy Duck	<i>Oxyura jamaicensis</i>	2	Bird		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
American Eel	<i>Anguilla rostrata</i>	1	Inland Fish / Marine	X	
Arctic Charr	<i>Salvelinus alpinus oquassa</i>	1	Inland Fish	X	
Lake Trout (Togue)	<i>Salvelinus namaycush</i>	1	Inland Fish	X	
Lake Whitefish	<i>Coregonus clupeaformis</i>	1	Inland Fish	X	
Swamp Darter	<i>Etheostoma fusiforme</i>	1	Inland Fish	X	
Brook Trout	<i>Salvelinus fontinalis</i>	2	Inland Fish	X	
Burbot (Cusk)	<i>Lota lota</i>	2	Inland Fish	X	
Landlocked Salmon	<i>Salmo salar</i>	2	Inland Fish	X	
Longnose Sucker	<i>Catostomus catostomus</i>	2	Inland Fish	X	

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Rainbow Smelt	<i>Osmerus mordax</i>	2	Inland Fish / Marine	X	
Round Whitefish	<i>Prosopium cylindraceus</i>	2	Inland Fish	X	
Spatterdock Darner	<i>Rhionaeschna mutata</i>	1	Invertebrate Damselflies & Dragonflies	X	
Big Bluet	<i>Enallagma durum</i>	2	Invertebrate Damselflies & Dragonflies	X	
Citrine Forktail	<i>Ischnura hastata</i>	2	Invertebrate Damselflies & Dragonflies		X
Dusky Dancer	<i>Argia translata</i>	2	Invertebrate Damselflies & Dragonflies	X	
Rambur's Forktail	<i>Ischnura ramburii</i>	2	Invertebrate Damselflies & Dragonflies	X	
Scarlet Blue	<i>Enallagma pictum</i>	2	Invertebrate Damselflies & Dragonflies	X	
Tule Blue	<i>Enallagma carunculatum</i>	2	Invertebrate Damselflies & Dragonflies	X	
Tidewater Mucket	<i>Leptodea ochracea</i>	1	Invertebrate Freshwater Mussels	X	
Yellow Lampmussel	<i>Lampsilis cariosa</i>	1	Invertebrate Freshwater Mussels		X
A Mayfly	<i>Siphonurus demaryi</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Siphonurus securifer</i>	2	Invertebrate Mayflies	X	
A Spire Snail	<i>Amnicola decisus</i>	1	Invertebrate Snails		X
Bigmouth Pondsnaill	<i>Stagnicola mighelsi</i>	2	Invertebrate Snails	X	
Great Lakes Physa	<i>Physella magnalacustris</i>	2	Invertebrate Snails	X	
Emergent Marsh and Wet Meadows (WM)					
Black Tern	<i>Chlidonias niger</i>	1	Bird	X	

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Sedge Wren	<i>Cistothorus platensis</i>	1	Bird	X	
Short-eared Owl	<i>Asio flammeus</i>	1	Bird		X
American Bittern	<i>Botaurus lentiginosus</i>	2	Bird	X	
American Black Duck (breeding)	<i>Anas rubripes</i>	2	Bird	X	
American Coot	<i>Fulica americana</i>	2	Bird	X	
Barn Swallow	<i>Hirundo rustica</i>	2	Bird		X
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	2	Bird		X
Bobolink	<i>Dolichonyx oryzivorus</i>	2	Bird		X
Common Moorhen	<i>Gallinula chloropus</i>	2	Bird	X	
Great Blue Heron	<i>Ardea herodias</i>	2	Bird		X
Least Bittern	<i>Ixobrychus exilis</i>	2	Bird	X	
Marsh Wren	<i>Cistothorus palustris</i>	2	Bird	X	
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	2	Bird		X
Pied-billed Grebe	<i>Podilymbus podiceps</i>	2	Bird		X
Purple Martin	<i>Progne subis</i>	2	Bird	X	
Sandhill Crane	<i>Grus canadensis</i>	2	Bird	X	
Yellow Rail	<i>Coturnicops noveboracensis</i>	2	Bird	X	
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Eastern Box Turtle	<i>Terrapene c. carolina</i>	1	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
A Caddisfly	<i>Hydroptila tomah</i>	2	Invertebrate Caddisflies		X
Spatterdock Darner	<i>Rhionaeschna mutata</i>	1	Invertebrate Damselflies & Dragonflies		X
Citrine Forktail	<i>Ischnura hastata</i>	2	Invertebrate Damselflies & Dragonflies		X
Rambur's Forktail	<i>Ischnura ramburii</i>	2	Invertebrate Damselflies & Dragonflies		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Sedge Darner	<i>Aeshna juncea</i>	2	Invertebrate Damselflies & Dragonflies	X	
Tomah Mayfly	<i>Siphonisca aerodromia</i>	1	Invertebrate Mayflies		X
Bigmouth Pondsnaail	<i>Stagnicola mighelsi</i>	2	Invertebrate Snails		X
Forested Wetland (WF)					
American Black Duck	<i>Anas rubripes</i>	2	Bird		X
Canada Warbler	<i>Wilsonia canadensis</i>	2	Bird		X
Rusty Blackbird	<i>Euphagus carolinus</i>	2	Bird		X
Yellow-throated Vireo	<i>Vireo flavifrons</i>	2	Bird		X
Blue-spotted Salamander	<i>Ambystoma laterale x jeffersonianum</i>	2	Herpetofauna Amphibian		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Eastern Box Turtle	<i>Terrapene c. carolina</i>	1	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile		X
Hessel's Hairstreak	<i>Callophrys hesseli</i>	1	Invertebrate Butterflies	X	
Ringed Boghaunter	<i>Williamsonia lintneri</i>	1	Invertebrate Damselflies & Dragonflies		X
Swamp Darner	<i>Epiaeschna heros</i>	2	Invertebrate Damselflies & Dragonflies	X	
Precious Underwing	<i>Catocala p. pretiosa</i>	2	Invertebrate Moths	X	
Deep-throat Vertigo	<i>Vertigo nylanderi</i>	2	Invertebrate Snails		X

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Mystery Vertigo	<i>Vertigo paradoxa</i>	2	Invertebrate Snails		X
Pleistocene Catinella	<i>Catinella exile</i>	2	Invertebrate Snails		X
Shrub-scrub Wetlands (WS)					
Blue-winged Warbler	<i>Vermivora pinus</i>	1	Bird		X
American Bittern	<i>Botaurus lentiginosus</i>	2	Bird		X
American Woodcock	<i>Scolopax minor</i>	2	Bird		X
Olive-sided Flycatcher	<i>Contopus borealis</i>	2	Bird		X
Rusty Blackbird	<i>Euphagus carolinus</i>	2	Bird	X	
Willow Flycatcher	<i>Empidonax traillii</i>	2	Bird	X	
Blue-spotted Salamander	<i>Ambystoma laterale x jeffersonianum</i>	2	Herpetofauna Amphibian	X	
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile	X	
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile	X	
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile		X
Clayton's Copper	<i>Lycaena dorcas claytoni</i>	1	Invertebrate Butterflies		X
Ringed Boghaunter	<i>Williamsonia lintneri</i>	1	Invertebrate Damselflies & Dragonflies	X	
Swamp Darner	<i>Epiaeschna heros</i>	2	Invertebrate Damselflies & Dragonflies		X
Deep-throat Vertigo	<i>Vertigo nylanderii</i>	2	Invertebrate Snails		X
Peatlands (WP)					
Olive-sided Flycatcher	<i>Contopus borealis</i>	2	Bird		X
Rusty Blackbird	<i>Euphagus carolinus</i>	2	Bird		X
Clayton's Copper	<i>Lycaena dorcas claytoni</i>	1	Invertebrate Butterflies	X	

