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ELEMENT 2 - KEY HABITATS AND NATURAL COMMUNITIES

Element 2 identities the extent and condition of wildlife habitats and community types essential to the conservation of Species of Greatest Conservation Need (SGCN).

Abstract Maine's Wildlife Action Plan employs The Northeast Terrestrial Habitat Classification System (NETHCS), developed by NatureServe and The Nature Conservancy (TNC), to identify the extent of habitats and community types essential to the conservation of Species of Greatest Conservation Need (SGCN). Federal and state agencies in the Northeast have endorsed the NETHCS as a tool for assessing habitat distribution and composition. The specific version of the NETHCS used in Maine includes a number of modifications made by the Maine Dept. of Marine Resources (MDMR) and the Maine Dept. of Inland Fisheries and Wildlife (MDIFW) to reflect Maine's landscape and coastal features. The basic layer within NETHCS is the habitat 'system', which corresponds to the Ecological Systems classification. There are approximately 150 Ecological Systems in Maine. The more general 'Macrogroup' level was used for several of our analyses, and there are 42 habitat macrogroups in Maine.

Maine further consolidated the macrogroups into three broad habitat categories to facilitate development of conservation actions. The broad categories are Coastal and Marine, Terrestrial (including Freshwater Wetlands) and Freshwater Aquatic (Rivers, Lakes, and Ponds). The importance of various habitats to SGCN is not related to their statewide abundance; habitats such as pine barrens, open freshwater wetlands, and rivers and streams are dis-proportionately important compared to many other habitat types. It is estimated that there are 3,824,842 acres of conservation land in Maine, accounting for nearly 20% of the State. Much of this conserved land lies within Focus Areas of Statewide Significance, which have been identified to help prioritize Maine's landscape for SGCN and other habitat values.

Significant Differences from 2005 Drawing from several sources, Maine's 2005 plan identified 21 key habitats important for the conservation of Species of Greatest Conservation Need. These habitats were cross-walked with the National Vegetation Classification and NatureServe ecological systems to promote regional and national consistency. The 2015 Wildlife Action Plan employs The Northeast Terrestrial Habitat Classification System (NETHCS), developed by NatureServe and The Nature Conservancy (TNC), to identify the extent of habitats and community types essential to the conservation of Species of Greatest Conservation Need (SGCN). Federal and state agencies in the Northeast have endorsed the NETHCS as a tool for assessing habitat distribution and composition. The specific version of the NETHCS used in Maine includes a number of minor alterations and additions made by the University of Massachusetts, as well as minor modifications made by the Maine Dept. of Marine Resources (MDMR) and the Maine Dept. of Inland Fisheries and Wildlife (MDIFW) to reflect Maine's landscape and coastal features. There are approximately 150 Ecological Systems in Maine and 42 habitat macrogroups. Maine further consolidated the macrogroups into three broad ecosystem categories to facilitate discussion among conservation partners during the

consideration of the extent and condition of SGCN habitats and during the development of conservation actions. The broad categories are Marine; Terrestrial, including Freshwater Wetlands; and Freshwater Rivers, Streams, Lakes, and Ponds.

2.1 LANDSCAPE OVERVIEW

Maine encompasses approximately 21 million acres of lands and waters, from the dramatic coastline to the heights of Mount Katahdin. Maine is as large as the remaining New England states combined, and more than 31,800 miles of streams and rivers and 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. Roughly one quarter of the state consists of freshwater wetlands, including hardwood floodplains, freshwater marshes, and dense assemblages of vernal pools. At nearly 90% forest cover, Maine is the most heavily forested state in the United States, but it also contains some of the most significant grassland and farmlands in the Northeast. Maine's broad habitat types are shown in Figure 1.

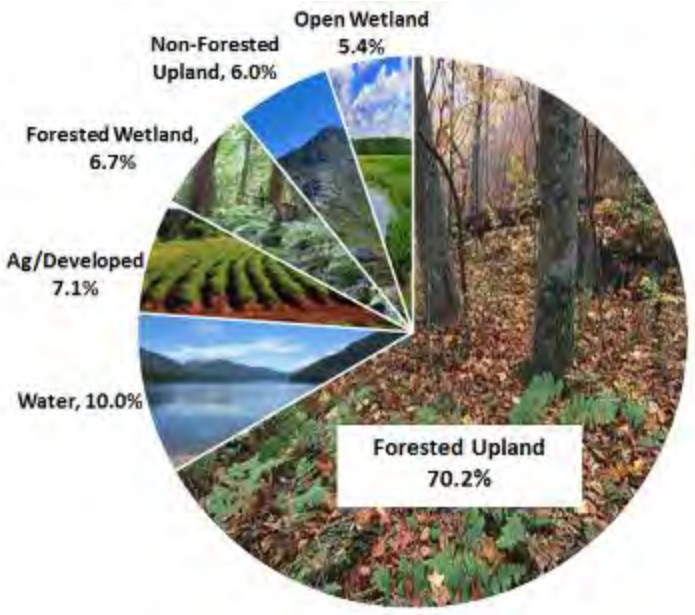


Figure 1. Broad breakdown of habitat types in Maine *(Source: NatureServe Ecological Systems GIS layer, 2012)*

2.1.1. CLIMATE

Maine's climate plays a major role in determining the plant and animal assemblages 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 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.

