

Patuxent Wildlife Research Center

Shoreline Changes and Impacts to Natural Resources in Chesapeake Bay



The Challenge: Climate change and sea level rise are expected to affect many miles of shoreline in the Chesapeake Bay and elsewhere along the Atlantic Coast in the coming years. In this scenario, federal and state agencies need to make more detailed assessments of how different watersheds and shoreline types might influence an array of ecosystem functions and components. Recently, most states are promoting “living shorelines” (soft engineering with marsh vegetation) rather than hardening methods (riprap or bulkheads). Not all methods can effectively be applied in all locations; therefore both field and modeling approaches are needed to determine how different shoreline types and watershed conditions influence water quality, submerged vegetation (SAV), and macrofauna, including top-level trophic waterbirds.



The Science: The USGS, along with the Smithsonian Institution and a number of universities and other organizations, is conducting studies at a number of subestuaries along the entire Chesapeake Bay salinity gradient, and on the ocean coast (DE to VA), over a five-year period to assess watershed condition and shoreline types, ranging from bulkhead and riprap to natural marsh. Data being collected include water quality, SAV abundance, fish, macroinvertebrate, and waterbird population abundance and densities. In addition, an experimental approach is being used to control Phragmites. As many as 35 subestuaries are potentially to be included in the study as part of an overall plan to compare the results among the following watershed conditions: developed-urbanized, mostly agricultural, or relatively forested.



The Future: After several years, patterns should emerge that will allow the investigators to compare the relative resource value of the different shoreline types to each component. In addition, at a larger scale, the scientists should be able to correlate the diversity and/or abundances of each component to overall shoreline conditions and the watershed condition. Modeling in the future should allow the scientists to assist coastal managers in prescribing shoreline management schemes that will have the best impact on the natural resources of the Bay and ocean coasts.