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.					
Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Hessel's Hairstreak	<i>Callophrys hesseli</i>	1	Invertebrate Butterflies		X
Crowberry Blue	<i>Plebejus idas empetri</i>	2	Invertebrate Butterflies	X	
Frigga Fritillary	<i>Boloria frigga</i>	2	Invertebrate Butterflies	X	
Canada Whiteface	<i>Leucorrhinia patricia</i>	2	Invertebrate Damselflies & Dragonflies	X	
Quebec Emerald	<i>Somatochlora brevicincta</i>	2	Invertebrate Damselflies & Dragonflies	X	
Sedge Darner	<i>Aeshna juncea</i>	2	Invertebrate Damselflies & Dragonflies		X
Graceful Clearwing	<i>Hemaris gracilis</i>	2	Invertebrate Moths		X
Bigmouth Pondsail	<i>Stagnicola mighelsi</i>	2	Invertebrate Snails		X
Deep-throat Vertigo	<i>Vertigo nylanderi</i>	2	Invertebrate Snails	X	
Pleistocene Catinella	<i>Catinella exile</i>	2	Invertebrate Snails	X	
Six-whorl Vertigo	<i>Vertigo morsei</i>	2	Invertebrate Snails	X	
Rivers and Streams (WR)					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2	Bird		X
Barrow's Goldeneye	<i>Bucephala islandica</i>	2	Bird	X	
Golden Eagle	<i>Aquila chrysaetos</i>	2	Bird		X
Greater Scaup (non-breeding)	<i>Aythya marila</i>	2	Bird		X
Louisiana Waterthrush	<i>Seiurus motacilla</i>	2	Bird	X	
Yellow-throated Vireo	<i>Vireo flavifrons</i>	2	Bird	X	
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Eastern Box Turtle	<i>Terrapene c. carolina</i>	1	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile	X	
American Eel	<i>Anguilla rostrata</i>	1	Inland Fish / Marine	X	
Lake Whitefish	<i>Coregonus clupeaformis</i>	1	Inland Fish		X
Redfin Pickerel	<i>Esox americanus americanus</i>	1	Inland Fish	X	
Brook Trout ¹	<i>Salvelinus fontinalis</i>	2	Inland Fish		X
Burbot (Cusk)	<i>Lota lota</i>	2	Inland Fish		X
Landlocked Salmon	<i>Salmo salar</i>	2	Inland Fish		X
Longnose Sucker	<i>Catostomus catostomus</i>	2	Inland Fish		X
Rainbow Smelt	<i>Osmerus mordax</i>	2	Inland Fish / Marine		X
Round Whitefish	<i>Prosopium cylindraceus</i>	2	Inland Fish		X
A Caddisfly	<i>Hydroptila tomah</i>	2	Invertebrate Caddisflies	X	
Rapids Clubtail	<i>Gomphus quadricolor</i>	1	Invertebrate Damselflies & Dragonflies	X	
Arrow Clubtail	<i>Stylurus spiniceps</i>	2	Invertebrate Damselflies & Dragonflies	X	
Arrowhead Spiketail	<i>Cordulegaster obliqua</i>	2	Invertebrate Damselflies & Dragonflies	X	
Big Bluet	<i>Enallagma durum</i>	2	Invertebrate Damselflies & Dragonflies		X
Boreal Snaketail	<i>Ophiogomphus colubrinus</i>	2	Invertebrate Damselflies & Dragonflies	X	
Cobra Clubtail	<i>Gomphus vastus</i>	2	Invertebrate Damselflies & Dragonflies	X	
Dusky Dancer	<i>Argia translata</i>	2	Invertebrate Damselflies & Dragonflies		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Pygmy Snaketail	<i>Ophiogomphus howei</i>	2	Invertebrate Damselflies & Dragonflies	X	
Southern Pygmy Clubtail	<i>Lanthus vernalis</i>	2	Invertebrate Damselflies & Dragonflies	X	
Tule Bluet	<i>Enallagma carunculatum</i>	2	Invertebrate Damselflies & Dragonflies		X
Tidewater Mucket	<i>Leptodea ochracea</i>	1	Invertebrate Freshwater Mussels		X
Yellow Lampmussel	<i>Lampsilis cariosa</i>	1	Invertebrate Freshwater Mussels	X	
Brook Floater	<i>Alasmidonta varicosa</i>	2	Invertebrate Freshwater Mussels	X	
Roaring Brook Mayfly	<i>Epeorus frisoni</i>	1	Invertebrate Mayflies	X	
Tomah Mayfly	<i>Siphonisca aerodromia</i>	1	Invertebrate Mayflies	X	
A Mayfly	<i>Baetisca rubescens</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Nixe horrida</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Nixe rusticalis</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Plauditus veteris</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Procloeon mendax</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Procloeon ozburni</i>	2	Invertebrate Mayflies	X	
A Mayfly	<i>Procloeon simplex</i>	2	Invertebrate Mayflies	X	
A Spire Snail	<i>Amnicola decisus</i>	1	Invertebrate Snails	X	