Potential changes to Maine's climate, and their subsequent impacts on Maine's habitats and wildlife, have been the focus of recent studies by the University of Maine, conservation groups, and state agencies (Whitman et al 2013, Fenandez et al 2015). These changes include rising seas, altered natural disturbance processes (e.g., increased fire), changes in hydrology of wetlands and waterways, and transitions in forest composition. Despite uncertainties regarding the magnitude and timing of future changes in Maine's climate, there is a general understanding that high elevation habitats, boreal forests and peatlands, tidal marshes, and cold water fisheries are among Maine's vulnerable habitats (Whitman et al 2013). Potential impacts on SGCN are discussed in Element 3, and associated conservation actions are addressed in Element 4.

2.1.2 PHYSIOGRAPHY

Maine's western border adjoining New Hampshire and Quebec is characterized by rugged terrain with numerous glacier-scoured peaks, lakes, and valleys. The Appalachian Mountain chain, formed nearly 500 million years ago, extends into Maine from New Hampshire, terminating at the 5,268' Mount Katahdin. 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, and coves north and east of Portland. 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.

2.1.3 HABITAT CLASSIFICATION

Northeast Terrestrial Habitat Classification System

The Northeast Terrestrial Habitat Classification System (NETHCS), developed by NatureServe and The Nature Conservancy (TNC), is a hierarchical framework for characterizing and mapping wildlife habitat in the region (The Nature Conservancy and NatureServe 2011). The classification system has been endorsed by the Northeast Association of Fish and Wildlife Agencies, US Fish and Wildlife Service (USFWS), and North Atlantic Landscape Conservation Cooperative (NALCC) as a tool for assessing habitat distribution and composition across the northeast. A companion effort is underway to map and classify habitats in adjacent parts of Canada. Details of this classification and mapping approach, including habitat 'profiles' of many common ecological systems, are available at https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/habitatmap/Pages/default.aspx.

The specific version of the NETHCS used for Maine's State Wildlife Action Plan (SWAP) includes a number of minor alterations and additions made by the University of Massachusetts

(digital 'ESM Plus' layer available from NALCC), with additional minor modifications by the Maine Dept. of Marine Resources (MDMR) and the Maine Dept. of Inland Fisheries and Wildlife (MDIFW) to reflect Maine's landscape and coastal features. State-based modifications include incorporation of a geographic information system (GIS) layer of impermeable surfaces by MDIFW, and finer-scaled marine classes identified by MDMR that reflect underlying substrate and biotic composition in the intertidal and subtidal areas.

The basic layer within NETHCS is the habitat 'system', which corresponds to the Ecological Systems classification. There are approximately 150 Ecological Systems in Maine, and all have been entered into the State Wildlife Action Plan database. These include natural vegetated habitats ('Boreal Laurentian Bog'), aquatic systems ('Headwaters and Creeks'), marine systems ('Gastropod Reef'), and human-modified habitats ('Powerline Right of Way').

It is important to note that only about 50 of the 150 ecological systems are reflected in the GIS map layer because of scale limitations or difficulty of distinguishing tidal and subtidal habitats.

It should also be noted that although the classification system can accommodate structural modifiers (e.g., early successional forest), the GIS layer upon which our analyses are based does generally distinguish between successional stages of forest. Therefore, the 'Northern Hardwood and Conifer' macrogroup, for example, includes forest stands of all successional stages.

The more general 'Macrogroup' level was used for several of our analyses. There are 42 habitat macrogroups in Maine, though not all of these are mapped (e.g., intertidal mollusc reef). Acreages for mapped macrogroups in Maine are in Table 1 (shown in descending order of statewide acreage).

Table 1. Acreages of habitat macrogroups and proportions conserved in Maine *(Sources: NatureServe Ecological Systems GIS map, 2012, and Maine Conserved Lands Database 2015)*

Habitat Macrogroup	Acres in state	% of State	% Conserved
Northern Hardwood & Conifer	8,787,683	39.87%	17.1%
Boreal Upland Forest	6,560,611	29.77%	26.0%
Open Water	2,206,392	10.01%	1.9%
Northern Swamp	1,435,003	6.51%	18.9%
Agricultural	802,154	3.64%	1.2%
Urban/Suburban Built	765,055	3.47%	4.6%
Emergent Marsh	438,838	1.99%	52.2%
Northern Peatland	362,022	1.64%	27.9%
Wet Meadow / Shrub Marsh	354,013	1.61%	19.4%
Central Oak-Pine	126,500	0.57%	13.3%
Outcrop & Summit Scrub	64,435	0.29%	33.5%
Cliff and Talus	43,774	0.20%	49.4%
Northeastern Floodplain Forest	29,135	0.13%	13.8%
Salt Marsh	26,213	0.12%	30.2%
Ruderal Shrubland & Grassland	22,632	0.10%	7.1%
Alpine	3,624	0.02%	99.1%
Coastal Grassland & Shrubland	4,443	0.02%	11.0%
Central Hardwood Swamp	2,790	0.01%	1.8%
Rocky Coast	3,146	0.01%	18.7%
Coastal Plain Swamp	654	0.00%	18.9%
Glade and Savanna	183	0.00%	16.4%

Coastal and Marine Classification System

Since the NETHCS focuses on habitats vegetated with vascular plants, the NETHCS marine and coastal habitat components had poor accuracy and low specificity, especially for intertidal and subtidal habitats. "Rocky coast," "coastal," and "tidal marsh" habitat macrogroups were retained from the NETHCS scheme because they have associated vegetation, but all intertidal and subtidal habitats were reclassified to increase the specificity and accuracy for these ecologically, culturally, and economically important habitats. Staff from the Maine Department of Marine Resources (MDMR) and the Maine Coastal Program (MCP) worked with other SWAP partners to generate a coastal and marine habitat classification scheme for Maine's marine and coastal environment (Table 2) that encompasses all areas from the high tide line to the boundary of state waters, which extend three nautical miles offshore.

