Maine 2015 Action Plan Marine Habitat Classifications

Formation Name: **Intertidal**

Macrogroup Name: **Intertidal Bedrock**

Macrogroup Description:

From the NTHCS: "These intertidal zones of solid rock can experience extremes of exposure to winds, waves, currents, and icescour. They are often covered with seaweeds. Tidepools are frequently found in these habitats and are nurseries for lumpfish, sea snails, and pollock, as well as other fish. Many species of birds are found on these rocky shores. Many species of birds are found on these rocky shores. Purple sandpipers are found in the winter; ruddy turnstone and sanderlings are the main species in spring and fall migrations. Other shorebirds that also use rocky shores include black-bellied plovers, American oystercatchers, and pectoral sandpipers." Corresponds to the NTHCS Rocky Intertidal Habitat System, moves the system to a Macrogroup, and expands to habitat systems. Also adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Bedrock

Habitat System Name: **High Intertidal**

Habitat System Description:

Includes the Supralittoral fringe. From the upper limit of barnacles (in quantity) to the nearest convenient landmark above this (e.g. the "upper limit of Littorinae or the lower limit of maritime land-lichens or flowering plants). High water of spring tides invades at least the lower part of this zone. Blue-green algae are common in the high intertidal zones, as are barnacles (Semibalanus balanoides) in the lower high intertidal zone, periwinkles (littorinids), springtails, and seasonally, blue mussels, (Mytilus edulis) frequently comprise most of the animal biomass in this zone.

Habitat System Name: **Low-Intertidal**

Habitat System Description:

Turfs formed by Irish moss (Chondrus crispus), Mastocarpus crispus, and kelp (Laminariales) can inhabit the lower edge of the intertidal. Blue mussels and green sea urchins (Strongylocentrotus droebachiensis) can also occur. Fishes are attracted to the structure provided by macroalgae and the prey they support. Shorebirds feed and rest on floating mats of rockweed and knotted wrack.

Habitat System Name: **Mid-Intertidal**

Habitat System Description:

Blue mussels are common in the mid intertidal along with periwinkles, dog whelks (Nucella lapillus), seastar (Asterias forbesi), and springtails. Dominant plants include brown, erect macroalgae like rockweeds (Fucus spp.) and knotted wrack (Ascophyllum nodosu).

Macrogroup Name: **Intertidal Gravel Shore**

Macrogroup Description:

This Macrogroup includes sediment textures/ size classes ranging from pebbles to boulders. Adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Unconsolidated shore, Substrate-Gravel. This includes particle size gravel, granule, pebble, cobble, and boulder.

Habitat System Name: **High Intertidal**

Habitat System Description:

The uppermost part of this zone is dominated by microscopic blue green algae. Barnacles (Semibalanus balanoides), periwinkles (littorinids), and seasonally, blue mussels, (Mytilus edulis) frequently comprise most of the animal biomass in the mid-intertidal zone.

Habitat System Name: **Lower Intertidal**

Habitat System Description:

Turfs formed by Irish moss (Chondrus crispus) and Mastocarpus crispus are common in the low intertidal and kelp (Laminariales) can inhabit the lower edge of the intertidal. Fishes are attracted to the structure provided by macroalgae and the prey they support. Shorebirds feed and rest on floating mats of rockweed and knotted wrack. Rock gunnel (Pholis gunnellus) and decapod crustaceans like crabs and post-larval lobsters (Homarus americanus) can be found in the interstices between rocks at low tide. Blue mussels and green sea urchins (Strongylocentrotus droebachiensis) can also occur

Habitat System Name: **Mid-Intertidal**

Habitat System Description:

Blue mussels are common in the mid intertidal along with periwinkles, dog whelks (Nucella lapillus), seastar (Asterias forbesi), and springtails. Dominant plants include brown, erect macroalgae like rockweeds (Fucus spp.) and knotted wrack (Ascophyllum nodosum).