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
A Stonefly	<i>Neoperla mainensis</i>	2	Invertebrate Stoneflies	X	
Atlantic Salmon	<i>Salmo salar</i>	1	Marine Diadromous Fish	X	
Atlantic Sturgeon	<i>Acipenser oxyrhynchus</i>	1	Marine Diadromous Fish	X	
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	1	Marine Diadromous Fish	X	
Striped Bass	<i>Morone saxitalis</i>	1	Marine Diadromous Fish	X	
American Shad	<i>Alosa sapidissima</i>	2	Marine Diadromous Fish	X	
UPLAND					
Deciduous and Mixed Forest (UD)					
American Woodcock	<i>Scolopax minor</i>	2	Bird		X
Baltimore Oriole	<i>Icterus galbula</i>	2	Bird	X	
Barred Owl	<i>Strix varia</i>	2	Bird		X
Black and White Warbler	<i>Mniotilta varia</i>	2	Bird	X	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	2	Bird	X	
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	2	Bird	X	
Black-throated Green Warbler	<i>Dendroica virens</i>	2	Bird	X	
Canada Warbler	<i>Wilsonia canadensis</i>	2	Bird	X	
Chimney Swift	<i>Chaetura pelagica</i>	2	Bird		X
Eastern Screech Owl	<i>Megascops asio</i>	2	Bird	X	
Great-crested Flycatcher	<i>Myiarchus crinitus</i>	2	Bird	X	
Long-eared Owl	<i>Asio otus</i>	2	Bird		X
Louisiana Waterthrush	<i>Seiurus motacilla</i>	2	Bird		X
Northern Flicker	<i>Colaptes auratus</i>	2	Bird	X	
Northern Parula	<i>Parula americana</i>	2	Bird	X	
Olive-sided Flycatcher	<i>Contopus borealis</i>	2	Bird		X
Purple Finch	<i>Carpodacus purpureus</i>	2	Bird		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	2	Bird	X	
Scarlet Tanager	<i>Piranga olivacea</i>	2	Bird	X	
Veery	<i>Catharus fuscescens</i>	2	Bird	X	
Whip-poor-will	<i>Caprimulgus vociferous</i>	2	Bird		X
Wood Thrush	<i>Hylocichla mustelina</i>	2	Bird	X	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	2	Bird	X	
Yellow-throated Vireo	<i>Vireo flavifrons</i>	2	Bird		X
Blue-spotted Salamander	<i>Ambystoma laterale x jeffersonianum</i>	2	Herpetofauna Amphibian		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Eastern Box Turtle	<i>Terrapene c. carolina</i>	1	Herpetofauna Reptile	X	
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Timber Rattlesnake	<i>Crotalus horridus</i>	2	Herpetofauna Reptile		X
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile		X
American Burying Beetle	<i>Nicrophorus americanus</i>	2	Invertebrate Beetles	X	
Early Hairstreak	<i>Erora laeta</i>	2	Invertebrate Butterflies	X	
Spicebush Swallowtail	<i>Papilio troilus</i>	2	Invertebrate Butterflies	X	
Lamellate Supercoil	<i>Paravitrea lamellidens</i>	2	Invertebrate Snails	X	
Mystery Vertigo	<i>Vertigo paradoxa</i>	2	Invertebrate Snails	X	
Canada Lynx	<i>Lynx canadensis</i>	2	Mammal		X
Eastern Small-footed Myotis	<i>Myotis leibii</i>	2	Mammal		X
Wolf	<i>Canis lupus</i>	2	Mammal		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Coniferous Forest (UC)					
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	2	Bird	X	
Barred Owl	<i>Strix varia</i>	2	Bird	X	
Bay-breasted Warbler	<i>Dendroica castanea</i>	2	Bird	X	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	2	Bird		X
Blackburnian Warbler	<i>Dendroica fusca</i>	2	Bird	X	
Black-throated Green Warbler	<i>Dendroica virens</i>	2	Bird		X
Cape May Warbler	<i>Dendroica tigrina</i>	2	Bird	X	
Long-eared Owl	<i>Asio otus</i>	2	Bird	X	
Louisiana Waterthrush	<i>Seiurus motacilla</i>	2	Bird		X
Northern Flicker	<i>Colaptes auratus</i>	2	Bird		X
Olive-sided Flycatcher	<i>Contopus borealis</i>	2	Bird	X	
Purple Finch	<i>Carpodacus purpureus</i>	2	Bird	X	
Red Crossbill	<i>Loxia curvirostra</i>	2	Bird	X	
Blue-spotted Salamander	<i>Ambystoma laterale x jeffersonianum</i>	2	Herpetofauna Amphibian		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile		X
Purple Lesser Fritillary	<i>Boloria chariclea grandis</i>	2	Invertebrate Butterflies	X	
A Moth	<i>Nepytia pellucidaria</i>	2	Invertebrate Moths		X
Pine Devil	<i>Citheronia sepulcralis</i>	2	Invertebrate Moths	X	
Pine Pinion	<i>Lithophane l. lepida</i>	2	Invertebrate Moths		X
Canada Lynx	<i>Lynx canadensis</i>	2	Mammal		X
Wolf	<i>Canis lupus</i>	2	Mammal		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Dry Woodland and Barrens (UB)					
Short-eared Owl	<i>Asio flammeus</i>	1	Bird		X
Upland Sandpiper	<i>Bartramia longicauda</i>	1	Bird	X	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	2	Bird		X
Bobolink	<i>Dolichonyx oryzivorus</i>	2	Bird		X
Brown Thrasher	<i>Toxostoma rufum</i>	2	Bird		X
Common Nighthawk	<i>Chordeiles minor</i>	2	Bird		X
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	2	Bird		X
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	2	Bird		X
Prairie Warbler	<i>Dendroica discolor</i>	2	Bird	X	
Vesper Sparrow	<i>Pooecetes gramineus</i>	2	Bird	X	
Whimbrel	<i>Numenius phaeopus</i>	2	Bird		X
Whip-poor-will	<i>Caprimulgus vociferous</i>	2	Bird		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Northern Black Racer	<i>Coluber c. constrictor</i>	2	Herpetofauna Reptile	X	
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Cobweb Skipper	<i>Hesperia metea</i>	2	Invertebrate Butterflies		X
Edward's Hairstreak	<i>Satyrium edwardsii</i>	2	Invertebrate Butterflies	X	
Leonard's Skipper	<i>Hesperia leonardus</i>	2	Invertebrate Butterflies		X
Sleepy Duskywing	<i>Erynnis brizo</i>	2	Invertebrate Butterflies	X	
Twilight Moth	<i>Lycia rachelae</i>	1	Invertebrate Moths	X	
A Moth	<i>Cucullia speyeri</i>	2	Invertebrate Moths	X	

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
A Moth	<i>Nepytia pellucidaria</i>	2	Invertebrate Moths	X	
A Noctuid Moth	<i>Chaetagnalea cerata</i>	2	Invertebrate Moths	X	
Barrens Itame	<i>Itame sp. 1</i>	2	Invertebrate Moths	X	
Graceful Clearwing	<i>Hemaris gracilis</i>	2	Invertebrate Moths	X	
Pine Barrens Zale	<i>Zale sp. 1nr. lunifera</i>	2	Invertebrate Moths	X	
Pine Barrens Zanclognatha	<i>Zanclognatha Martha</i>	2	Invertebrate Moths	X	
Pine Devil	<i>Citheronia sepulcralis</i>	2	Invertebrate Moths		X
Pine Pinion	<i>Lithophane l. lepida</i>	2	Invertebrate Moths	X	
Pink Sallow	<i>Psectraglaea carnosa</i>	2	Invertebrate Moths	X	
The Buckmoth	<i>Hemileuca m. maia</i>	2	Invertebrate Moths	X	
Mountaintop Forest (UM)					
Bicknell's Thrush	<i>Catharus bicknelli</i>	1	Bird	X	
Purple Finch	<i>Carpodacus purpureus</i>	2	Bird		X
Northern Bog Lemming	<i>Synaptomys borealis</i>	2	Mammal	X	
Alpine (UA)					
American Pipit (breeding)	<i>Anthus rubescens</i>	2	Bird	X	
Katahdin Arctic	<i>Oeneis polixenes katahdin</i>	1	Invertebrate Butterflies	X	
Shrub / Early Successional (US)					
Blue-winged Warbler	<i>Vermivora pinus</i>	1	Bird	X	
American Woodcock	<i>Scolopax minor</i>	2	Bird	X	
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	2	Bird	X	

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Brown Thrasher	<i>Toxostoma rufum</i>	2	Bird	X	
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	2	Bird	X	
Common Nighthawk	<i>Chordeiles minor</i>	2	Bird	X	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	2	Bird	X	
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	2	Bird	X	
Field Sparrow	<i>Spizella pusilla</i>	2	Bird		X
Loggerhead Shrike (non-breeding)	<i>Lanius ludovicianus</i>	2	Bird	X	
Whip-poor-will	<i>Caprimulgus vociferous</i>	2	Bird	X	
Willow Flycatcher	<i>Empidonax traillii</i>	2	Bird		X
Blue-spotted Salamander	<i>Ambystoma laterale x jeffersonianum</i>	2	Herpetofauna Amphibian		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Eastern Box Turtle	<i>Terrapene c. carolina</i>	1	Herpetofauna Reptile		X
Northern Black Racer	<i>Coluber c. constrictor</i>	2	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Timber Rattlesnake	<i>Crotalus horridus</i>	2	Herpetofauna Reptile		X
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile		X
Clayton's Copper	<i>Lycaena dorcas claytoni</i>	1	Invertebrate Butterflies		X
Juniper Hairstreak	<i>Callophrys gryneus</i>	2	Invertebrate Butterflies		X
New England Cottontail	<i>Sylvilagus transitionalis</i>	1	Mammal	X	
Canada Lynx	<i>Lynx canadensis</i>	2	Mammal	X	
Wolf	<i>Canis lupus</i>	2	Mammal	X	
Grassland / Agriculture / Old Fields (UG)					
Sedge Wren	<i>Cistothorus platensis</i>	1	Bird		X