This habitat scheme was based on several existing classification systems that were either too detailed for our intended purpose or did not encompass the diverse breadth of habitats found in the coastal and marine regions in Maine (e.g. the Coastal and Marine Ecological Classification Standard, Brown, 1993). Although this scheme was adapted to fit the particular needs of the Maine SWAP, it is written in generalized terms, where possible, in order to fit the needs of surrounding New England states. Additionally, it is possible to crosswalk this scheme with the other classification schemes listed above in order to compare existing habitat classification and maps for the limited regions where these data exist. During the development of this habitat scheme, several gaps in knowledge were identified including the geographic locations and spatial extents of most marine and coastal habitats, the health and resiliency of these habitats, and past and projected ecosystem changes over time. Thus, mapping marine and coastal habitats and monitoring their changes over time have been highlighted as priorities for the conservation of marine SGCN over the next 10 years.

There are five broad coastal and marine habitat f*ormations* associated with conservation actions (tidal marsh, rocky coast, coastal, intertidal, and subtidal). The tidal marsh formation includes all peat-forming tidal marshes. The rocky coast formation encompasses rocky habitats above the high tide line. The coastal formation encompasses coastal grasslands and shrublands. The intertidal and sub-tidal formations encompass all of the benthic and pelagic (water column) habitats from the littoral zone to the open ocean. These broad habitat groups were subdivided into 15 *macrogroups* based on wave energy and the resulting physical composition of the substrate for benthic habitats (e.g. tidal marsh, mud, sand, rock, etc.); pelagic habitats are classified separately (e.g. water column).

At the habitat *system* level, additional biological and physical drivers that shape the ecosystem were incorporated into the classification scheme (e.g. presence of fauna and flora, relative nutrient concentration, desiccation and temperature stressors, etc.). In Maine, certain kinds of flora and fauna, such as eelgrass, kelp beds, and soft corals, form ecologically important habitats by creating a three-dimensional structure that rises above the substrate and serves as a nursery ground or can be used for protection by fishes and invertebrates. These habitats also tend to be vulnerable to environmental stressors. To highlight the importance and relative vulnerability of these habitats, the classification scheme lists these individually at the habitat system level. The language has been generalized to "submerged aquatic vegetation," "kelp bed," and " erect epifauna" to encompass additional flora and fauna that may exist throughout the northeast region in case other New England states elect to adopt this classification scheme.

Table 2. Coastal and marine habitat classification developed for the Maine Wildlife Action Plan.

Formation	Macrogroup	Habitat System
Tidal Marsh	Intertidal Tidal Marsh (peat-forming)	Acadian Coastal Salt Marsh
		Coastal Plain Tidal Marsh
Rocky Coast	Rocky Coast	Acadian-North Atlantic Rocky Coast
		North Atlantic Cobble Shore
Coastal	Coastal Grassland & Shrubland	Northern Atlantic Coastal Plain Dune and Maritime Grassland
		Northern Atlantic Coastal Plain Sandy Beach
Intertidal	Intertidal Mudflat	Non-Vascular Mudflat
		Freshwater Tidal Marsh
		Submerged Aquatic Vegetation
	Intertidal Sandy Shore	Sand Flat
		Submerged Aquatic Vegetation
		Sand Beach
	Intertidal Mollusc Reefs	Oyster Reef
		Gastropod Reef
		Mussel Reef
	Intertidal Bedrock	High Intertidal
		Mid-Intertidal
		Low-Intertidal
	Intertidal Gravel Shore	High Intertidal
		Mid-Intertidal
		Lower Intertidal
	Intertidal Water Column	Confined Channel
		Embayment
		Exposed Shore
Subtidal	Subtidal Mud Bottom	Unvegetated
		Submerged Aquatic Vegetation
	Subtidal Sand Bottom	Unvegetated
		Submerged Aquatic Vegetation
	Subtidal Mollusc Reefs	Oyster Reef
		Gastropod Reef
		Mussel Reef
	Subtidal Bedrock Bottom	Bedrock
		Kelp Bed
		Erect Epifauna
	Subtidal Coarse Gravel Bottom	Coarse Gravel
		Kelp Bed
		Erect Epifauna
	Subtidal Pelagic (Water Column)	Nearshore
		Offshore
		Upwelling Zones
		Confined Channel

2.1.4 COASTAL AND MARINE ECOSYSTEMS

The Gulf of Maine watershed encompasses 69,115 square miles of Nova Scotia, New Brunswick, Maine, New Hampshire, Massachusetts, and Quebec. Maine is the only jurisdiction located entirely within the watershed. 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.

Tidal Marshes and Estuaries

Gulf of Maine intertidal areas include 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. These habitats support several commercially important species as well as numerous SGCN.