Macrogroup Name: **Intertidal Mollusc Reefs**

Macrogroup Description:

A reef is typically a cohesive mass comprised of hard biogenic structures like calcarius shell forming animals. Adopted from the USFWS ACFHPand CMECS habitat descriptions, but definitions concentrated only on cohesive masses of bivalves.

Habitat System Name: **Gastropod Reef**

Habitat System Description:

FROM CMECS: Areas dominated by consolidated aggregations of living and dead gastropod mollusks, typically those of the Family Vermetidae or the Genus Crepidula. Shells in a “reef” must have consolidated or conglomerated into a reef structure with some relief and permanence; a reef is more that an accumulation of loose shells. Vermetids construct tubes that are cemented to hard substrates and to conspecifics, generally in intertidal habitats. Crepidula forms reefs through preferential settling of larvae on conspecifics (Zhao and Qian 2002) combined with very limited mobility, and sediment infilling. Crepidula reefs are generally flat features with little vertical relief.

Habitat System Name: **Mussel Reef**

Habitat System Description:

Dense aggregations of blue mussels and/or their shells that are fringing or form masses rising above the surrounding seabed. Among other functions, these can provide food for waterfowl like American Eider (Somateria mollissima). From CMECS: Areas dominated by the ridge- or mound-like structures formed by the colonization and growth of mussels that are attached to a substrate of live and dead conspecifics. Mussels use byssal threads and a powerful glue to tether their shells to a substrate, and their reefs also provide valuable habitat and filtration.

Habitat System Name: **Oyster Reef**

Habitat System Description:

Dense aggregations of oysters and/or their shells that are fringing or form masses rising above the surrounding seabed. From CMECS: Areas dominated by the ridge- or mound-like structures formed by the colonization and growth of oysters that are attached (cemented) to a substrate of live and dead conspecifics. Oyster reefs provide excellent structural habitat as well as effective water filtration.

Macrogroup Name: **Intertidal Mudflat**

Macrogroup Description:

From the NTHCS: "Intertidal mudflats are usually located in quiet pockets of bays and protected by headlands. Sand-sized particles are mixed with silt and clay. These flats can be highly productive of clams and other invertebrates, and are important habitats for many shorebird species, including the semipalmated sandpiper, semipalmated plover, short-billed dowitcher, black-bellied plover, and least sandpiper. In the summer, green macroalgae such as sea lettuce and hollow green weed can cover these mudflats. Other characteristic species include ditchgrass and eelgrass." The Macrogroup is the same as the NTHCS Intertidal Mudflat Habitat System. Also adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Fine Unconsolidated shore, Substrate-Mud. This includes particle sizessilt, silt-clay, and clay. The group is expanded upon from the NTHCS system. The Freshwater Tidal Marsh system is the same habitat as the NTHCS "Acadian Estuary Marsh", but moved to the Mud Macrogroup and used the MNAP name and description of "Freshwater Tidal Marsh" consistent with MNAP, and to be more intuitive.

Habitat System Name: **Freshwater Tidal Marsh**

Habitat System Description:

From MNAP Habitat Descriptions: "Dominated by emergent herbaceous plants growing on mud substrates versus growing on their own accumulated peat as do the marshes under the "Tidal Marsh" Macrogroup. Plants in this Habitat System are typically a mixture of wild rice, softstem bulrush, and pickerelweed, often covering extensive areas. Mixed in with the tall herbs are lower forbs including several rare species. Some marshes may have mudflats dominated by forbs and low vegetation in patches among the graminoids; many have a very narrow band of low forbs near the high tide/upland interface. Brackish marsh species, such as chair-maker's rush, may be in these marshes as well, but at least some obligate freshwater plants such as pickerelweed, common arrowhead, sweet flag, and northern water-plantain will also be present. Bryophytes are essentially absent."

These marshes are found along brackish estuaries of the Gulf of Maine, and include both emergent and submergent vegetation. Dominance ranges from extensive bulrush beds and tall grasses and sedges to sparsely vegetated mudflats, all tidally influenced. These marshes grade into the salt marsh system at the mouth of estuaries.

