Mapping the “New Frontier” of Soil Survey: Rhode Island’s MapCoast Partnership

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In the Summer 1993 edition of Soil Survey Horizons, the late Dr. George Demas articulated his initial thoughts and ideas on “Submerged Soils: A New Frontier in Soil Survey.” George was a soil survey party leader in eastern Maryland and posed the question: “Why do we stop mapping soils at the water’s edge?” He postulated that just as terrestrial soil survey data provide interpretations used in planning and environmental conservation, soil data for shallow water areas may be equally useful for coastal planners. Under the direction of Dr. Martin Rabenhorst at the University of Maryland, Demas began studying and mapping the substrates of permanently submerged areas of a Maryland estuary. The results of his dissertation research (Demas, 1998) suggested that permanently submerged estuarine substrates undergo pedogenic processes and can best be studied and mapped as subaqueous soils. As a result of Demas’ studies, the definition of soil was modified to include these subaqueous soils, opening up the possibility for shallow water soil mapping and data collection by the National Cooperative Soil Survey.

Subaqueous Soils in Rhode Island

Pedologists in Rhode Island recognized the value of a coastal subaqueous soil survey in the “Ocean State” as a result of expanding pressures on coastal resources, including interest in submerged aquatic vegetation restoration and shellfish farming and restocking. To investigate the feasibility of mapping soils underwater, a graduate thesis study was initiated by the University of Rhode Island’s Department of Natural Resources Science (Bradley, 2001). The study investigated the subaqueous soil-landscape relationship in a 116-ha area of a micro-tidal coastal lagoon in southern Rhode Island. The study concluded that, in this lagoon, subaqueous soils followed a landscape model and could be mapped in a similar manner to terrestrial soils (Bradley and Stolt, 2003).

In response to a growing interest in subaqueous soils, the first National Workshop on Subaqueous Soils (2003) was held in Delaware, where interested participants were provided with an overview of subaqueous soils, coastal processes, and mapping techniques. During this time, the Northeast region of the National Cooperative Soil Survey (NCSS) began holding subcommittee meetings focused on subaqueous soils. Inspired by questions developed during these meetings, Dr. Mark Stolt from the University of Rhode Island focused his 2004 sabbatical leave efforts on cataloging the types of subaqueous soils and the methods used to map those soils in a range of estuaries between Maine and Texas. As a part of these efforts, and in cooperation with the NCSS, Stolt developed a glossary of soil landscape terms specifically for subaqueous landforms, which were added to the National Soil Survey Handbook (USDA-NRCS, 2007).

In 2004, the Rhode Island USDA-NRCS adopted a “Working Waters” approach and began in earnest to focus Farm Bill programs to restore estuarine, marine, and near-shore coastal habitats. As a part of this coastal restoration effort, federal funding was received by NRCS to conduct eelgrass restoration in Narragansett Bay. However, when the staff of Rhode Island NRCS began working on a site selection model in the coastal zone, a gap in the existing soil survey mapping was identified and deemed to be a crucial missing data set for successful planning of restoration efforts. The lack of information about the soil in the coastal zone led to the development of a