Designing Sustainable Landscapes:
Water salinity settings variable

A project of the University of Massachusetts Landscape Ecology Lab

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With support from:

- North Atlantic Landscape Conservation Cooperative (US Fish and Wildlife Service, Northeast Region)
- Northeast Climate Science Center (USGS)
- University of Massachusetts, Amherst

Reference:

McGarigal K, Compton BW, Plunkett EB, DeLuca WV, and Grand J. 2017. Designing sustainable landscapes: water salinity settings variable. Report to the North Atlantic Conservation Cooperative, US Fish and Wildlife Service, Northeast Region.

General description

Water salinity is one of several ecological settings variables that collectively characterize the biophysical setting of each 30 m cell at a given point in time (McGarigal et al 2017). Salinity (**Fig. 1**), which varies from 0‰ in freshwater to 30‰ in seawater, is a major driver of aquatic systems, as very few organisms can survive across this full range.

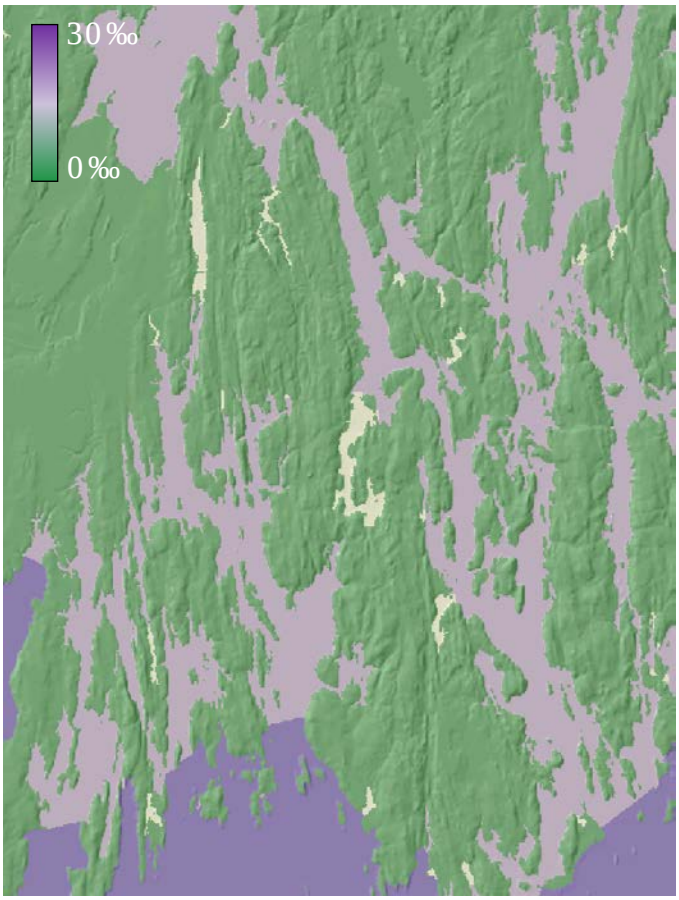

Figure 1. Salinity in the Kennebec estuary, Maine.

Use and interpretation of this layer

This ecological settings variable is used for the similarity and connectedness ecological integrity metrics.

This layer carries the following assumptions:

- Salinity classes from NWI accurately portray salinity. This is true only in a coarse sense, as salinity is a continuous phenomenon, and it varies over time with tides and freshwater inputs in estuarine systems.

Derivation of this layer

Data source

- DSLland.—Our integrated landcover layer (see DSLland document, McGarigal et al 2017, for details).
- National Wetland Inventory (NWI).—This dataset is the source for estuarine and marine systems in DSLland. Here, we use an additional attribute to identify oligohaline classes.

Algorithm

This layer was assigned weights by landcover class according to **Table 1**. Upper estuarine areas come directly from NWI.

Table 1. Terrestrial barrier weights by road and railroad class.

Landcover	Weight
Marine intertidal and subtidal	1 (30‰)
Estuarine intertidal and subtidal	0.7 (21‰)
Upper Estuarine (NWI oligohaline polygons)	0.5 (15‰)
Terrestrial and freshwater	0

GIS metadata

This data product is distributed as a geoTIFF raster (30 m cells). The cell values range from 0 (freshwater) to 1 (saltwater, 30‰). This data product can be found at McGarigal et al (2017).

Literature Cited

McGarigal K, Compton BW, Plunkett EB, DeLuca WV, and Grand J. 2017. Designing sustainable landscapes products, including technical documentation and data products. https://scholarworks.umass.edu/designing_sustainable_landscapes/