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Short-eared Owl	<i>Asio flammeus</i>	1	Bird	X	
Upland Sandpiper	<i>Bartramia longicauda</i>	1	Bird		X
American Bittern	<i>Botaurus lentiginosus</i>	2	Bird		X
Barn Swallow	<i>Hirundo rustica</i>	2	Bird		X
Bobolink	<i>Dolichonyx oryzivorus</i>	2	Bird	X	
Eastern Meadowlark	<i>Sturnella magna</i>	2	Bird	X	
Field Sparrow	<i>Spizella pusilla</i>	2	Bird	X	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	2	Bird	X	
Horned Lark (breeding)	<i>Eremophila alpestris</i>	2	Bird	X	
Purple Martin	<i>Progne subis</i>	2	Bird		X
Sandhill Crane	<i>Grus canadensis</i>	2	Bird		X
Vesper Sparrow	<i>Pooecetes gramineus</i>	2	Bird		X
Blanding's Turtle	<i>Emys blandingii</i>	1	Herpetofauna Reptile		X
Eastern Box Turtle	<i>Terrapene c.carolina</i>	1	Herpetofauna Reptile		X
Northern Black Racer	<i>Coluber c.constrictor</i>	2	Herpetofauna Reptile		X
Spotted Turtle	<i>Clemmys guttata</i>	2	Herpetofauna Reptile		X
Timber Rattlesnake	<i>Crotalus horridus</i>	2	Herpetofauna Reptile		X
Wood Turtle	<i>Glyptemys insculpta</i>	2	Herpetofauna Reptile		X
American Burying Beetle	<i>Nicrophorus americanus</i>	2	Invertebrate Beetles		X
Cobweb Skipper	<i>Hesperia metea</i>	2	Invertebrate Butterflies	X	
Coral Hairstreak	<i>Satyrium titus</i>	2	Invertebrate Butterflies	X	
Greenish Blue	<i>Plebejus saepiolus amica</i>	2	Invertebrate Butterflies	X	

Table 29. Distribution of SGCN in 21 Key Habitats in Maine.

Habitat / Species	Scientific Name	SGCN Priority	TAXON	PRIMARY HABITAT	SECONDARY HABITAT
Juniper Hairstreak	<i>Callophrys gryneus</i>	2	Invertebrate Butterflies	X	
Leonard's Skipper	<i>Hesperia leonardus</i>	2	Invertebrate Butterflies	X	
Urban / Suburban (UU)					
Barn Swallow	<i>Hirundo rustica</i>	2	Bird		X
Chimney Swift	<i>Chaetura pelagica</i>	2	Bird	X	
Common Nighthawk	<i>Chordeiles minor</i>	2	Bird		X
Eastern Screech Owl	<i>Megascops asio</i>	2	Bird		X
Northern Flicker	<i>Colaptes auratus</i>	2	Bird		X
Purple Finch	<i>Carpodacus purpureus</i>	2	Bird		X
Cliff Face and Rocky Outcrop (UR)					
Peregrine Falcon	<i>Falco peregrinus</i>	1	Bird	X	
Golden Eagle	<i>Aquila chrysaetos</i>	2	Bird	X	
Northern Black Racer	<i>Coluber c.constrictor</i>	2	Herpetofauna Reptile		X
Timber Rattlesnake	<i>Crotalus horridus</i>	2	Herpetofauna Reptile	X	
Juniper Hairstreak	<i>Callophrys gryneus</i>	2	Invertebrate Butterflies		X
Eastern Small-footed Myotis	<i>Myotis leibii</i>	2	Mammal	X	
Caves and Mines (UCM)					
Eastern Small-footed Myotis	<i>Myotis leibii</i>	2	Mammal		X

¹ For summary purposes, American eel, brook trout, and rainbow smelt are assigned to the Inland Fish taxa though they also occur in marine environments.

4.3 SPECIES AT-RISK FOCUS AREAS

Southern and coastal Maine has the highest level of plant and animal diversity in the state. Unfortunately, this area is one of the most desirable for development, and increasing development is leading to habitat fragmentation and loss. Within this area, the State of Maine has been working to identify at risk plant and animal populations and the habitats they need to remain viable.

During the past five years, MDIFW and MNAP have undertaken systematic surveys of high value habitats supporting rare species and high quality natural communities in this region. These surveys included aerial photo interpretation to identify potential sites, tax map research, requests for permission from landowners to conduct field surveys, field surveys, and data entry into a Biological Conservation Database (BCD).

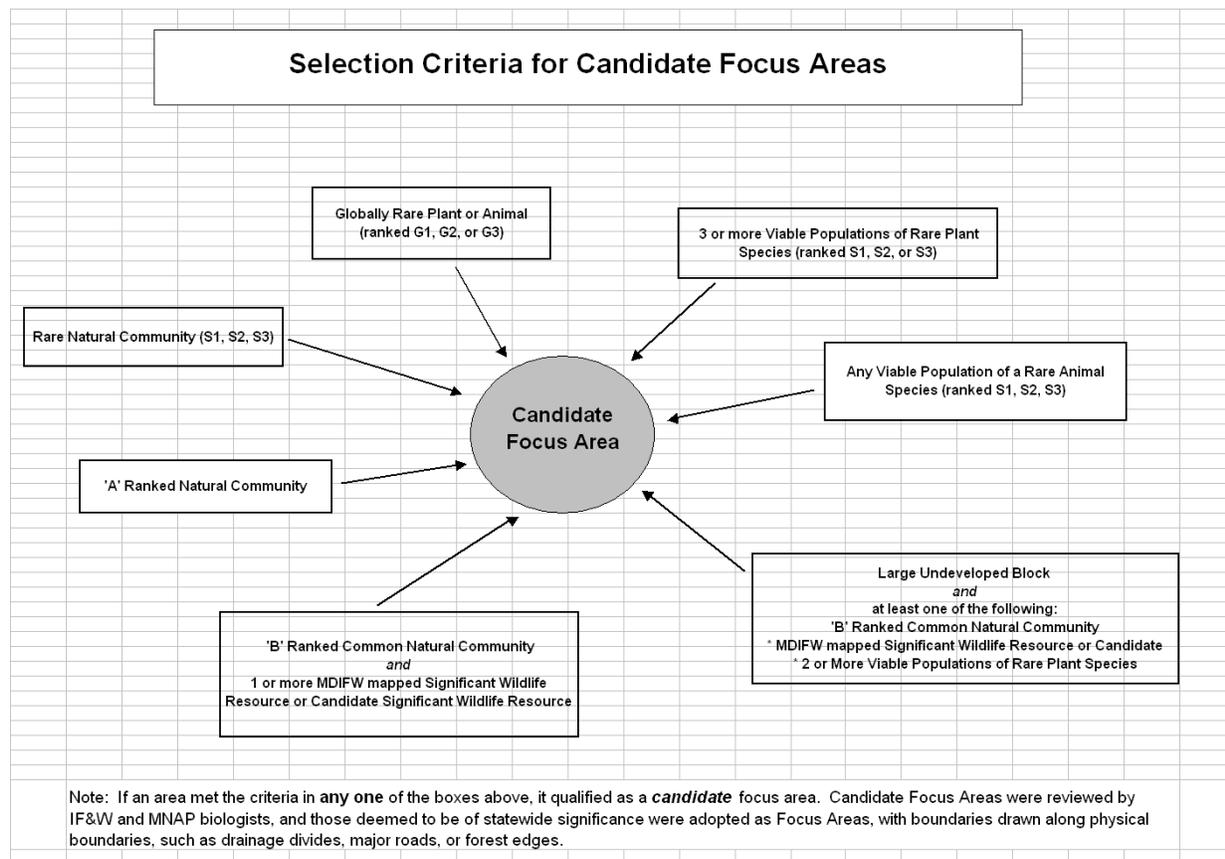
Using data from this inventory work and from other sources, biologists at MNAP, MDIFW, and The Nature Conservancy (TNC) evaluated the landscape identifying the areas with the highest concentrations of rare species and high quality habitats. Degree of rarity and landscape context were also included in the process. The result of this effort is a mapped suite of species-at-risk Focus Areas. These areas include assemblages of the best examples of rare species populations and high quality natural habitats in Maine. For each species-at-risk Focus Area there is a basic conservation plan that includes descriptions of significant features, recommendations for how best to protect those resources, and a map that delimits the area and shows locations of rare species and high quality habitats. Appendix 8 provides links to 93 species at-risk focus areas in Maine http://www.mainenaturalareas.org/docs/program_activities/land_trust_descriptions.php.