Tidal 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, approximately 157,500 acres are tidal (tidal flats, salt marsh, brackish marsh, aquatic beds, beach bars and reefs), including roughly 22,000 acres of salt marsh (ME DEP 1996, MEPC 1998, MNAP 2014). In fact, there are more tidal wetlands in Maine than in any state north of New Jersey (MEPC1998).

Despite harsh growing conditions and low plant diversity, tidal 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 tidal marshes and adjacent tidal flats, and birds rely on the rich food webs of tidal marshes for breeding and during migration.

Estuaries, places where freshwater rivers meet the ocean, 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 tidal marshes, rockweeds, and oceanic sources to stimulate phytoplankton growth throughout the year. Eelgrass and other submerged aquatic vegetation sometimes grow in estuaries and provide a three-dimensional habitat that serve as critically important 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), and many eelgrass meadows have receded dramatically over the last few years due to unknown causes.

Islands, Beaches, and Dunes

Roughly 500 Maine islands support nesting wading birds, seabirds, and Common Eiders. Islands cause upwelling of deep, nutrient-rich water to the sea surface, enriching nearby waters. Currents driven by tidal action swirl around islands and surge through passages, "creating a

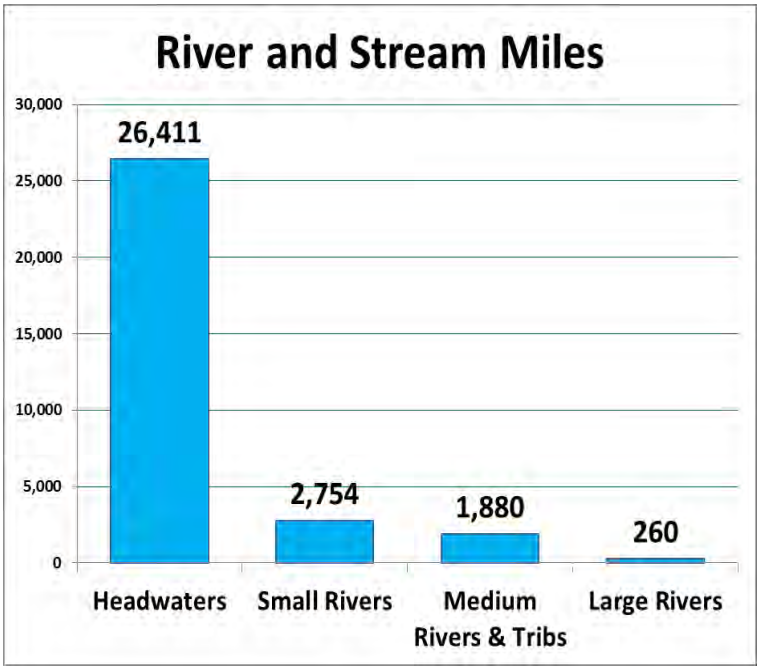
funnel effect that increases the volume of feed available to filter feeders, as well as those species that prey on the filter feeders" (Conkling 1995 as cited in GOMC 2004).
Nearly all of Maine's larger islands were cleared in the past, primarily for sheep or cattle pasture. Many islands were burned 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 islands has resulted in their reforestation. In the last few decades, recreational use and construction of seasonal homes have limited the ecological recovery of some islands.

Beaches, pounded by an average 8,000 waves a day, may be high-energy, climatically extreme environments. They vary from long shorelines of fine-grained silt or sand to cobbleshores and boulders. Because of geological differences between western and Downeast Maine, 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.

2.1.5 AQUATIC ECOSYSTEMS

Maine has more than 5,000 rivers and streams, encompassing 31,800 miles of flowing waters that cover nearly half of the watershed for the Gulf of Maine. More of Maine's rivers and streams are undeveloped and free-flowing than 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). However, the overwhelming majority of flowing water mileage in Maine is in headwater streams (Figure 2). Maine also boasts more than 5,600 lakes and ponds. Moosehead Lake, covering about 117 mi^2, is the state's largest lake, and Sebago Lake is the deepest at 316 ft (40 ft below sea level).

Figure 2: River and Stream Mileage in Maine



2.1.6 TERRESTRIAL AND WETLAND ECOSYSTEMS

Terrestrial Ecosystems

Maine falls in the transition between the deciduous forest region to the south and the boreal forest region to the north. Maine's forests cover more than 17 million acres, making Maine the most heavily forested state in the nation. Unlike other regions 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, 2010) describes 104 Natural Community types that are linked to the NatureServe's National Vegetation Classification and the Ecological Systems.

At the macrogroup level, Maine's most abundant forest type is Northern Hardwood and Conifer, which accounts for approximately 40% of the state and extends from York to Aroostook County (Figure 3). This macrogroup consists of a mosaic of northern hardwood, spruce-fir, and mixed forest types featuring Sugar Maple, Beech, Yellow Birch, Red Spruce, Balsam Fir, and Hemlock. Boreal Forest, which accounts for 30% of the state, is dominated by spruce-fir types and is most common in northern Maine and along the Downeast Coast. The Central Oak Pine macrogroup, characterized by White Pine and Red Oak, occurs in southernmost Maine and accounts for less than 1% of the state.

