WHY IS UNDERWATER MAPPING IMPORTANT?

Imagine you are selecting a location for your garden. You might want to look at the soil before you start digging. Is it rich, dark earth that would promote good rooting and productive crops? Or is it hard-crusted gravel, left over from construction that would challenge even the best gardener?

This type of assessment is now underway by the scientists involved in the MapCoast program. They are using state-of-the-art science to examine the productivity of the submerged soils that lie beneath Narragansett Bay and the salt ponds along the southern shore of the state. The same soils that support verdant gardens and flower beds also provide a rich foundation for underwater plants that are the essential habitat for fish and shellfish. Imagine that fertile garden running directly into the waters of the Bay from the rose bushes next to the house past the tomato plants in the backyard into the water out to depths of almost 10 feet. These areas of submerged aquatic vegetation (called SAV by scientists) are the basis of our marine fisheries. By examining the underwater soils in our coastal ponds and estuaries, scientists can gauge the health of these ecosystems.

Ninigret Pond Soils and 2-Foot Elevation Contours
Charlestown, Rhode Island

The need to increase scientific understanding of submerged (or "subaqueous") soils is of vital in the management of coastal activities such as dredging, fishing, habitat conservation and eelgrass restoration depend on accurate information on submerged soils. Mapping of the soils permits identification of areas that SAV can be planted to increase the habitat for fish and shellfish.

The MapCoast project is developing new methods that can unlock the hidden qualities of our estuarine habitats. It is using cutting-edge techniques to describe and understand soils and sediment that can serve as indicators that tell us where we have healthy estuarine ecosystems, where we need to focus our restoration efforts, and that can serve as an early warning of estuarine decline. These are signs that we would be foolish to ignore.

By combining the methods used by soil scientists on land for the past century with state-of-the-art marine sensing technologies, we are creating a new set of tools that we can use to map our underwater habitats. These are the baseline data that guide the protection, conservation and management of our near coastal waters. They have an affect on the environmental, economic, and even the social impacts of a unique natural resource that is only now being given its proper due for their long-term implications.

So who benefits from this research? Every Rhode Islander who uses Narragansett Bay or the coastal ponds for boating, fishing or swimming. The end result is healthier estuaries, productive fisheries, abundant shellfish and clean water. Everyone is a winner.

MAPPING THE LAND-WATER DIVIDE

The Rhode Island MapCoast Partnership

Soil scientists have been making maps of soil types on land for more than a century. Likewise, oceanographers have been studying and mapping the marine environment since the early years of ocean navigation. Both fields of science create valuable maps of natural resources; however, it has become evident that there is a large gap in available data in shallow water and intertidal areas outside the bounds of both fields.

This data gap became obvious in Rhode Island when USDA Natural Resources Conservation Service (NRCS) adopted a "Working Waters" approach and began to focus Farm Bill programs to restore estuarine, marine, and nearshore coastal habitats. When staff began working on a site selection model for restoring eelgrass beds in the coastal zone, there was no available data on soil and sediment type.

Recognizing that this data gap affected multiple coastal planning efforts in the state, the Rhode Island NRCS office organized a meeting with soil scientists, geologists, benthic ecologists, and oceanographers in the state to discuss goals and solutions in mapping and understanding shallow coastal areas. From this group, the Mapping Partnership for Coastal Soils and Sediment (MapCoast) was formed.

The MapCoast Partnership is a consortium dedicated to multidisciplinary mapping of coastal subaqueous resources, including bathymetry, habitat, geology, soils/ sediment, and archeology. MapCoast currently consists of 16 partners including the USDA Natural Resources Conservation Service, the University of Rhode Island, the Coastal Resources Management Council, the Narragansett Bay Estuary Program, RI Sea Grant, RI Department of Environmental Management, and the Environmental Protection Agency.

In addition to seamless bathymetric/ topographic maps, acoustic data, and benthic geologic habitat maps, a variety of imagery products (soil profiling images (SPI), video, and bottom photography), MapCoast and NRCS soil scientists have begun to map subaqueous soils just as terrestrial soils are mapped. Using this national mapping standard enables mapping to be consistent nationwide.

Although naming conventions from the National Cooperative Soil Survey standard can be used for these subaqueous soil maps, in the marine environment it is also necessary to integrate naming conventions with other scientists that work in these areas. The Coastal and Marine Ecological Classification Standard (CMECS) has been in development by NOAA for about 10 years as a standard for mapping and naming marine habitats. MapCoast was invited to work with NOAA in the development of CMECS, resulting in the evolution of a soils component in this coastal classification standard.

Although documenting what types of soils and sediments are in these subaqueous areas is important, the major use of a soil survey is the interpretations that can be made based on a map. Interpretations are currently in development including sulfidic soil dredge disposal concerns, shellfish habitat suitability, carbon storage capability, and eelgrass transplant suitability.

For more information on MapCoast projects, go to:
http://www.mapcoast.org