Criteria used to delineate focus areas include locations of rare plants, animals, and natural communities; locations of the best examples of common natural communities; locations of significant wildlife habitats; and locations where these features overlapped with larger undeveloped blocks (Figure 14).

Focus Area boundaries are based on sub-watersheds and major fragmenting features such as roads. The boundaries are neither firm nor field-checked, rather they are meant to indicate the general location of conservation focus. The data that were used to identify Focus Areas are described below:

MNAP Rare or Exemplary Natural Communities are two broad classes of natural communities recognized as important for conservation: those that are rare and those that are common but in exemplary condition. A natural community is a system of interacting plants and their common environment, recurring across the landscape, where the effects of human intervention are minimal. There are currently 98 natural communities known in Maine, examples of which include pitch pine/scrub oak barrens, Atlantic white cedar bog, and *Spartina* tidal marsh. Examples of common community types include oak/pine forest, red maple swamp, and cattail marsh. Most upland natural communities have been impacted by land use practices, and it is unusual to find relatively large, undisturbed examples of them. Size, disturbance, and condition are all considered when assessing the quality of common natural communities.

Figure 14. Selection Criteria for Candidate Focus Areas.



MNAP Rare Plant Locations designate specific points where populations of rare, Threatened, and Endangered plants have been documented and, for some species, habitat for the respective plants. Rare plants have no formal protection in Maine (rare plant legislation is for informational purposes only), thus the habitat in which these plants occur is important for their survival. Rare Plant Locations may occur outside of, or within documented MNAP Rare and Exemplary Natural Communities. Rare plants are often components of documented natural communities and can be conserved in the context of these larger systems. Populations of rare plants outside of documented natural communities will require separate conservation actions.

Essential Wildlife Habitats are defined as areas currently or historically providing physical or biological features essential to the conservation of an Endangered or Threatened species in Maine, and which may require special management considerations. Examples of areas that could qualify for designation are nest sites or important feeding areas. For some species, protection of these kinds of habitats is vital to preventing further decline or achieving recovery goals.

Before an area can become designated as Essential Habitat, it must be identified and mapped by MDIFW and adopted through public rulemaking procedures, following Maine's Administrative Procedures Act. Essential Habitats were first taken through rulemaking by MDIFW in 1989, when designation criteria and protection guidelines were developed for bald eagle nest sites. Since then, Essential Habitat has also been implemented for three more listed species: the

Roseate Tern, Least Tern, and Piping Plover. Additions of newly qualified areas, as well as deletions of sites no longer eligible, are ongoing for these four species.

Once an area becomes designated as Essential Habitat, the Maine Endangered Species Act requires that no state agency or municipal government shall permit, license, fund, or carry out projects that would significantly alter the habitat or violate protection guidelines adopted for the habitat. If a project occurs partly or wholly within an Essential Habitat, it must be evaluated by MDIFW before state and/or municipal permits can be approved or project activities can take place.

This regulatory habitat protection tool is used only when habitat loss has been identified as a major factor limiting species recovery. This action rarely stops development. In fact, in the past, most development has proceeded, but MDIFW biologists work to modify the project so listed species and their habitat are protected.

Significant Wildlife Habitats include: habitat for Endangered and Threatened species; high and moderate value deer wintering areas and travel corridors; high and moderate value waterfowl and wading bird habitats; shorebird nesting, feeding, and staging areas; seabird nesting islands; significant vernal pools (not mapped in this project); and nursery areas for Atlantic salmon (not mapped in this project). These habitats are mapped as a product of the Natural Resources Protection Act (NRPA), a law passed in 1988 to prevent degradation of significant state resources. This law provides for habitat identification and mapping for animals that have very specific habitat requirements. To date, seabird nesting islands have received formal designation as Significant Wildlife Habitat. Other candidate Significant Wildlife Habitats have yet to receive full legal designation, but various state agencies reviewing development applications refer to these mapped data for guidance on permitting.

Other Rare Wildlife Data contains Endangered and Threatened animal habitats and the locations of rare animals themselves. These rare animals also include Special Concern species that may be very rare or vulnerable, for which biologists are gathering more information.

Large Undeveloped Blocks are relatively unbroken areas of habitat that include forest, grassland/agricultural land, and wetlands. "Unbroken" indicates that the habitat is crossed by few roads, and has relatively little development and human habitation.

As depicted in Figure 15, focus area delineation to date has occurred in southern, coastal, and downeast Maine, though we are currently in the process of evaluating focus area criteria for statewide application, including Maine's unorganized towns in northern and western portions of the state. We hope to have Focus Areas designated statewide by June 2007.

Twenty of these Focus Areas have been identified as priorities for conservation through Maine's Landowner Incentive Program (LIP). Conservation of species-at-risk Focus Areas is

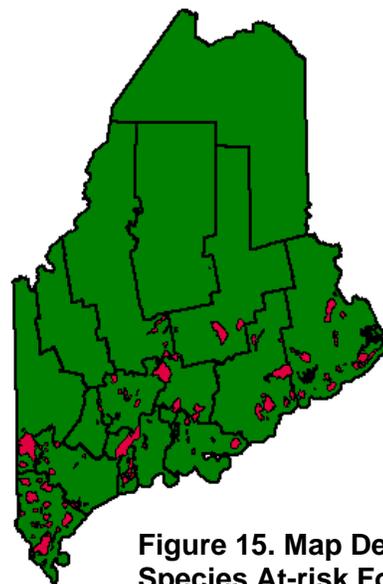


Figure 15. Map Depicting Species At-risk Focus Areas Identified through 2004.

critical as the pace and pervasiveness of development in southern and coastal Maine is a constant threat. Without a doubt, these areas represent some of the most extensive, high quality habitats left in the developed regions of the Northeast. Now is the time for meaningful protection of these habitats and the suites of species they support; in a few short years, it is likely that many of these areas will become fragmented and degraded by encroaching development.

Examples of Focus Area descriptions for Acadia East and West and Cobscook Bay located in Hancock and Washington Counties is presented below:

Acadia East and West Focus Area

Bar Harbor, Mount Desert, Southwest Harbor, Tremont

Site Description

Lying just east of Penobscot Bay, Mount Desert Island is an ecologically prominent feature of the Maine coast. It encompasses roughly 60,000 acres, about half of which is within Acadia National Park. The maritime climate along the coast is cool and humid, and fog is frequent and often lingering. Mount Desert Island has an almost 300-year history of settlement, including extensive land clearing, and the peninsulas and other islands in Penobscot Bay have been likewise settled or at least used for pasture and/or timber for centuries.



Cadillac Mountain, Acadia National Park

Ecologically, Mount Desert Island is at the transition from the southwestern portions of our coastline, which share many characteristics with the Atlantic coast south of Maine, to the Down East coast, which shares more characteristics with the Canadian Maritimes. The overlap of features from both ecological regions is unique along Maine's coast. "Southern" features include pitch pine woodlands reminiscent of areas in the Mid-Coast region. The more boreal features include headlands with roseroot (*Rhodalia rosea*) and beach-head iris (*Iris setosa*), or rocky

woodlands with patchy black spruce and heaths. Spruce-fir forests, in various stages of post-disturbance succession, characterize much of the region.