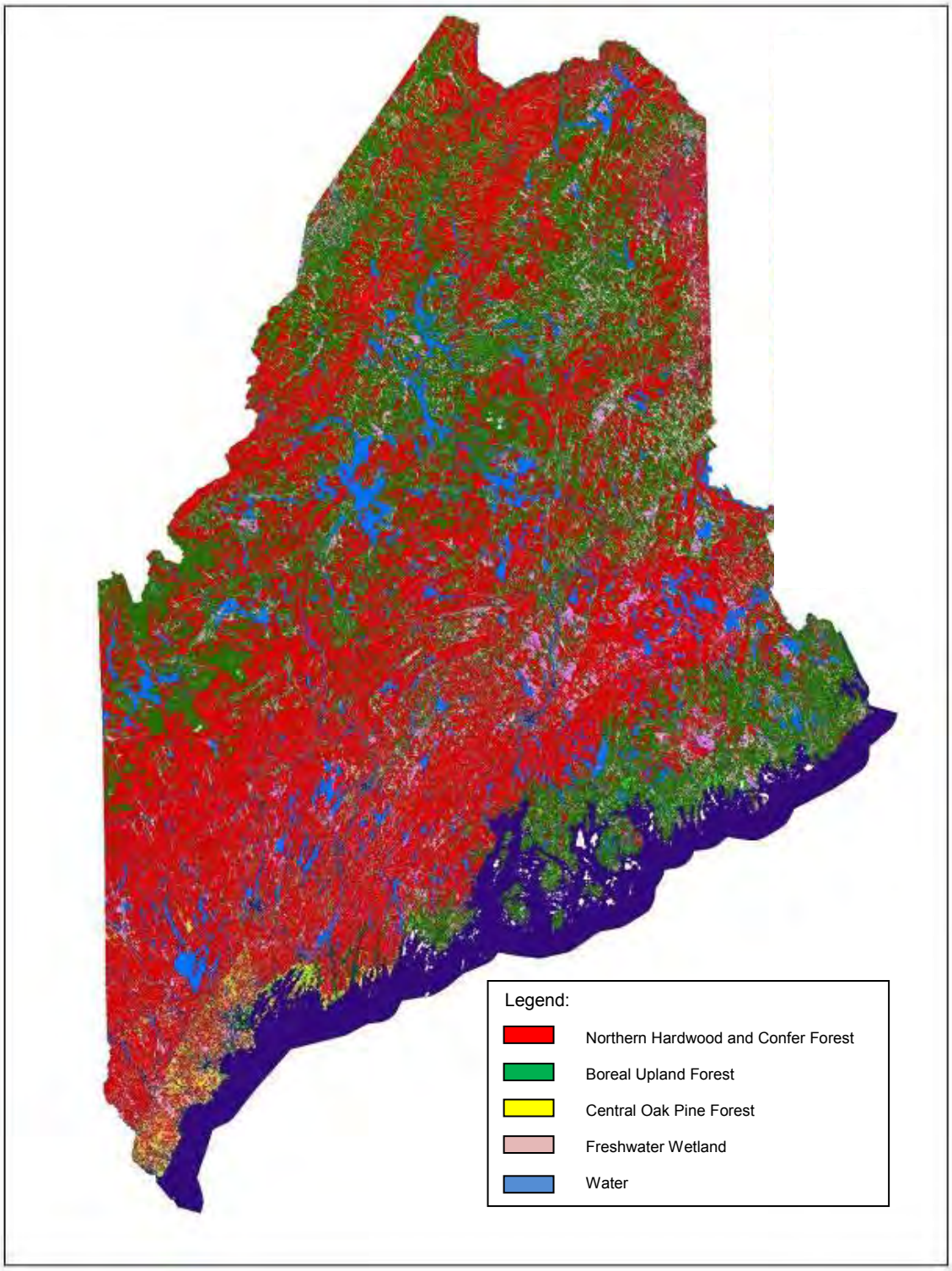


Figure 3: Generalized map of Maine habitat types, from the Northeastern Habitat Classification System

Freshwater Wetland Ecosystems

Freshwater wetlands account for roughly one quarter of the surface area of Maine (Calhoun 2001), four times the wetland area of the other New England States combined. Forested wetlands include red maple swamps, spruce flats, and cedar swamps, while non-forested wetlands range from emergent meadows created by beavers to large peatlands. In particular, Maine's diversity of peatland types is unequaled 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. Some Maine peatland types are rare in the state (maritime slope bogs, coastal plateau bogs, circumneutral fens, patterned fens, and eccentric bogs), while others are more common (unpatterned fens, domed bogs, level bogs, kettlehole bogs and ponds, and some streamshore ecosystems).

Native Plants *(to be moved to SGCN chapter)*

There are approximately 1,443 native and 653 introduced species of vascular plants in Maine (Gawler et al. 1996). The state's vascular plants include species at the northern edge of their range and boreal representatives at their southern limit.

No plant species are included as Maine SGCN taxa because SGCN are restricted to fauna only. There is presently no statutory protection for native plants in Maine, though natural community and landscape level conservation of SGCN and their habitats will provide secondary benefits to many rare and vulnerable plants.

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. Roughly one third are considered vulnerable to climate change. The list is used to assist scientific research, environmental assessment, permit review, land management, and for educational purposes. Nearly one quarter of Maine's native flora (340 species) is considered possibly extirpated, rare, Threatened, or Endangered in the State, and 15 species, or fewer than two percent, of the plants native to Maine are rare throughout their worldwide range (e.g., ranked G1 or G2).The list is managed by the Maine Natural Areas Program and is under the jurisdiction of the Commissioner of the Department of Agriculture, Conservation and Forestry. Section 6 funding under the U.S. Endangered Species Act supports conservation of federally listed plants in Maine.

