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Physical climate change impacts on coastal habitats have implications for the function of coastal ecosystems. These habitats are particularly vulnerable to sea level rise, increased intensity and variability in storm surge, and human management responses (*e.g.* artificially hardening shorelines). The eastern subspecies of the Pacific harbor seal (*Phoca vitulina richardii)* is federally under the Marine Mammal Protection Act of 1972, and is a key conditional indicator of the state of California coastal habitats. Patterns of *Phoca vitulina* terrestrial habitat optimization (i.e. choice of "haul-out" location) are predicated upon environmental covariates established in existing scientific literature. These covariates include proximity to human disturbance, terrestrial predation risk, and proximity to foraging areas. In prior studies these are usually established from statistical interpolation of individual seal tracking and point-observations. Fine-scale quantification of the geophysical parameters underpinning and correlated with key covariates is limited in the literature. Physical changes to habitats are known to alter habitat utility. Under climate change scenarios, the impact of increased severity and variability of storm surge, erosion, and human management responses are expected to compound in coastal habitat areas, with unknown consequences. To address these knowledge gaps, we used fine-scale spatial data to create a physical model of the study area along the California coast. With the Russian River estuary as a case study, these results will be combined with a fine-scale sea level rise model inclusive of high-resolution elevation data, erosivity predicated on sediment type, local management action, and wave action data accounting for variability in storm surge. These results will be combined with a quantitative habitat comparison and fine-scale species distribution model. Our analyses fill an important knowledge gap, contributing to understanding the physical influence of climate change and the implications of those habitat changes for an important coastal conditional indicator species.