MARINE HYDROKINETIC ENERGY ASSESSMENT: BALANCING EFFICIENCY AND ENVIRONMENTAL CONCERNS

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The development of offshore renewable energy projects is growing rapidly worldwide and wave energy is one of the largest resources being evaluated. Currently, there exists a wide range of wave energy converter (WEC) technologies. Different device types and different devices within a particular device archetype can have dissimilar power production capabilities depending on, for example, surface wave conditions. It has been shown that optimization of device type and array size and shape to wave resources is a critical component for reduction of the levelized cost of wave energy such that it becomes a viable resource. However, a WEC array optimized to harness the maximum available wave energy could feasibly number in the hundreds of individual devices per array and extend for miles along the coast. These WEC arrays have the potential to alter nearshore wave propagation and circulation patterns and hence, ecosystem processes. As the industry progresses from pilot- to commercial-scale, it is important to understand and quantify the effects of WEC arrays on the natural nearshore processes that support a local, healthy ecosystem. To help accelerate the realization of commercial-scale wave power, predictive modeling tools have been developed and utilized to assess WEC power output and simultaneously, evaluate the likelihood of environmental impact to habitats of particular concern. The primary objectives of this study are to develop and evaluate tools for quantitatively assessing different wave energy conversion array design strategies and assist developers with refining site deployment plans to optimize energy capture while minimizing environmental effects.

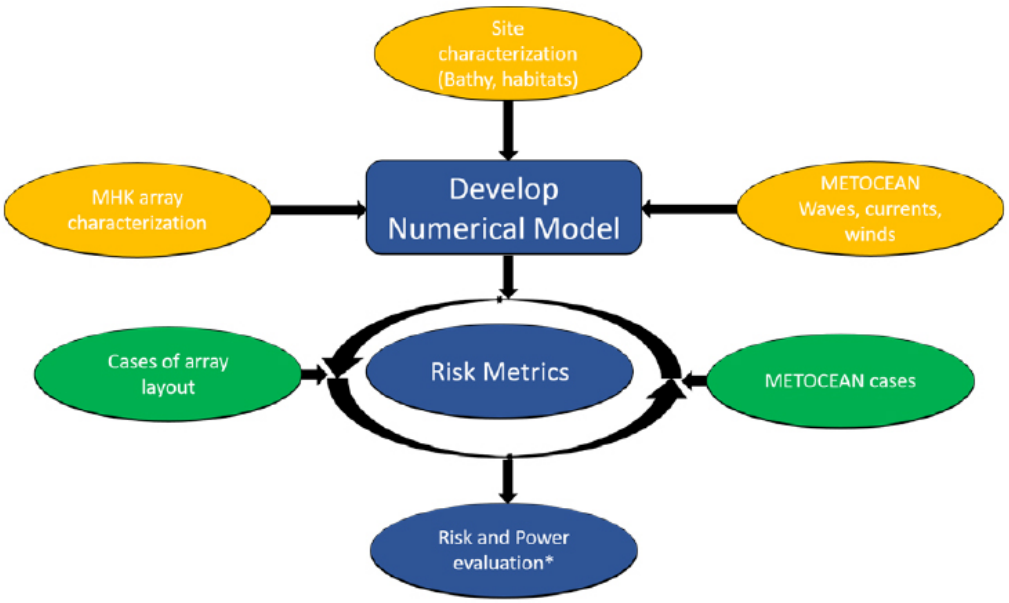

FIGURE 1. SPATIAL ENVIRONMENTAL ASSESSMENT TOOL (SEAT) MODELING AND EVALUATION.

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