

THE ROLE OF WATERSHED CHARACTERISTICS IN ESTUARINE CONDITION: AN EMPIRICAL APPROACH

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Estuarine condition is a function of the nature of the estuary, ocean, and atmospheric systems, and the upstream watershed. To fully understand and predict how an estuary will respond to drivers and pressures, each compartment must be characterized. For example, eutrophication effects on estuarine condition are generally well known; less understood is how the attributes of estuarine watersheds, and their spatial distributions, relate to estuarine condition. The Gulf of Maine Council's Ecosystem Indicator Partnership (ESIP) and the Environmental Protection Agency's (EPA) Office of Research and Development have joined for a project designed to link watersheds to estuarine conditions. Specifically, the goal of this research is to develop methods and indicators for mapping watershed integrity and aquatic condition in order to predict estuarine condition. The analysis uses a common set of watershed spatial indicators and estuarine state/impact indicators. The study builds on past work in southern New England using relationships between land use characteristics and aquatic habitat extent metrics (e.g., eelgrass) and on ESIP's work in northern New England, which has assembled a large database of watershed, contaminants, climate change, aquaculture, and eutrophication variables. The aquatic condition data are comprised of regional data sets, including EPA's National Coastal Assessment. Watersheds are being characterized using multiple indicators such as land use magnitude and proximity, percent impervious cover, landscape development indexes, and measures of terrestrial and hydrological fragmentation and connectivity. Preliminary results are consistent with the hypothesis that land use magnitude and proximity affect downstream estuarine status and impacts. The research will develop methods, models, and data on estuarine condition and watershed characteristics, which in turn can help justify and prioritize watershed protection across the United States and Canada.

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