RANKING ENVIRONMENTAL STRESSORS IN COASTAL AND MARINE ECOSYSTEMS: DEVELOPING A FRAMEWORK FOR PRIORITIZATION

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Coastal and marine ecosystems in the Northeastern U.S. are experiencing a growing number of environmental stressors, and are undergoing dramatic changes as a result. Many of these anthropogenic stressors interact, and the magnitude of many of the resulting impacts is likely to be exacerbated by climate change. Developing the necessary policies and taking action to address these stressors and to promote resilience within these systems requires a better understanding how these stressors interact, and which are likely to become the dominant drivers of change in the future. Resource managers must consider the likely cascading effects of climate change on existing environmental drivers and require a means of prioritizing which stressors to address with limited resources. Developing a better understanding of these relationships and causal linkages is also important to understanding which management solutions may be most efficient at addressing multiple stressors.

In order to further our understanding of which stressors are having the greatest impact on various ecosystems and resources in the Northeast region, as well as how this level of impact might change under future climate change, Environmental Defense Fund developed an expert survey which was sent to experts in a variety of relevant subject areas around the Northeast U.S. region. Survey respondents were asked to rank the level of impact of a list of stressors on selected habitats and resources now and in 2050 under a given emissions scenario. An analysis of survey results demonstrates that experts perceive those stressors most strongly driven by climate change are likely to have the greatest impact in the future on marine and coastal ecosystems and resources, as well as coastal cities and towns, in many cases supplanting what are seen as the dominant stressors today.

We then presented the compiled survey results to a group of experts assembled for a two-day workshop, and asked for their input to validate or revise the survey results. The workshop participants corroborated the survey results but provided additional nuance and context to the categorization. Experts also created conceptual ecological models of the relationships between stressors and with resources/habitats to allow for better understanding of the interactions between stressors and ecosystem components.

This paper presents the results of the survey and the expert workshop, as well as a discussion of this methodology as a means of arriving at consensus among experts. These complementary methods allowed us to develop a characterization of environmental stressors on coastal and marine ecosystems in the Northeastern U.S., and to rank their relative impact for each of four habitats or topic areas. Additionally, the results of this process have provided the necessary context to begin to develop a framework for managers to better understand how to prioritize which stressors to address when resources are limited.