Habitat System Name: **Non-Vascular Mudflat**

Habitat System Description:

Mudflats primarily devoid of macrophytes, but may support seasonal coverage of macroalgae. Mudflats support diverse infaunal assemblages that include marine worms, bivalves like softshell clams (Mya arenaria) and quahog (Mercenaria mercenaria), and transient use by decapod crustaceans like crabs and shrimp, horseshoe crabs (Limulus polyphemus), demersal fishes, and waterbirds, including herons, black duck (Anas rubripes), and shorebirds like the Semipalmated Sandpiper (Calidris pusilla).

Habitat System Name: **Submerged Aquatic Vegetation**

Habitat System Description:

These areas, dominated by eelgrass (Zostera marina) or in more fresh environments, wild celery (Vallisneria americana), are more common in the subtidal than the intertidal, but are considered worthy of their own intertidal Habitat System. Among other functions, these plants support transient use by crustaceans, fishes and waterfowl.

Macrogroup Name: **Intertidal Sandy Shore**

Macrogroup Description:

From the NTHCS: "These intertidal sand flats occurs primarily in embayed areas of the mid-Atlantic and north Atlantic coasts, where rocky or sandy barriers help create protected sounds and lagoons. The invertebrate diversity in these sheltered habitats is higher than that of more exposed sandy beaches. Intertidal sand flats are frequently used by shorebirds, such as sanderlings, semipalmated sandpipers, black-bellied plovers, red knots, and semipalmated plovers." Corresponds to the NTHCS Tidal Sand Flat Description, but also includes natural breakouts for habitat systems. Also adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Fine Unconsolidated shore, Substrate-Sand. This includes particle sizes from very fine sand to course sand.

Habitat System Name: **Sand Beach**

Habitat System Description:

Primarily unvegetated and located in more exposed environments than Sand Flats. This lower extent of this habitat can support marine worms, softshell clams and transient use by crustaceans, fishes and waterbirds including Sanderling. Piping Plover (Charadrius melodus) and Least Tern (Sternula antillarum) can nest in the irregularly flooded portion of the high intertidal sand beach.

Habitat System Name: **Sand Flat**

Habitat System Description:

Primarily unvegetated flats in protected environments that can support marine worms, softshell clams and quahog (Mercenaria mercenaria) and transient use by decapod crustaceans like crabs and shrimp, horseshoe crabs, demersal fishes and shorebirds including the semipalmated sandpiper and sanderling (Calidris alba).

Habitat System Name: **Submerged Aquatic Vegetation**

Habitat System Description:

Supports a predominance of eelgrass (Zostera), or in more fresh tidal environments wild celery (Vallisneria) are more common in the subtidal than the intertidal, but are considered worthy of their own intertidal Habitat System. Among other functions, these plants support transient use by crustaceans, fishes and waterfowl.

Macrogroup Name: **Intertidal Tidal Marsh (peat-forming)**

Macrogroup Description:

Species supported by tidal marshes include crustaceans, fishes that migrate between the marsh surface and tidal creeks (e.g. Fundulus spp., sticklebacks [Gasterosteidae]) an extremely wide range of waterbirds (e.g. rails, herons, waterfowl, raptors, shorebirds, songbirds), and mammals. Exact same as NTHCS, just moved formation group to be under Intertidal, and changed name from "Salt marsh" to "Tidal Marsh". Moved "Acadian Estuary Marsh" to Mud Macrogroup and used the MNAP name and description of "Freshwater Tidal Marsh" consistent with MNAP, and to be more intuitive.

Habitat System Name: **Acadian Coastal Salt Marsh**

Habitat System Description:

This system covers saltwater marshes of the Gulf of Maine along the immediate ocean shore and near estuary mouths. Sometimes called "salt meadows," these marshes display strong graminoid dominance, with patchy forbs. Salt hay and smooth cordgrass are the major dominants. These marshes may be extensive where the local topography allows; however, they are generally not associated with sand beach and dune systems, being more characteristic of the primarily rocky portions of the Gulf of Maine coast. Where the coastal topography becomes more dissected, they are commonly seen as a fairly narrow fringe along tidal shorelines. For the purposes of this classification, these include the uncommon salt ponds sometimes found behind barrier beaches, which are treated elsewhere as a separate system (Northern Atlantic Coastal Plain Salt Pond Marsh).