Mount Desert Island's prominence derives not only from its biogeographic placement, but also from the exceptional combination of physical features that make up the island. The landforms of Acadia are among its best-known features, and gave origin to the name Mount Desert Island (roughly, "Isle of the Barren Hills"). Glacial and post-glacial activity has left a series of north-south trending ridges separated by deep U-shaped valleys. The ridges are rounded along their crests, and extensive windswept areas are treeless, standing out sharply above the predominant forest cover of the lower slopes. Cadillac Mountain is the best known; other prominent hilltops are Pemetic, Parkman, and Penobscot Mountains on the eastern half of the island; and Western, Acadia, and St. Sauveur Mountains on the western side. These dramatic ridges are juxtaposed against the rocky coastline, with a diversity of wetlands in the low-lying areas in between. Somes Sound, which bisects the island, is the only true fjord on the east coast of the U.S. The upland soils are mostly thin and granitic, with many areas of bedrock or talus where soil development is minimal at best. Wetlands are underlain by marine deposits or poorly drained tills, and include both mineral soil and organic soil wetlands.

Fire is an important factor in Acadia's natural history. The famed 1947 fire that burned most of the eastern side of Mount Desert Island is the most recent extensive fire, but evidence of past burns is present in trees and soils throughout the Park. Post-fire aspen-birch communities are still abundant. The spruce-fir forests, the dominant closed-canopy forest type on the island, include a large component of earlier-successional birch and red maple within the area that burned, along with the maturing spruce and fir. Vegetation on the western half of the island, which escaped the 1947 fire, reflects more clearly the underlying edaphic characteristics rather than the effects of recent fire.

Eastern Mountains

The ridges on the eastern half of the island include the most prominent of Acadia's mountains. These feature expansive open ridges where harsh conditions limit tree growth, and trees are either very sparse or occur as stunted woodlands. Cadillac Mountain has the most varied vegetation as well as the greatest concentration of rare plants.

The open areas running from the summit of Cadillac south along its ridge include areas of low-elevation summit bald, subalpine heath – krummholz, pitch pine woodland, and jack pine woodland. The slopes of Cadillac display the full altitudinal range of post-fire aspen-birch woodland/forest complex vegetation, ranging from forests to woodlands to scrubby shrublands on the upper slopes. Rare plants on Cadillac include Appalachian fir-clubmoss (*Huperzia selago*), alpine blueberry (*Vaccinium boreale*) at its only low-elevation site in Maine, and smooth sandwort (*Minuartia glabra*).



Nearby mountain ridges—Champlain, Dorr, Pemetic, Penobscot, Sargent, and Norumbega—have similar pitch pine woodland and subalpine heath – krummholz vegetation, with some smaller areas of low-elevation summit balds. The side slopes of The Bubbles have good examples of birch – oak talus woodlands, which are different in both tree and herb flora from the more common spruce talus woodlands. Together, Cadillac and the other eastern mountains form an extensive network of these uncommon community types.

Western Mountains

The mountains on the western side of Mount Desert Island tend to be more fully vegetated, in part because they escaped the 1947 fire, but also because most are somewhat lower than the eastern mountains. Western Mountain and Bernard Mountain have good examples of spruce – fir – broom-moss forests, including some areas of old-growth. The pitch pine woodlands that are so characteristic of Acadia and Mount Desert Island occur on the western mountains as well—e.g. Acadia Mountain and St. Sauveur, including an interesting variation with pitch pine and scrub oak (*Quercus ilicifolia*) on Acadia Mountain. Along the St. Sauveur trail one can also find a good example of a red pine – white pine forest.

Near-Coastal Low Hills

The lower hills near the coast show the conifer woodlands in a slightly different expression. On Mount Desert Island, good examples of pitch pine woodlands are seen on many of the low hills near the coast, including Kebo Mountain, the area northwest of Thunder Hole, and along the Beachcroft Trail.

Rocky woodlands dominated by northern white cedar (*Thuja occidentalis*) can also be found on some of the lower hills (rarely on the mid-to-upper slopes) on Mount Desert Island. These white cedar woodlands have not been documented anywhere else in the state; if they occur elsewhere, it would almost certainly be along the coast. Two variants have been seen on Mount Desert Island: a fairly dry and acidic expression with cedar and heath shrubs, and a more mesic setting with white cedar and ash over thin seepy soils.

Wetlands

The forested and open wetlands of Mount Desert Island encompass a wide variety of habitat types. Big Heath, in Southwest Harbor, is an example of a coastal plateau bog ecosystem at the extreme southwestern limit for the type. This kind of peatland is typical of further Down East Maine and the Canadian Maritimes, featuring large amounts of black crowberry (*Empetrum nigrum*) along with lawn-like patches of deer-hair sedge (*Trichophorum cespitosum*) and occasional baked-apple berry (*Rubus chamaemorus*). Bass Harbor Marsh is an exemplary streamshore ecosystem that shows an interesting gradation from mixed graminoid-forb saltmarsh to brackish tidal marsh, all the way to freshwater conditions (mixed graminoid - shrub marsh) as one moves upstream. Fresh Meadow, near the north end of Mount Desert Island, is an interesting tidally influenced level bog ecosystem, with both raised bog portions and tidal creeks. Great Meadow in Bar Harbor contains good examples of red maple alluvial swamp (-red maple – sensitive fern swamp), and mixed graminoid – shrub marsh. Unusual forested wetlands on Mount Desert Island include two small areas of hardwood seepage forests, dominated by ash and/or yellow birch rather than by the more typical red maple and spruce.

Shores

The rocky coastline of Downeast Maine attracts many visitors who come for the views, sounds, and salt air. The shores of Mount Desert Island also feature unusual natural communities and several rare plants, not to mention their importance as habitat for birds and other animals. Open headland vegetation can be found in small pockets wherever bedrock forms headlands along the shore. Sand Beach, while not a particularly large sandy beach, is noteworthy as a beach with a dune grassland, because sandy beaches rarely occur this far downeast. The shoreline from Sand Beach to Otter Cover provides winter habitat for purple sandpipers.

Wildlife

Mt. Desert Island fosters some excellent habitat for a variety of rare and uncommon bird species. Peregrine Falcons nest at several locations on Mt. Desert Island. Least Bitterns have been observed nesting in Two Moose Pond adjacent to Bass Harbor Marsh. Nelson's Sharp-tailed Sparrows—an uncommon species in Maine—also are regular breeders at Bass Harbor Marsh and other smaller salt marshes around the periphery of the island. And Northeast Creek hosts breeding pairs of Sedge Wrens and Nelson's Sharp-tailed Sparrows.

Rare Species and Exemplary Natural Communities Occurring on Mt. Desert Island.				
Common Name	Scientific Name	S-RANK	G-RANK	State Status
Exemplary Natural Communities				
Coastal Plateau Bog Ecosystem		S3	N/A	N/A
Raised Level Bog Ecosystem		S4	N/A	N/A
Low Elevation Bald		S3	N/A	N/A
Maritime Spruce-Fir Forest		S4	N/A	N/A
Pitch Pine Woodland		S3	N/A	N/A
Red Pine Woodland		S3	N/A	N/A
Spruce-Pine Woodland		S4	N/A	N/A
Spruce - Northern Hardwoods Forest		S4	N/A	N/A
Streamshore Ecosystem		S4	N/A	N/A
White Cedar Woodland		S2	N/A	N/A
Jack Pine Woodland (historic)		S3	N/A	N/A
Rare Plants				
Nantucket shadbush	<i>Amelanchier nantucketensis</i>	S2	G3Q	T
New England northern reed grass	<i>Calamagrostis stricta</i> spp. <i>Inexpansa</i>	S1	G5T5	E
Wiegand sedge	<i>Carex wiegandii</i>	S3	G3	SC
Appalachian fir-clubmoss	<i>Huperzia appalachiana</i>	S2	G4G5	SC