2.1.7 CONSERVATION LAND IN MAINE

According to the best available data, there are 3,824,842 acres of conservation land in Maine, accounting for nearly 20% of the State[1] (Schlawin and Cutko 2014). 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. There are 757,450 acres of land that are considered 'Gap 1 or Gap 2' according to the USFWS classification of conserved lands. These Gap 1 and Gap 2 lands are

[1] The state's database of conservation lands is continually being updated; some smaller conservation parcels and municipal lots are not included in these totals.

managed for non-extractive uses (i.e., off limits to timber harvesting, gravel extraction, etc.) and account for just under 4% of the state (Figure 4).

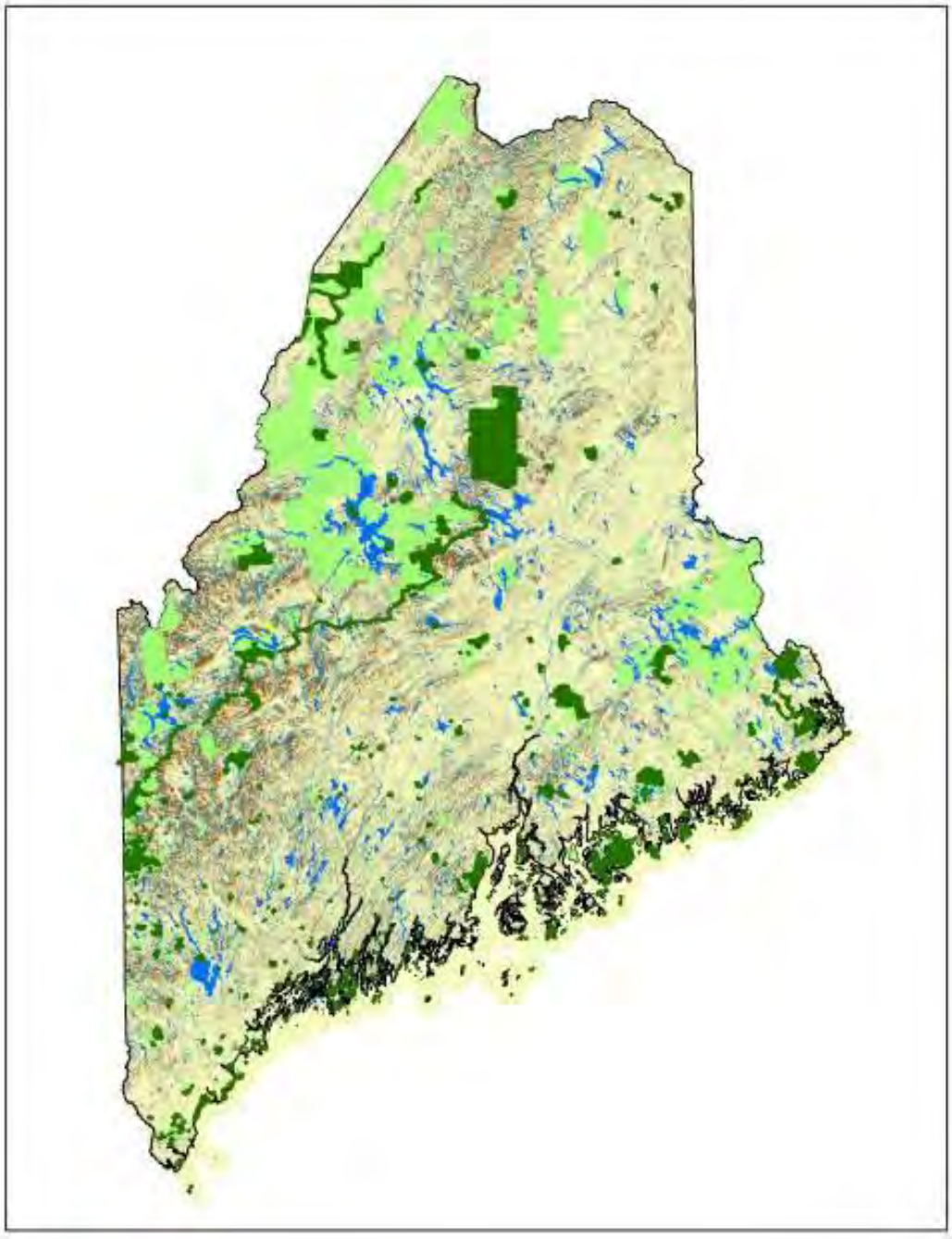


Figure 4: Conserved lands in Maine. Dark green lands are Gap 2 (off limits to extractive uses) and light green lands are considered Gap 3 (fee lands and conservation easements managed for forest products).

MDIFW holds title to approximately 106,000 acres on more than 50 Wildlife Management Areas (WMAs). Most of these lands were purchased with federal 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 and tidal wetlands, and seabird nesting islands. Wetlands account for more than 37% of WMAs, and several wetland types (emergent marsh, northern peatland, northern swamp, wet meadow/shrub marsh) are more than twice as well represented in WMAs compared to the landscape as a whole.

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. WMA information and map are available at http://www.maine.gov/ifw/wildlife/land/index.html.