Habitat System Name: **Coastal Plain Tidal Marsh**

Habitat System Description:

This system encompasses the intertidal marshes of the North Atlantic Coastal Plain from Chesapeake Bay north to Cape Cod, and sporadically to the southern Maine coast. It includes a number of different broad vegetation types including salt pannes, salt marshes, and salt shrublands. This system occurs on the bay side of barrier beaches and the outer mouth of tidal rivers where salinity is not much diluted by freshwater input. The typical salt marsh profile, from sea to land, features a low regularly flooded marsh strongly dominated by salt marsh cordgrass; a higher irregularly flooded marsh dominated by saltmeadow cordgrass and saltgrass; low hypersaline pannes characterized by saltwort; and a salt scrub ecotone characterized by marsh elder, groundsel-tree, and switchgrass. Salt marsh "islands" of slightly higher elevation also support red-cedar. For the purposes of this classification, these include the uncommon salt ponds sometimes found behind barrier beaches, which are treated elsewhere as a separate system (Northern Atlantic Coastal Plain Salt Pond Marsh).

Macrogroup Name: Intertidal Water Column

Macrogroup Description:

The Water Column above intertidal areas. This macrogroup is distinct from the subtidal group because it describes the volume of water that varies in depth relative to shore with the tidal cycle. Adopted from CMECS Tidal Zone systems. Confined Channel is similar to CMECS Riverine Tidal Zone; Embayment is similar to Estuarine Tidal Zone, and Exposed Shore is similar to Marine Nearshore Intertidal.

Habitat System Name: Confined Channel

Habitat System Description:

The intertidal portion of the water column within a channel feature; for all drainage sizes supporting riverine environments ranging from major rivers to creeks. These environments are especially important to diadromous fishes requiring access between marine and freshwater environments. This habitat can also provide a food base for piscivorous birds like Bald Eagle (Haliaeetus leucocephalus), Osprey (Pandion haliaetus), terns (Sternidae), mergansers (Mergus spp.), and cormorants (Phalacrocorax spp.).

Habitat System Name: Embayment

Habitat System Description:

The intertidal portion of the water column in lower energy (protected) environments. This habitat supports plankton and fishes and can also provide a food base for piscivorous birds like Bald Eagle (Haliaeetus leucocephalus), Osprey (Pandion haliaetus), terns (Sternidae), mergansers (Mergus spp.), and cormorants (Phalacrocorax spp.).

Habitat System Name: Exposed Shore

Habitat System Description:

The intertidal portion of the water column in higher energy (exposed) environments. This habitat can also provide a food base for piscivorous birds like Bald Eagle (Haliaeetus leucocephalus), Osprey (Pandion haliaetus), terns (Sternidae), mergansers (Mergus spp.), and cormorants (Phalacrocorax spp.).

Formation Name: Subtidal

Macrogroup Name: Subtidal Bedrock Bottom

Macrogroup Description:

The Subtidal Bedrock may be igneous, metamorphic, or sedimentary rock with particle sizes greater than or equal to 4.0 meters in any dimension that cover 50% or greater of the Geologic Substrate surface, submerged during the entire tidal cycle. Adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Bedrock

Habitat System Name: Bedrock

Habitat System Description:

This Habitat System features bedrock lacking kelp, but may support turf-forming macroalgae, calcareous algae, or other forms. Blue mussels, green sea urchins (Strongylocentrotus droebachiensis), and decapod crustaceans like crabs and lobster can occur.

Habitat System Name: Erect Epifauna

Habitat System Description:

These are areas supporting often slow-growing, fragile animals like anemones, soft corals, cold water corals, sponges, tunicates, and crinoids that provide complex habitat structure for other species.