Rare Species and Exemplary Natural Communities Occurring on Mt. Desert Island.				
Common Name	Scientific Name	S-RANK	G-RANK	State Status
Prototype quillwort	<i>Isoetes prototypus</i>	S1	G2?	T
Smooth sandwort	<i>Minuartia glabra</i>	S2	G4	SC
Mountain sandwort	<i>Minuartia groenlandica</i>	S3	G5	SC
Alga-like pondweed	<i>Potamogeton confervoides</i>	S3	G3G4	SC
Comb-leaved mermaid-weed	<i>Prosperpinaca pectinata</i>	SH	G5	SC
Water awlwort	<i>Subularia aquatica</i>	S2	G5	SC
Alpine blueberry	<i>Vaccinium boreale</i>	S1S2	G4	T
Horned pondweed	<i>Zannichellia palustris</i>	S2	G5	SC
Alpine clubmoss (exact location not known)	<i>Huperzia selago</i>	S1	G5	T
Acadian quillwort (exact location not known)	<i>Isoetes acadiensis</i>	S1	G3?	T
American sea-blite (historic)	<i>Suaeda calceoliformis</i>	S1	G5	T
Dwarf rattlesnake root (historic)	<i>Prenanthes nana</i>	S1	G5	E
Auricled twayblade (historic)	<i>Listera auriculata</i>	S1	G3	T
Long's bitter-cress (historic)	<i>Cardamine longii</i>	S2	G3Q	T
Swarthy sedge (historic)	<i>Carex adusta</i>	S1	G5	E
Sweet pepperbush (historic)	<i>Clethra alnifolia</i>	S2	G5	SC
Showy lady's slipper (historic)	<i>Cypripedium reginae</i>	S2S3	G4	T
Small purple bladderwort (historic)	<i>Utricularia resupinata</i>	S1	G4	E
Mountain laurel (historic)	<i>Kalmia latifolia</i>	S2	G5	SC
Canada mountain ricegrass (historic)	<i>Oryzopsis canadensis</i>	S1?	G5	SC
Rare Animals				
Peregrine Falcon	<i>Falco peregrinus</i>	S2B	G4	E
Least Bittern	<i>Ixobrychus exilis</i>	S2B	G5	SC
Sedge Wren (exact location not available)	<i>Cistothorus platensis</i>	S1B	G5	E
Ebony boghaunter (historic)	<i>Williamsonia fletcheri</i>	S3?	G3	SC

Other Habitats Mapped by MDIF&W

Tidal Waterfowl / Wading Bird Habitat
 Freshwater Waterfowl / Wading Bird Habitat

Conservation Considerations

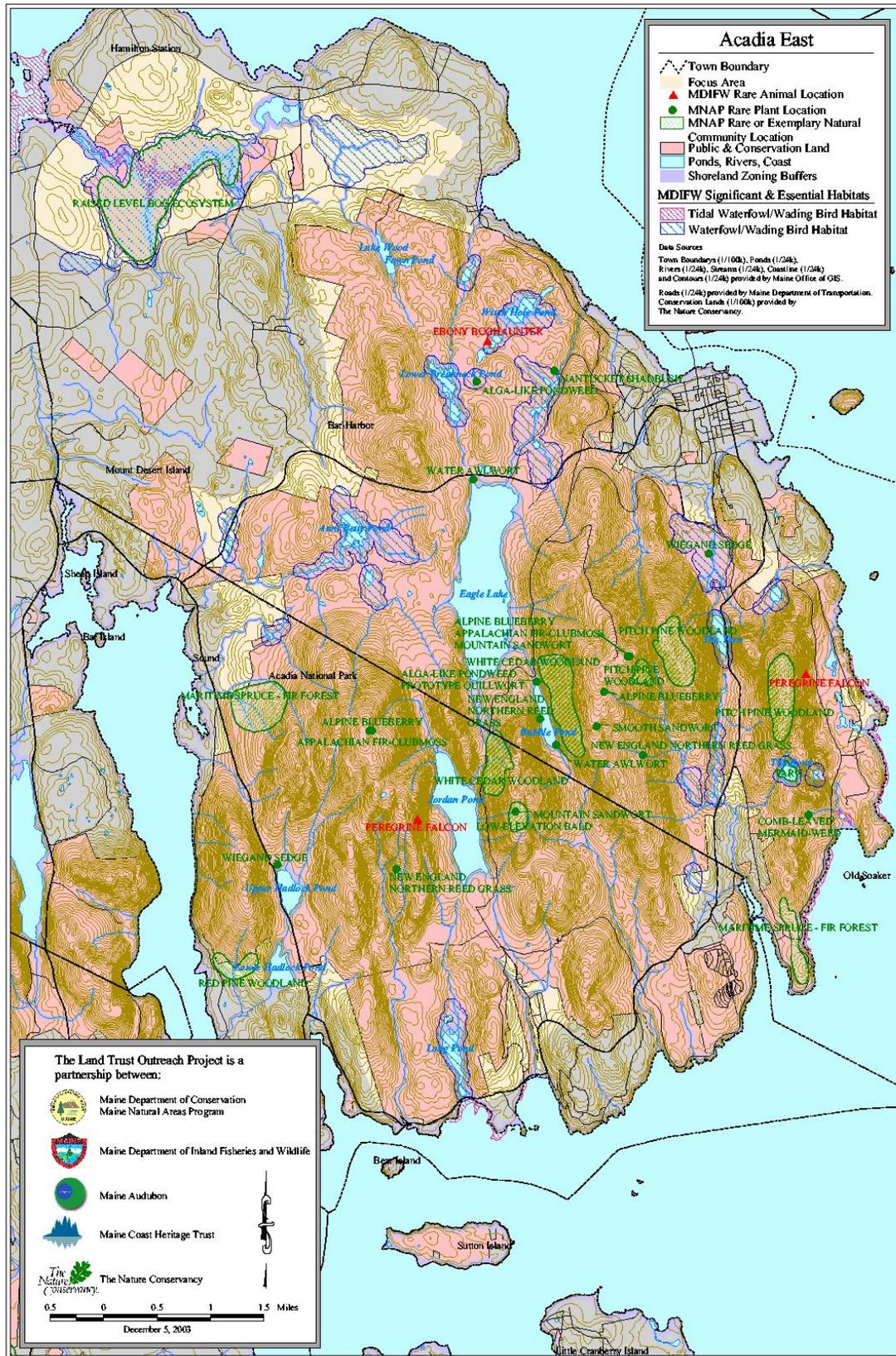
- The greatest threat to most rare or exemplary natural features on Mount Desert Island is recreational over-use from the extremely heavy tourist and recreational pressure. While the Park does its best to manage the recreational impacts, degradation of some habitats is inevitable. Tourist use of non-park holdings focuses on the developed towns on the island; almost all of the tourist and recreational effects on natural features falls within the Park. With three million visitors per year, Acadia is one of the most heavily visited

