TRAIT-BASED FRAMEWORK TO PREDICTING RELATIVE VULNERABILITY TO CLIMATE CHANGE IN NEAR-COASTAL SPECIES AND HABITAT

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Like Icarus, near-coastal species are "flying too close" to the sun, and are being impacted by climate-induced changes in air and ocean temperature, precipitation, salinity, ocean pH, sea level rise, and nonindigenous species. Sound management requires knowledge of what species and habitats are at the greatest risk and which climate changes are the major stressors. To address this issue, we are developing a trait-based framework to predict the relative vulnerability of near-coastal species based on generally available information: biogeographic distributions, habitat attributes (e.g., depth ranges), physiological limits, regional abundances, population trends, and niche specialization. The biotic data are synthesized and the vulnerabilities calculated in a web-based system, the Coastal Biogeographic Risk Analysis Tool (CBRAT). Vulnerability is assessed at the "Marine Ecosystems of the World" (MEOW) ecoregion scale, covering the species that occur in the 12 ecoregions spanning the Gulf of California to Beaufort Sea. The framework has been applied to all the rockfish (*Sebastes* spp.) and brachyuran and lithodid crabs that occur at $\leq$200 m (total 462 species). One-hundred sixty (43.5%) brachyuran crabs, 10 (50%) lithodid crabs, and 39 (52.7%) rockfish were assigned high climate vulnerability in one or more MEOW ecoregions. Traits associated with high vulnerabilities differed among taxa. Among crabs, high vulnerabilities most frequently resulted because species are obligate symbionts (59 species), have exclusively intertidal distributions (57 species), or are endemic (48 species). In comparison, high vulnerabilities in rockfish most frequently resulted from the interaction of climate change and population declines due to overfishing (21 species).