Habitat System Name: Kelp Bed

Habitat System Description:

Blue mussels, green sea urchins (Strongylocentrotus droebachiensis), and decapod crustaceans like crabs and lobster can occur. Fishes are attracted to the structure provided by kelp and the prey it supports.

Macrogroup Name: Subtidal Coarse Gravel Bottom

Macrogroup Description:

This Subtidal Macrogroup includes sediment textures/ size classes ranging from pebbles to boulders and their associated biological communities, submerged during the entire tidal cycle. Adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Unconsolidated shore, Substrate-Gravel. This includes particle size gravel, granule, pebble, cobble, and boulder.

Habitat System Name: Coarse Gravel

Habitat System Description:

This Habitat System features bedrock lacking kelp, but may support turf-forming macroalgae, calcareous algae, or other forms. Blue mussels, green sea urchins (Strongylocentrotus droebachiensis), and decapod crustaceans like crabs and lobster can occur.

Habitat System Name: Erect Epifauna

Habitat System Description:

These are areas supporting often slow-growing, fragile animals like anemones, soft corals, cold water corals, sponges, tunicates, and crinoids that provide complex habitat structure for other species.

Habitat System Name: Kelp Bed

Habitat System Description:

Blue mussels, green sea urchins (Strongylocentrotus droebachiensis), and decapod crustaceans like crabs and lobster can occur. Fishes are attracted to the structure provided by kelp and the prey it supports.

Macrogroup Name: **Subtidal Mollusc Reefs**

Macrogroup Description:

A reef is typically a cohesive mass comprised of hard biogenic structures like calcarius shell forming animals. Adopted from the USFWS ACFHPand CMECS habitat descriptions, but definitions concentrated only on cohesive masses of bivalves.

Habitat System Name: **Gastropod Reef**

Habitat System Description:

FROM CMECS: Areas dominated by consolidated aggregations of living and dead gastropod mollusks, typically those of the Family Vermetidae or the Genus Crepidula. Shells in a “reef” must have consolidated or conglomerated into a reef structure with some relief and permanence; a reef is more that an accumulation of loose shells. Vermetids construct tubes that are cemented to hard substrates and to conspecifics, generally in intertidal habitats. Crepidula forms reefs through preferential settling of larvae on conspecifics (Zhao and Qian 2002) combined with very limited mobility, and sediment infilling. Crepidula reefs are generally flat features with little vertical relief.

Habitat System Name: **Mussel Reef**

Habitat System Description:

Dense aggregations of blue mussels and/or their shells that are fringing or form masses rising above the surrounding seabed. Among other functions, these can provide food for waterfowl like American Eider (Somateria mollissima). From CMECS: Areas dominated by the ridge- or mound-like structures formed by the colonization and growth of mussels that are attached to a substrate of live and dead conspecifics. Mussels use byssal threads and a powerful glue to tether their shells to a substrate, and their reefs also provide valuable habitat and filtration.

Habitat System Name: **Oyster Reef**

Habitat System Description:

Dense aggregations of oysters and/or their shells that are fringing or form masses rising above the surrounding seabed. From CMECS: Areas dominated by the ridge- or mound-like structures formed by the colonization and growth of oysters that are attached (cemented) to a substrate of live and dead conspecifics. Oyster reefs provide excellent structural habitat as well as effective water filtration.

Macrogroup Name: **Subtidal Mud Bottom**

Macrogroup Description:

The Mud Bottom Macrogroup is composed of 90% or more Mud (particles less than 0.0625 millimeters in diameter); the remainder (< 10%) is composed of Sand. The bottom is submerged during the entire tidal cycle. Adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Fine Unconsolidated shore, Substrate-Mud. This includes particle sizessilt, silt-clay, and clay.

Habitat System Name: **Submerged Aquatic Vegetation**

Habitat System Description:

In shallow water generally less than 10 m, eelgrass and Vallisneria beds can support dense concentrations of diverse invertebrates and fishes, in addition to providing food for waterfowl.

