Subaqueous soils occur from the lower limit of the intertidal zone to a depth of <2.5 m in protected estuarine coves, bays, inlets, and lagoons. These soils support a diverse floral and faunal assemblage and are a vital component of the estuarine ecosystem. Only recently have pedologists considered these substrates soil, thus, very few subaqueous soils have been characterized and relationships between subaqueous soils and associated subtidal landforms are unknown. In this study, we investigated shallow-subtidal settings and associated subaqueous soils within a 116-ha area of a Rhode Island estuary. Our objectives were to gain an understanding of soil distribution within a coastal lagoon and to elucidate subaqueous soil-landscape relationships within differing geomorphic settings. Twelve submerged landscape units were delineated based on water depth, slope, landscape shape, and the depositional environment. Soils were sampled, described, and representative samples from each landscape unit were analyzed for pH, electrical conductivity, CaCO$_3$, particle-size distribution, and organic matter. The Lagoon Bottom landscape unit was mostly comprised of Typic Hydraquents (70%). These soils had the finest particle-size distribution of all soils sampled (silt contents ranged from 23 to 64%; clay contents ranged from 16 to 30%). All the subaqueous soils found within the Storm-surge Washover Fan Flat were classified as Typic Sulfaquents. Greater than 75% of the Barrier Submerged Beach, Mainland Submerged Beach, Shoal, and the Mid-lagoon Channel landscape units contained Typic Endoaquents. Thapto-histic Hydraquents were found in 60% of the Mainland Cove landscape units. These relationships suggest that landscape units can be used to model subaqueous soil distribution at the subgroup taxonomic level. Understanding of the distribution of these soils and the associated characteristics should prove valuable to coastal specialists managing these critical resources.
Soil hydromorphology deals with soil morphological features (especially redoximorphic features) caused by water saturation and their relation to hydrologic conditions. Redox features (formerly called mottles and low chroma colors) are formed by the processes of alternating reduction–oxidation due to saturation–desaturation and the subsequent translocation or precipitation of Fe and Mn compounds in soils (Hurt et al., 1998). In the UK, in the absence of direct measurement, soils can be assigned to one of six soil wetness classes that describe the height and duration of water logging based on soil profile features including the depth to a slowly permeable layer and depth to gleying (Lilly and Matthews, 1994; Lilly et al., 2003).