2.1.8 ECOREGIONS

Ecoregions (or biophysical regions) are defined as large areas with similar biota, climate, and physical environment. Most coarse-grained ecoregional classifications (e.g., Westveld 1956, Bailey 1980, U.S. Environmental Protection Agency 2009) typically divide Maine into two or three ecoregions or biophysical 'provinces'. For the purposes of inventory and conservation planning, MDIFW and MNAP have used 7 biophysical sections (Figure 5). While a map of the 7 sections gives the impression of distinct entities, the gradients in environment and species composition really form a continuum of change (McMahon 1990).

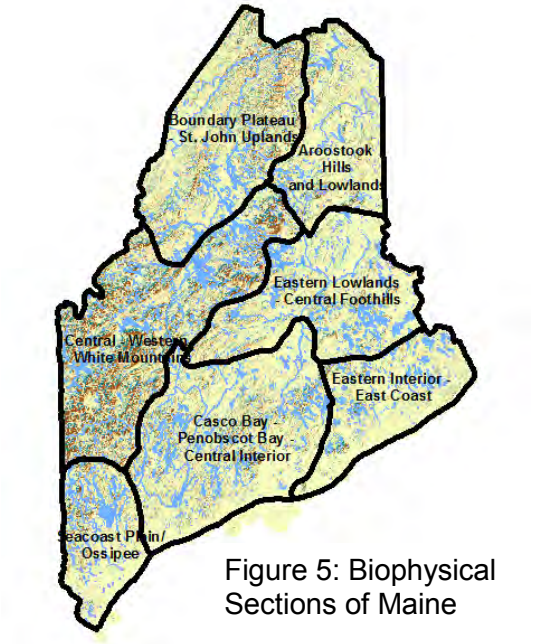


Figure 5: Biophysical Sections of Maine

2.1.9 IMPORTANCE OF HABITATS TO SGCN

Maine has identified 376 Species of Greatest Conservation Need. 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. However, habitat requirements for all SGCN species, especially some invertebrates, are not well understood, so best professional judgment was exercised in those cases.

The importance of each habitat type to SGCN varies and is not proportional to their statewide acreage. Figure 6 indicates that while the majority of the state is forest uplands, those habitats provide habitat to fewer than 35% of the state's SGCN. Conversely, open wetlands account for only 5% of the state but support more than 21% of the state's SGCN.

Table 3 indicates the importance of various habitat macrogroups to SGCN. Northern Hardwood and Conifer Forest supports 153 SGCN, more than any other type. This is not surprising, given that this habitat types is the most abundant in the state, covering nearly 40% of Maine. However, Central Oak Pine Forest provides habitat for 127 SGCN but covers *less than 1% of the state.* The importance of the Central Oak Pine Type is largely driven by the value of the Northeastern Interior Pine Barrens ecological system, which is home to 42 SGCN and covers less than 9,000 acres statewide.

All 14 of the Marine and Coastal Macrogroups support multiple SGCN, with the sub-tidal pelagic group home to the most Priority 1 SGCN as well as total SGCN.

Notably, habitats that are moderately to significantly altered by humans provide habitat for numerous SGCN. In particular, agricultural areas support 40 SGCN, and significant numbers of SGCN are also supported by Ruderal Grasslands and Shrublands, Urban/Suburban – Built, and Modified – Managed Marshes.

Figure 6: Proportions of Statewide Habitats and SGCN (see text for explanation)