Habitat System Name: **Unvegetated**

Habitat System Description:

Mud seabed primarily devoid of macroalgae or vascular plants. This habitat supports a diverse assemblage of benthic invertebrates including marine worms, cerianthid anemones, decapod crustaceans like crabs and American lobster, horseshoe crabs, quahog (Mercenaria mercenaria), and also demersal fish species.

Macrogroup Name: Subtidal Pelagic (Water Column)

Macrogroup Description:

Adopted from CMECS: The Subtidal pelagic environment includes waters from the coastline to the central oceans. Salinity may range from 0-35ppt. This system has dilution from fresh water near the mouths of estuaries and rivers. Spalding et al. (2007) in Marine Ecosystems of the World (MEOW), adopted by CMECS

Habitat System Name: Confined Channel

Habitat System Name: Nearshore

Habitat System Description:

From CMECS: "The Marine Nearshore Subsystem extends from the landward limit of the Marine System to the 30 meter depth contour. The 30 meter depth contour was selected as a useful cutoff between shallower nearshore and deeper offshore waters. It is intended to represent an ecologically significant depth to which water column and benthic processes are strongly coupled in the Nearshore Subsystem. Surface currents and waves impinge the bottom at the storm wave base and vertical circulation generally distributes nutrients and sediments throughout the water column. The photic zone extends through the entire water column except in extreme cases. The presence of nutrients and light support the growth of vegetation on the bottom including seagrass and macroalgal beds and 30 meters generally represents the depth to which most living coral is found."

Habitat System Name: Offshore

Habitat System Description:

From CMECS: "The Marine Offshore Subsystem extends from the 30 meter depth contour to the continental shelf break, as defined by the maximum slope discontinuity with a rapid change in gradient of 3° or greater at the outer edge of the continental shelf. This shelf break boundary generally occurs between 100 - 200 meters depth. In the case of steep-sided, oceanic islands, where a continental shelf is not present, the offshore boundary of the Offshore Subsystem is defined at a bottom slope discontinuity occurring between 100-200 meters, or at 200 meters if no such discontinuity exists. The waters and benthos of the Offshore Subsystem are less coupled to each other and typically less influenced by terrigenous processes than in the Nearshore Subsystem. Distance from shore can vary greatly, depending on shelf morphology, and waters at the 30 meter isobath can be quite distant from the shore or may lie relatively close to land. The Offshore Subsystem may be strongly influenced by open-ocean biogeochemistry and physical processes. Often distinct water layers at the surface and bottom may be present. Because Offshore Subsystem waters are less influenced by coastal inputs, they generally are less turbid than those of the Nearshore Subsystem. Light penetration in the Offshore Subsystem can extend to significant depths and often reach the ocean bottom."

Habitat System Name: Upwelling Zones

Habitat System Description:

Adopted from CMECS: Upwelling can occur in the open ocean and along coastlines. Water that rises to the surface as a result of upwelling is typically colder and is rich in nutrients and are often associated with high biological productivity. Upwelling can be found along boundary currents, occur as a result of buoyancy flow, deep boundary currents, Ekman flow, and front hydroforms, where linear features are formed at the conjunction of two or more water masses with different properties (e.g. coastal, shelf-breaks, and tidal fronts).

Macrogroup Name: Subtidal Sand Bottom

Macrogroup Description:

Adopted from CMECS Substrate Components. This category is equivalent to CMECS Subtrate Class-Fine Unconsolidated shore, Substrate-Sand. This includes particle sizes from very fine sand to course sand.

Habitat System Name: Submerged Aquatic Vegetation

Habitat System Description:

In shallow water generally less than 10 m, eelgrass and Vallisneria beds in very fine muddy sand can support dense concentrations of diverse invertebrates and fishes, in addition to providing food for waterfowl.

Habitat System Name: Unvegetated

Habitat System Description:

Seabed dominated by sand, which can support scallops, surf clam (Spisula solidissima), quahog, mahogany clam (Arctica islandica), crustaceans, flounders, and sand lance (Ammodytes americanus).