

## **CURRENT AND FUTURE ENVIRONMENTAL SENSING APPLICATIONS FOR COASTAL ZONE MANAGEMENT**

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Coastal zone management, environmental protection, natural resource preservation and other related programs are currently faced with complex policy, management, and regulatory issues in coastal and ocean systems. In Massachusetts, these include: ocean management and/or marine spatial planning; coastal shoreline and floodplain management; tidal habitat restoration; and water quality protection and improvement. Reliable, relevant, and current information is necessary to inform these decisions, and environmental sensing technologies are providing new opportunities to fill this need as part of regional Integrated Coastal and Ocean Observing Systems or as stand-alone applications.

For ocean management and planning, remote sensing technologies are being employed to support important ocean resource characterization including towed sonar and seismic sensors for seafloor mapping and habitat classification, satellite radiation-detection for sea surface temperature and chlorophyll, pressure and optical sensors for real-time water column and atmospheric monitoring, and high-frequency radar for sea-surface current measurements.

Light detection and ranging (LIDAR) optical and spectral sensor technologies are also being employed in coastal shoreline and floodplain management and tidal habitat restoration applications. Using LIDAR data and analytical procedures, maps are developed to delineate the landward extent of the flood velocity zone. Elevation data, aerial imagery, and spectral signatures are being employed in estuarine marsh mapping and modeling to generate digital terrain models with linked hydrological data and delineation of salt marsh plant communities.

New and future applications of environmental sensors in coastal zone management include sensors for harmful algal blooms and coliform bacteria as well as autonomous vehicle deployment of various technologies.

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