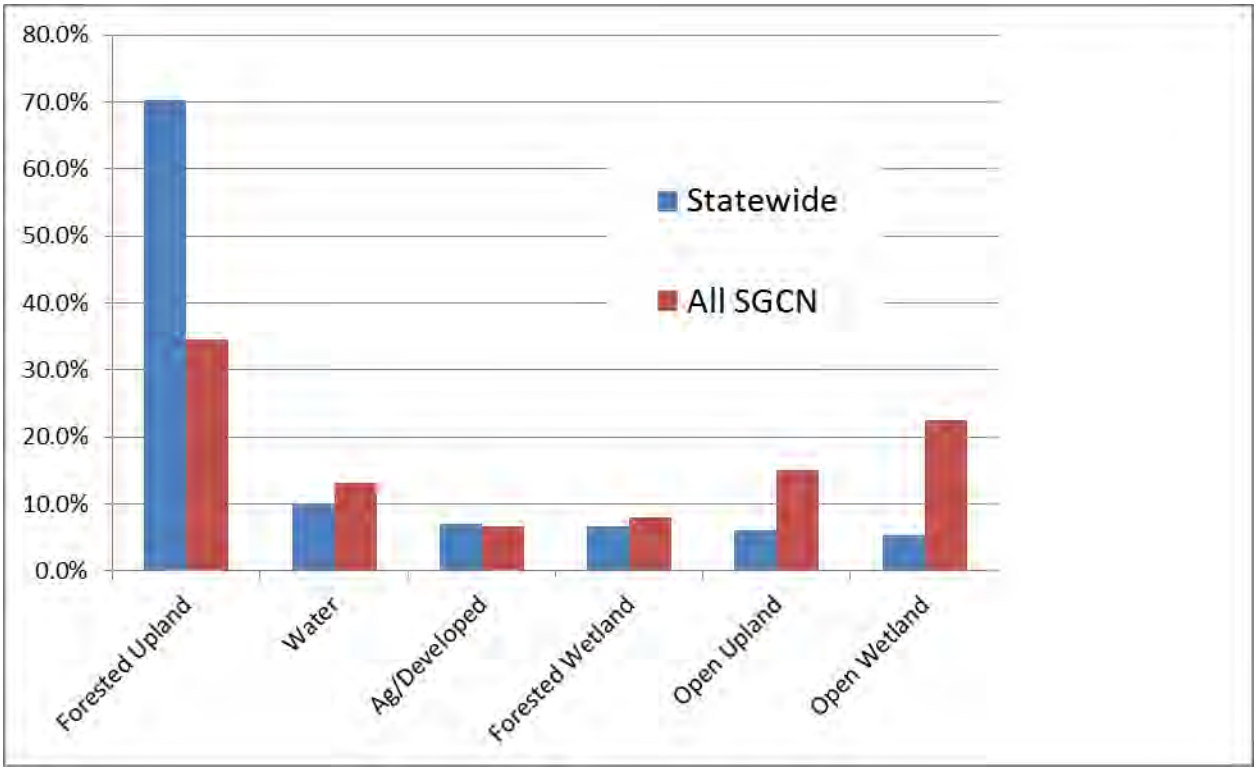


Table 3: SGCN Associations with Habitat Macrogroups

Macrogroup Name	Priority 1	Priority 2	Priority 3	Total SGCN
Coastal/Marine				
Intertidal Bedrock	3	10	6	19
Intertidal Gravel Shore	1	19	15	35
Intertidal Mollusc Reefs	3	1	5	9
Intertidal Mudflat	7	13	16	36
Intertidal Sandy Shore	8	10	9	27
Intertidal Tidal Marsh (peat-forming)	6	14	16	36
Intertidal Water Column	11	5	10	26
Rocky Coast	6	11	13	30
Subtidal Bedrock Bottom	3	13	2	18
Subtidal Coarse Gravel Bottom	7	31	9	47
Subtidal Mollusc Reefs	2	3	3	8
Subtidal Mud Bottom	6	20	9	35
Subtidal Pelagic (Water Column)	22	46	28	96
Subtidal Sand Bottom	9	21	4	34
Freshwater/Aquatic				
Coastal Plain Pond	4	9	9	22
Lake & River Shore	2	3	4	9
Lakes and Ponds	12	24	43	79
Rivers and Streams	25	21	54	100
Terrestrial				
Agricultural	10	16	14	40
Alpine	3	4	13	20
Boreal Upland Forest	11	28	82	121
Central Oak-Pine	9	47	71	127
Cliff and Talus	4	4	2	10
Coastal Grassland & Shrubland	1	7	10	18
Exotic Upland Forest	4	5	3	12
Extractive	7	4	3	14
Glade, Barren and Savanna		7	1	8
Maintained Grasses and Mixed Cover	4	5	10	19
Northern Hardwood & Conifer	12	42	99	153
Outcrop & Summit Scrub	6	6	6	18
Plantation and Ruderal Forest	4	18	12	34
Ruderal Shrubland & Grassland	11	27	34	72
Urban-Suburban Built	3	14	15	32
Wetlands				
Boreal Forested Peatland	1	8	20	29
Central Hardwood Swamp	3	4	1	8
Coastal Plain Peat Swamp	1	2		3
Emergent Marsh	7	18	26	51
Modified-Managed Marsh	6	12	12	30
Northeastern Floodplain Forest	5	8	21	34
Northern Peatland & Fens	7	18	33	58
Northern Swamp	6	22	26	54
Wet Meadow-Shrub Marsh	11	22	27	60

2.1.9 FOCUS AREAS OF ECOLOGICAL SIGNIFICANCE

Background

Using data from inventory work and from other sources, biologists at Maine Natural Areas Program (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 more than 100 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. Maps and descriptions of Focus Areas that occur in Maine's organized town are available at http://www.maine.gov/dacf/mnap/focusarea/.

Focus Areas have become integrated into a number of land conservation programs such as the Maine Natural Resources Conservation Program, Land for Maine's Future Program, and Forest Legacy Program. They have been recognized by the land trust community and others as important indictors of ecological significance.

Criteria and Delineation

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. 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.

What do Focus Areas Represent?

In 2014 an assessment of Maine's Focus Areas was initiated to determine their effectiveness at conserving the variety of SGCN and habitats across the state, including conservations for a changing climate. While this assessment has not yet been finalized, a few key findings include:

- nearly all Focus Areas meet multiple criteria; that is, most Focus Areas support a combination of rare species and important wildlife habitats.
- most habitat macrogroups are well represented in Focus Areas, and several macrogroups (e.g. alpine) are more than four times as abundant in Focus Areas relative to their overall statewide coverage.
- the network of Focus Areas generally indicates a high resilience to climate change, reflecting both high habitat connectivity and representing nearly the full variety of Maine's geophysical settings.

In addition to Species of Greatest Conservation Need, the data used to identify Focus Areas are described below.

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.

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 104 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.

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.

Key to Acronyms

GIS	Geographic Information System
LIP	Landowner Incentive Program
MDFW	Maine Dept. of Inland Fisheries and Wildlife
MDMR	Maine Dept. of Marine Resources
MNAP	Maine Natural Areas Program
NALCC	North Atlantic Landscape Conservation Cooperative
NETHCS	Northeast Terrestrial Habitat Classification System
NRPA	Natural Resources Protection Act
SGCN	Species of Greatest Conservation Need
SWAP	State Wildlife Action Plan
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area

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