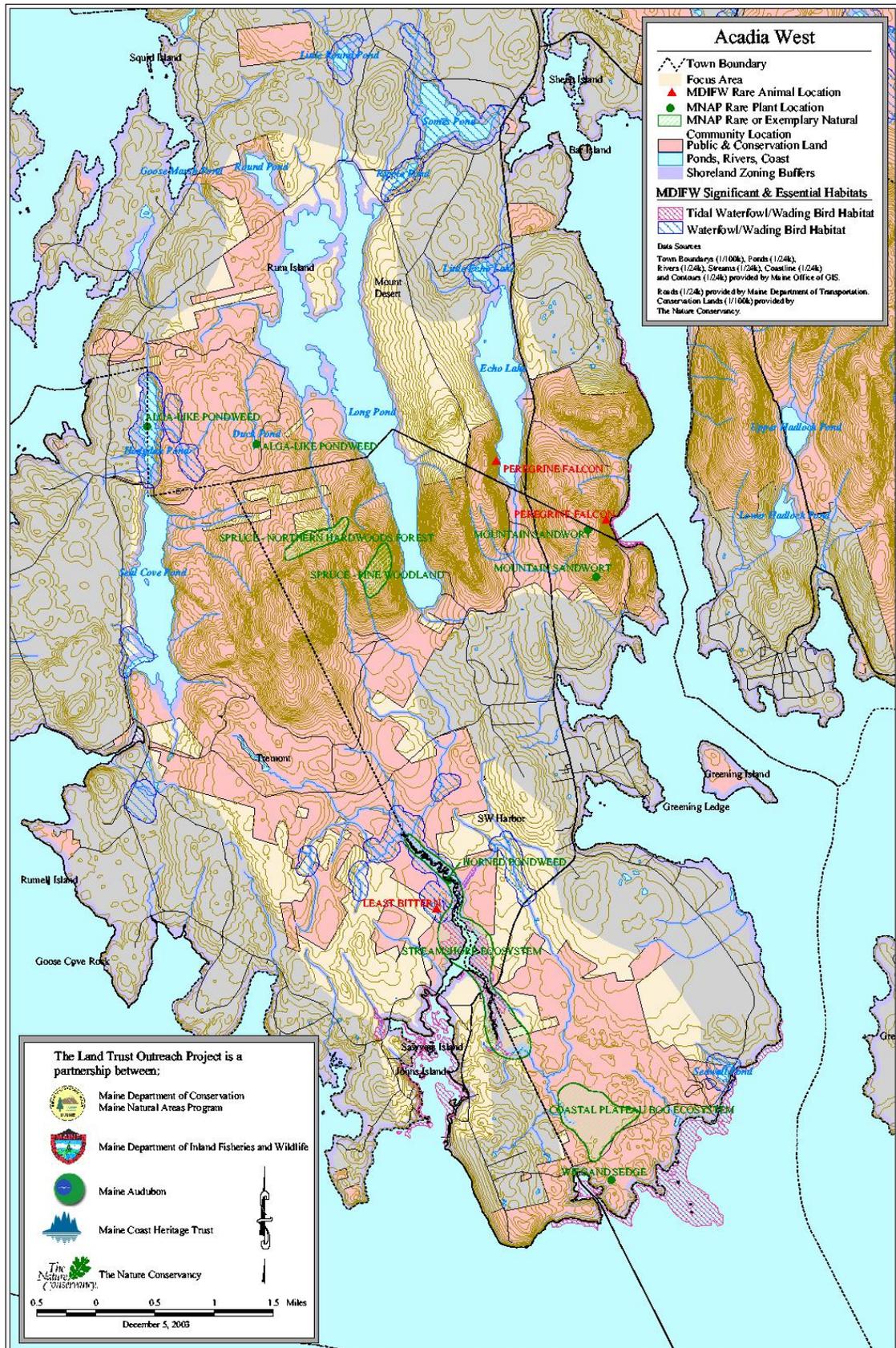
national parks. Managing recreational impacts to important natural features is a continuing and high-priority endeavor for park staff.

- Some wetlands have become susceptible to invasion by purple loosestrife (*Lythrum salicaria*), and some upland habitats are being invaded by other exotic plant species. Control of invasive exotic plants will be important to conservation efforts.
- Residential development pressure, already fairly intensive, will probably continue and may affect some features on private lands.
- Over the long term, global warming may further endanger the boreal/maritime habitats and plant species associated with coastal bogs, saltmarshes, and headlands.

Current Protection Status

Roughly half of Mount Desert Island, some 30,000 acres, is contained within Acadia National Park. The Park holds easements on an additional 11,000 acres. The Nature Conservancy also protects some smaller holdings in the area. Almost all of the features known to be of high conservation priority on Mount Desert Island are protected either in fee or by easement. Exceptions include Fresh Meadow on Mount Desert Island, which is partly in Park Service ownership and partly in private ownership.





Cobscook Bay Focus Area

Dennysville, Edmunds, Lubec, Pembroke, Trescott Township

Site Description

The Cobscook Bay Focus Area includes all of the tidal estuaries and embayments of Denny's Bay, Whiting Bay, Straight Bay, the Pennamaquan River, and East Bay, as well as the immediate terrestrial shoreline adjacent to them. It is a hydrologically and geologically complex estuary where very high levels of biodiversity and productivity are combined with comparatively little human impact. Cobscook Bay differs from most other estuaries along Maine's coast because the amount of freshwater input is so small in relation to the salt water brought in by the tides.

Cobscook Bay's tremendous tides circulate nutrient rich water from the deeper waters of the Gulf of Maine. Higher concentrations of nutrients in the tidal water stimulate increased plant growth, such as prolific blooms of phytoplankton, which in turn foster a variety of invertebrate species such as bottom dwelling shellfish, marine worms, and other important invertebrates. The abundance of marine animals leads to a high amount of biological waste production, which is then recycled into an added source of nutrients for plant growth. This internal process is a key part of what makes Cobscook Bay so productive.

Cobscook Bay is an outstanding resource for marine invertebrates and fish species, which contributes to its important role as habitat for a variety of bird species. Thousands of shorebirds visit Cobscook Bay for up to several weeks in the fall on their southerly migration from northern breeding sites, attracted by excellent foraging and roosting habitat. The irregular shoreline and strong tidal flow keeps the Bay relatively free of winter ice and makes it a very attractive area for waterfowl such as Black Ducks and Canada Geese throughout the year. In certain years, as much as 25% of the state's wintering Black Duck population may be found in Cobscook Bay.

Finally, there is a higher concentration of nesting Bald Eagle pairs in Cobscook Bay than anywhere else in Maine. The high number of eagles in Cobscook Bay has played a key role in restoring eagle populations in Maine and throughout the northeast United States. In contrast to other parts of coastal Maine, alewives constitute a much higher percentage of the diet of Bald Eagles in Cobscook Bay. Alewives, once abundant, are increasingly being recognized for the key role they play in the ecology of the bay and efforts are underway to return of them to their former spawning grounds in the Pennamaquan River, the Little River, and Boyden Stream.

Rare Species and Exemplary Natural Communities Occurring in Cobscook Bay.				
Common Name	Scientific Name	S-RANK	G-RANK	State Status
Rare Animals				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4	G4	T

Other Habitats Mapped by MDIFW

Bald Eagle Essential Habitat
 Tidal Waterfowl / Wading Bird Habitat
 Freshwater Waterfowl / Wading Bird Habitat
 Shorebird Feeding and Roosting Areas

Conservation Considerations

- An increase in shoreline development can have adverse impacts on the habitat of the bay itself through runoff, siltation, and loss of habitat buffer.
- Loss of habitat, rockweed harvesting, the potential impacts of an oil spill, are concerns when considering the impact of human activities on the bay.
- Barriers to anadromous fish passage by dams and other sources threaten a productive fishery and in turn may have impacts on other species like Bald Eagles that feed on alewives and other species. Dam removal or the installation of man-made fishways can help to alleviate this threat.
- The population of the invasive green crab has exploded in recent years at Cobscook Bay and threatens the viability of some shellfish species like clams that are especially prone as juveniles to green crab predation.
- Significant alteration to the nutrient load in Cobscook Bay through agricultural runoff, shoreline development, or aquaculture would likely disrupt the seemingly delicate and well-balanced nutrient cycling in the bay.

Protection Status

Approximately 3,500 acres have been protected within the Focus Area. Among the larger protected parcels are part of the Moosehorn Wildlife Refuge (USFWS), Morong Point Wildlife Management Area (MDIFW), the Tide Mill Farm (MDIFW easement), and Cobscook Bay State Park (Maine Department of Conservation). The Nature Conservancy and Quoddy Regional Land Trust have also protected parcels within this Focus Area.

