Implications of Climate Change for Ecosystem Monitoring and Management

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Abstract

Climate change is likely to persist into the future regardless of actions taken today to control emissions. Since climate change can have profound effects on species attributes (*e.g.*, changes in phenology, range shifts), ecological interactions (*e.g.*, decoupling of plants and pollinators, non-native invasions) and ecosystem processes (*e.g.*, nutrient cycling, carbon uptake), successful management may require enhancing or altering our monitoring, modeling, and management schemes.

In a report authored for the U.S. Climate Change Science Program entitled "Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources", we focus on federally owned and managed lands and waters to provide information on how management of key, representative ecosystems and resources can be adapted to account for their sensitivity to climate variability and change. For this presentation, our focus is on national estuaries and marine protected areas. We examine (1) the combined effects on ecosystems of climate changes and non-climate stressors, and consequent implications for achieving specific management goals; (2) existing management options or new management options that reduce the risk of negative outcomes; and (3) opportunities and barriers that could affect successful implementation of such management strategies.

The ideas and lessons learned from the report provide an approach that may be useful to the larger community of non-federal as well as federal resource managers. Responses may range from relatively simple changes in existing practices that fit within current programs and management policies, to wholly new practices that require a transformation in management and goal-setting from a static approach to one that is dynamic.

Key Words: climate change, adaptation, management, ecosystems, resources

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