Massachusetts CAPS Community Descriptions – February 2021

Source: https://umasscaps.org

This document lists the developed land and natural communities mapped and used in this version of CAPS. An index of ecological integrity is estimated for each of the natural communities (except bare land and ocean). Remember that IEI is scaled by comparing each cell in a community to other cells in the same community, thus IEI must be interpreted in terms of communities. Descriptions of classes from NOAA's C-CAP are paraphrased from their land cover classification scheme (https://coast.noaa.gov/data/digitalcoast/pdf/ccap-class-scheme-highres.pdf). See Appendix I for the grid codes used for each of these classes in CAPSland.

Developed land

Buildings (MassGIS roofprints, MassGIS 2016 land use) – we combined roofprints with land use to map five classes of buildings: commercial, industrial, agricultural, residential, recreational, and public buildings.

Pavement (Impervious in C-CAP) – typically parking lots or other extensive paved areas. We map buildings and roads separately.

Developed open space (C-CAP) – areas with a mixture of some constructed material, but mostly managed grasses or low-lying vegetation, maintained by human activity. Constructed surfaces account for 20% or less. Developed open space usually represents managed semi-natural space such as lawns, parks, and cemeteries.

Roads (MassDOT) – we map five classes of roads: expressway, primary highway, secondary highway, light-duty road, and unpaved road.

Railroads (MassGIS) – active railroads, abandoned railbeds, and rail trails, mapped separately.

Bridge or culvert – road-stream crossings from North Atlantic Aquatic Connectivity Collaborative (NAACC) represent bridges or culverts.

Dam – dams from Northeast Aquatic Connectivity Assessment Project (NACAP) version 2 were (carefully) moved a short distance to our stream centerlines.

Natural communities

Forest (Deciduous, Mixed, or Evergreen forest in C-CAP) – areas dominated by trees generally greater than 5 m tall and greater than 20% vegetative cover, with any combination of deciduous and coniferous species.

Shrubland (Scrub/shrub in C-CAP) – areas dominated by shrubs less than 5 m tall, with canopy typically greater than 20% of total vegetation, including shrubs, early successional trees, and trees stunted by environmental conditions.

Cropland (Cultivated crops in C-CAP) – areas intensely managed for the production of annual crops, which account for greater than 20% of total vegetation, as well as actively tilled land.

Pasture (Pasture/hay in C-CAP) – areas of grasses, legumes, or a mixture planted for grazing or the production of hay or seed crops, typically perennial and not tilled. Such vegetation accounts for greater than 20% of total vegetation.

Grassland (Grassland/herbaceous in C-CAP) – areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation, not subject to intensive management but can be utilized for grazing. Areas mapped as grasslands are usually some form of developed open space. As natural grasslands are rare in mainland Massachusetts, we remapped grasslands to developed open space except on the Cape and Islands.

Bare land (Barren land in C-CAP) – areas of bedrock, scarps, talus, slides, glacial debris, gravel pits, with vegetation generally covering less than 10%. Typically includes anthropogenic edges and beaches. We remapped barren land that falls on or adjacent to coastal beach, sea cliff, or ocean in 2005 DEP wetlands as beach or mudflat. **We do not treat bare land as a natural community, as it is most often of anthropogenic origin in Massachusetts.**

Forested wetland (Palustrine forested wetland in C-CAP) – freshwater-tidal and nontidal wetlands dominated by woody vegetation greater than 5 m tall, with vegetation coverage greater than 20%.

Shrub swamp (Palustrine scrub/shrub wetland in C-CAP) – freshwater tidal and nontidal wetlands dominated by woody vegetation less than 5 m tall, with vegetation coverage greater than 20%, including shrubs, early successional trees, and trees stunted by environmental conditions.

Marsh (Palustrine emergent wetland [persistent] in C-CAP) – freshwater tidal and nontidal wetlands dominated by persistent emergent vascular plants or mosses, with vegetation coverage greater than 80%. Plants generally remain standing until the next growing season.

Vernal pool – Small seasonal pools from the Natural Heritage and Endangered Species Programs Potential Vernal Pools layer. We used this layer to capture small wetlands that were not mapped by 2005 DEP wetlands. We placed a one cell (30 $\times$ 30 m) vernal pool on any upland where a potential vernal pool fell, after moving potential vernal pool points out from under road cells for roadside vernal pools. Thus, our vernal pool community primarily represents small upland vernal pools. This data layer has many errors of omission (especially pools under conifer cover) and errors of commission (small permanent ponds and sometimes shadows in aerial photos), but it's the only comprehensive source for this important ecological community.

Pond – Ponds are nonflowing unvegetated waterbodies < 8 ha.

Lake – Lakes are nonflowing unvegetated waterbodies > 8 ha.

Streams, by order and gradient – Streams are mapped by approximate order (first through fifth and higher) and gradient (low vs. high). Streams are derived from open water in 2016 MassGIS land cover, which we split between lentic and lotic. Approximate orders are defined by selecting cutpoints of watershed area based on a series of logistic regressions to

Strahler stream order from centerline data. All streams with watershed areas larger than the 5th order cutpoint were lumped. Gradient was split between low (flatwater, pool-riffle, plane-bed) and high (step-pool and cascade) at 3% gradient.

Salt marsh (Estuarine emergent wetland in C-CAP) – tidal wetlands dominated by erect, rooted, herbaceous hydrophytes (excluding mosses and lichens) in tidal areas with salinity of at least 0.5%. Total vegetation coverage is at least 80%, dominated by perennial plants.

Beach or mudflat (Unconsolidated shore in C-CAP) – silt, sand, or gravel subject to inundation and redistribution due to action of water.

Coastal dune (coastal dune, barrier beach-coastal dune, or barrier beach system in 2005 DEP wetlands and bare land or developed open space in C-CAP) – coastal dunes are generally sandy or lightly vegetated, identified as dunes in aerial photographs by DEP wetlands. Vegetated areas in dunes are mapped as grasslands.

Estuarine forested wetland (Estuarine forested wetland in C-CAP) – tidal wetlands with salinity of at least 0.5% dominated by woody vegetation greater than 5 m tall, with vegetation coverage greater than 20%.

Estuarine shrub swamp (Estuarine scrub/shrub wetland in C-CAP) – tidal wetlands with salinity of at least 0.5% dominated by woody vegetation less than 5 m tall, with vegetation coverage greater than 20%, including shrubs, early successional trees, and trees stunted by environmental conditions.

Salt pond/bay – Lentic waterbodies that coincide with "brackish" in the salinity settings variable.

Estuaries, by order – Estuaries are mapped by order (but not gradient) using the same process we used for streams. Estuaries are derived from lotic open water that corresponds to "brackish" in the salinity settings variable.

Ocean – 2005 DEP wetlands "open water ocean" (poly_code = 10), adjusted to include adjacent open water in MassGIS 2016 land use. Note that although ocean is a natural community, **CAPS does not run metrics or build an IEI for ocean.**